SUSTAINOVATION WHITEBOOK 2024-2025

EuroCham SINGAPORE

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Sustainovation Whitebook 2024-2025

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2 Yishun Street 42, Singapore, 768039
T: (65) 6230 4230
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GOLD MEMBERS

INTRODUCTION

The European Chamber of Commerce (EuroCham) in Singapore is proud to present the Sustainovation Whitebook 2024.

EuroCham has consistently demonstrated its commitment to fostering sustainable business practices and innovation. This Whitebook stands as a testament to this dedication, encapsulating the shared vision and best practices of European companies alongside their Singaporean counterparts. It serves as a comprehensive guide, highlighting the concerted efforts and collaborative strategies necessary to address global sustainability challenges.

SUSTAINOVATION is an amalgamation of sustainability and innovation, representing a movement that propels sustainable innovation forward.

With the urgent global push for net-zero emissions by 2050, sustainability can no longer be a separate concept or trend. Businesses must now integrate sustainability into their core operations, making it a fundamental part of their innovations. The EU's Green Deal and Singapore's Green Plan present a unique chance to modernise economies and societies for climate neutrality. Companies can invest in research and innovation to accelerate transitions, test solutions, and involve both private and public sectors in pioneering ideas. It's crucial for innovation teams to fully embrace and integrate sustainability into their daily operations and mindset.

Bridging the gap between Europe and Singapore, the Whitebook fosters an exchange of ideas, solutions, and best practices. It is designed to inspire and guide both private and public sectors towards sustainable development. Far from being a mere collection of theoretical approaches, the Whitebook offers a practical roadmap for companies seeking to embed sustainability into their core operations and innovation strategies.

This Whitebook is part of EuroCham's Sustainovation Programme 2024, developed in collaboration with Accenture as the knowledge partner. The Sustainovation Programme focusses on five key pillars: Sustainovative Energy Efficiency, Sustainovative Value Chain, Sustainovative Transportation, Sustainovative Technology, and Financing for Impact. These pillars are supported by four main activities: Sharing session, Closed door dialogues, the Sustainability Awards 2024 and the publication of the Whitebook.

The first chapter of the Sustainovation Whitebook delves into key European regulatory frameworks: the Carbon Border Adjustment Mechanism (CBAM), the European Union's Regulation on Deforestation-Free Products (EUDR), the Corporate Sustainability Due Diligence Directive (CSDDD) and the Fit for 55 Initiative. These regulations are catalysts for transformation, driving businesses towards more responsible and sustainable practices. They also significantly impact businesses in third markets, including those in ASEAN, which must adapt to comply with these evolving standards.

In the second chapter, the Whitebook presents five Position Papers, each focussed on one of the pillars. These Position Papers are the result of extensive desk research, the expertise of our knowledge partners, and case studies from EuroCham's member companies, culminating in actionable recommendations.

The third chapter highlights European, ASEAN, and Global Excellence in Sustainability. This section showcases projects from EuroCham members that exemplify outstanding sustainable practices, providing real-world examples of successful sustainability initiatives.

The final chapters focus on the National Business Groups, our valued partners who have been integral to our journey. Their updates offer a broader perspective on the sustainability efforts within their member companies, demonstrating the collaborative spirit essential for achieving our sustainability goals.

The Sustainovation Whitebook is a cornerstone of EuroCham's advocacy work on sustainability. We hope it will spark further dialogues, discussions, and collaborations, facilitating the exchange of information and insights on this crucial subject.

MESSAGE

from Deputy Prime Minister and Minister for Trade and Industry, Republic of Singapore, Mr Gan Kim Yong

Climate change is an existential challenge, and the pursuit of sustainability has become a shared imperative for individuals, businesses, and governments alike. As we navigate the complexities of working towards a greener and climate-resilient future, it is crucial to champion and recognise the innovative efforts that drive sustainable practices forward.

International collaborations are important drivers of collective action. Governments need to come together to provide political leadership and policy direction for critical issues such as carbon pricing, mitigation efforts and the development of green growth sectors. I am glad that Singapore and the European Union (EU) share similar priorities in seeking to combat climate change, as demonstrated by our ongoing efforts on the Singapore Green Plan 2030 and the European Green Deal. It is important for countries to work together toward broad alignment of such policies across borders, to facilitate compliance while continuing to support trade and investment flows.

Digitalisation plays an important role in advancing sustainable economies. The integration of innovative technologies and sustainable practices will serve as a catalyst for future growth, particularly in areas such as renewable energy and smart cities. Industries and companies have an important role to play in developing and leveraging technologies to find greener solutions and advance our sustainability goals.

Singapore and the EU are important trade and investment partners to each other, anchored by the 2019 EU-Singapore Free Trade Agreement (EUSFTA) – the first FTA between the EU and an ASEAN country. Singapore is the EU's largest goods and services trading partner in Southeast Asia, while the EU is Singapore's fourth largest goods trading partner and second largest services trading partner globally. In terms of digitally deliverable services, the EU is Singapore's largest export market and second largest source for imports. The frameworks we have in place for digital cooperation, such as the EU-Singapore Digital Trade Agreement and the EU-Singapore Digital Partnership, provide a good basis for us to expand into emerging domains like the green economy. I look forward to continued partnership between Singapore and the EU on this front.

As we celebrate the remarkable strides made in sustainable practices and innovative technologies, it is evident that the convergence of these efforts holds the key to shaping a more sustainable world for our future generations. I congratulate EuroCham on its fifth year embracing the Sustainovation programme and Sustainability Awards Gala, and I thank all valued members and partners for your outstanding sustainability initiatives and for leading the way. Together, we can harness the spirit of innovation and excellence to create a lasting impact on the environment, economy, and society.

MESSAGE

from the European Union Ambassador to Singapore, Iwona Piórko

Sustainability is at the core of EU policies and EU-Singapore relations. In the context of our current climate-crisis and a rapid evolving global economic landscape, it is paramount to stay on track towards our climate-neutrality goals. We do this through international collaboration and partnerships with relevant stakeholders.

The EU's forward-looking and ambitious Green Deal paves the way towards a sustainable economy on the European continent. In July 2021, the European Climate Law entered into force setting the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

The objective of climate neutrality by 2050 means achieving net zero greenhouse gas emissions for the EU as a whole, mainly by cutting emissions, investing in green technologies and protecting the natural environment. The law aims to ensure that all EU policies contribute to this goal and that all sectors of the economy and society play their part.

To accomplish this, the EU has set out a number of initiatives and proposals in the fields of climate, energy, transport and taxation to make our economy circular, environmentally friendly and climate neutral.

As part of the EU's international engagement, we work closely with like-minded partners such as Singapore to tackle climate change and environmental challenges. Sustainability is strongly embedded in the EU-Singapore Free Trade Agreement (EUSFTA), which celebrates its fifth anniversary in November 2024.

More recently, the EU and Singapore held the 10th Senior Officials' Meeting in June 2024. Among other issues, we discussed cooperation in the fields of climate change and the environment in light of the Conferences of Parties on Climate Change (COP 29) and Biodiversity (COP 16) at the multilateral level. The EU and Singapore agreed on the urgency to address the multi-layered climate crisis through a holistic approach. This includes the interest and will to cooperate on climate action, in particular on carbon pricing as a pivotal tool to incentivise emission reduction, and on water management.

To reach the ambitious goal of a green economy, it is key that society as a whole plays its part. I particularly welcome the efforts of EuroCham Singapore to keep sustainability at the heart of its programmes and activities and applaud the green initiatives by several European companies, big and small, to implement green business models and invest in sustainable supply chains.

This third edition of the Sustainability Whitebook 2024-2025, with its focus on innovation, showcases the leading role and commitment of European companies in Singapore to participate in the green economy and invest in innovative green technologies.

My heartfelt congratulations to the EuroCham Singapore team for another successful Whitebook and your contribution to 'sustainovate' for a greener tomorrow.

MESSAGE

from the President of EuroCham, Jens Rübbert

It is my honour to introduce the 2024 edition of EuroCham's Sustainovation Whitebook.

EuroCham's sustainability programme continues to evolve, responding to significant shifts in the global sustainability landscape, with stringent regulations now backing the adoption of sustainable practices.

The European Union (EU) is at the forefront of this transformation, implementing robust measures to achieve its ambitious climate goals.

Notably, the EU has introduced the Carbon Border Adjustment Mechanism (CBAM), which imposes a tax on certain carbon-intensive imports, ensuring that foreign producers pay a price for greenhouse gas emissions comparable to what EU producers pay under the EU's Emissions Trading Scheme (ETS).

Furthermore, the Corporate Sustainability Due Diligence Directive (CSDDD), effective since the end of May 2024, establishes a regulatory framework compelling large companies with significant activities in the EU to demonstrate their strategies and achievements in protecting human rights and the environment.

The European Union Deforestation Regulation (EUDR), approved by the European Parliament in 2022 and set to be implemented on December 30, 2024, represents a significant legislative step towards tackling global deforestation and forest degradation.

You will find detailed discussions on these initiatives in the following pages.

Similarly, Singapore is making strides with its SG Green Plan 2030, structured around five pillars: City in Nature, Energy Reset, Green Economy, Resilient Future, and Sustainable Living. Singapore has set ambitious targets, such as the '80-80-80 in 2030' green building initiatives, vehicles running on cleaner energy by 2040, and Singapore becoming a Zero Waste Nation with a Circular Economy. All these regulations and frameworks are set to have profound impacts on businesses.

EuroCham has always been a link between European businesses and the Singapore government, playing a crucial role in creating platforms where companies can understand the evolving landscapes from experts and relevant authorities.

By facilitating knowledge sharing and industry insights, businesses are supported in their journeys and value these dialogues as they chalk out their sustainability roadmaps.

This year, we have embraced the term "Sustainovation" to capture the fusion of sustainability and innovation for our sustainability programme. We believe that EuroCham's Sustainovation Programme 2024 encompasses the following five pillars: Sustainovative Energy Efficiency, Sustainovative Value Chain, Sustainovative Transportation, Sustainovative Technology, and Financing for Impact.

EuroCham has orchestrated numerous talks and panel discussions around these pillars in 2024.

Our Sustainability Awards Gala 2024, now in its fifth year, is a grand finale to our Sustainovation Programme, recognising the outstanding sustainability initiatives of organisations, by honouring those who lead the way.

Further, it will be interesting to witness what lies ahead in 2025 as companies embrace regulations that have begun to come into effect, with innovation teams pivoting to sustainable ways of manufacturing products through cleaner methods.

This year has been truly fulfilling with significant achievements through our collaborative efforts. None of this would be possible without the invaluable support of our key stakeholder, the European Union Delegation to Singapore, and the Ambassador, alongside other significant contributors including the Singapore government, the National Business Groups, EuroCham members, and all our strategic partners.

A special thank you goes to our knowledge partner, Accenture, for their steadfast support over the past five years, driving our sustainability programme forward. We also extend our gratitude to the sponsors of the EuroCham Sustainability Awards Gala 2024 for their generous contributions.

We remain deeply appreciative of our Diamond Members—Accenture, Airbus, BNP Paribas, SAP, XCL World Academy, and XCL American Academy—as well as our Gold Members. Their partnership is instrumental in achieving the milestones we celebrate today.

Thank you for your continued support. Together, we look forward to embracing Sustainovation and working together to build a sustainable and prosperous future for all.

MESSAGE

from the Executive Director of EuroCham, Nele Cornelis

I am proud to reflect on the tremendous growth we have experienced at EuroCham. We have expanded not only in knowledge, memberships, and partnerships but also in the strength and diversity of our team.

Diversity is our strength, with memberships across various industries and companies with origins in a wide range of countries. You will find this within our team members as well with staff hailing from a range of countries in Europe and Southeast Asia.

In 2024, we have provided our members with numerous opportunities through the various events we have organised. EuroCham has held more than 50 public events, including panel discussions, roundtables, sharing sessions, closed-door discussions, and innovation tours, keeping members updated on sustainability matters. Our members have had the chance to attend, share, and lead discussions. We have also arranged special events at the request of members who wish to explore collaboration opportunities in areas of sustainability and learn more about topics affecting their business.

Our engagement with members has been constant and dynamic this year. Besides our internal efforts, we have supported significant partner events such as the WWF Earth Hour Summit 2024, Greening ASEAN: Initiatives & Leadership (GAIL) 2024 Sustainability Forum, Net Zero Energy Transition, DZ BANK Day on Sustainable Transition, the UN Global Compact Network Singapore Apex Corporate Sustainability Awards, and an European Business Organisation Worldwide Network (EBOWN) powered event on EU's Carbon Border Adjustment Mechanism (CBAM) and its impact on the private sector in ASEAN.

We have also partnered with our supporting National Business Groups for events they have organised, such as Exploring a Dynamic Landscape of Carbon Credits with SwissCham and The Winning Futures Sustainathon – Empowering Change Together with DutchCham.

As a bridge between the EU and Singapore, we have organised dialogues that facilitate information exchange between the EU and Singapore. Events such as the European Union Election Briefing – What is at Stake for the EU & the EU-ASEAN relations?, Impact and Significance of the EU CBAM on Businesses in Singapore and Southeast Asia with DG TAXUD, and the EU-Singapore Dialogue Facilitating Green and Sustainable Investments in Southeast Asia via the Global Gateway, are examples of our efforts in this regard.

Sustainability has been a key focus across our 12 committees and programmes, with nearly 30 meetings held. Members have actively engaged, participating in site visits like Ravago's Manufacturing Plant and DHL's Innovation Hub. There's a clear and growing interest in sustainability among our members, reflecting its increasing importance for business success.

Our flagship initiative, the Sustainovation programme, exemplifies our commitment to sustainability. With its five critical pillars—Sustainovation Energy Efficiency, Sustainovation Value Chain, Sustainovation Transportation, Sustainovation Technology, and Financing for Impact—the programme provides a comprehensive framework guiding our members toward sustainable development. This effort culminated in our flagship event, the EuroCham Sustainability Award Gala 2024, now in its fifth year and with our knowledge partner Accenture, featuring award categories aligned with our five programme pillars.

I would like to highlight the 'Sustainovative Technology' pillar, which addresses the dual approach of integrating technology to achieve sustainability and advancing technology for sustainability. Recognising the intersection of artificial intelligence (AI) and sustainability, we have organised joint panel discussions under both our AI and sustainability programmes, focussed on green software. These discussions have offered valuable insights into how AI can drive sustainable practices and innovation, illustrating the synergy between these two crucial areas.

Within this book, you will find five position papers, each offering in-depth insights into the five pillars we have chosen. I am confident that this Whitebook will serve as a valuable resource for fostering continued dialogue and helping us to collectively build a more sustainable and prosperous future as we soon enter 2025.

I am deeply grateful to our valued members, strategic partners, National Business Groups, the government of Singapore and all ministries, our EBO network, and the EU Commission in Singapore and Brussels for their unwavering interest, support, and faith in EuroCham's mission and vision. Most importantly, I thank the EuroCham team members for their dedication, hard work, and commitment to advancing our objectives and fostering strong relationships within our members and stakeholders.

ABOUT EuroCham SINGAPORE

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 government circles.

OUR NETWORK

EuroCham offers you access to an extensive networking pool, including bilateral National Business Groups, the Singaporean government, the local business community, the diplomatic circle, and key partners across ASEAN.

We host a wide range of events such as closed-door discussions with the Singapore government, prestigious gala dinners, and flagship events like the Europe Business Summit and the Sustainability Awards Gala Dinner. These events are attended by both the local and European business communities, the diplomatic circle, and key partners across ASEAN. Additionally, our year-round panel discussions with expert speakers provide opportunities to connect with business partners from various industries.

We invite you to participate, enhancing your company's corporate visibility.

OUR COMMITTEES

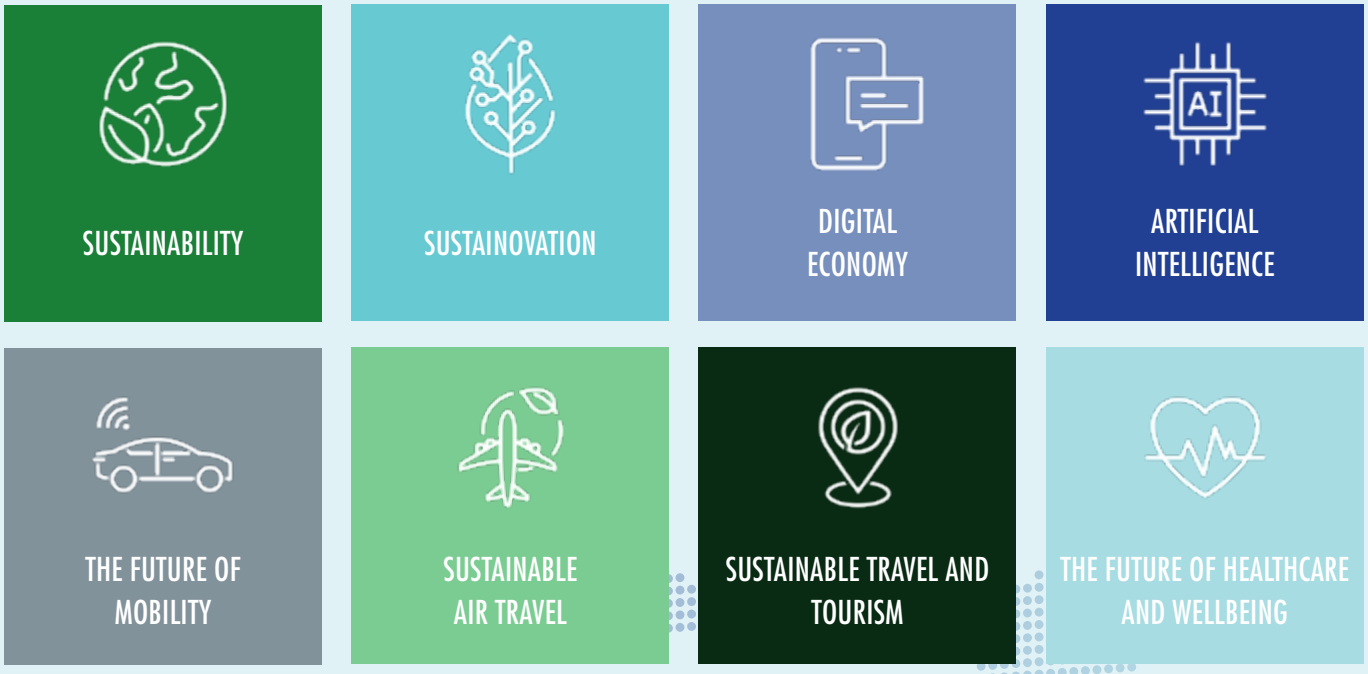
Our committees offer a unified European platform to exchange information, discuss common business challenges, and launch coordinated initiatives. Through our 12 committees, we conduct advocacy work and publish position papers to present our recommendations.

- AEROSPACE & AIR TRAVEL
- CIRCULAR ECONOMY
- DIGITAL ECONOMY
- EDUCATION & ACADEMIC
- FINANCIAL SERVICES
- HEALTHCARE
- HUMAN DEVELOPMENT
- INTELLECTUAL PROPERTY RIGHTS
- SMART MOBILITY
- SUPPLY CHAIN
- SUSTAINABILITY
- WINE & SPIRITS

OUR PROGRAMMES

When topics and trends become a common focus among our members and stakeholders, including the European Union and the Singaporean ecosystem, EuroCham elevates these topics into dedicated 'programmes'. These programmes provide an opportunity to delve into areas such as sustainability, innovation, and digitalisation. With a matrix of carefully chosen focus pillars and a robust schedule of events, sharing sessions, dialogues, and publications, EuroCham aims to create a supportive business environment that fosters growth and success for its member companies, contributing to economic prosperity and enhancing competitiveness.

The programmes are aligned with our committees, and most are supported by members who act as Knowledge Partners, offering their expertise to enrich the content. The Sustainability programme is EuroCham's annual flagship initiative. It features an annual review of five focus pillars, a comprehensive schedule of activities and events throughout the year to share knowledge, a prestigious Sustainability Awards and Gala, and every two years, the publication of the Sustainability Whitebook. This Whitebook includes position papers and articles highlighting the sustainability excellence of our members, primarily European companies.



THE EUROCHAM SUSTAINABILITY AWARDS 2023, A GRAND EVENING OF SUSTAINABILITY RECOGNITION

UNFOLDED AT THE CAPELLA SINGAPORE ON NOVEMBER 2, 2023

Deputy Prime Minister and Coordinating Minister for Economic Policies, Mr Heng Swee Keat, graced the event as the Guest of Honour, accompanied by distinguished guests such as Her Excellency Iwona Piórko, Ambassador of the European Union to Singapore, and Jens Rübbert, President of the European Chamber of Commerce, Singapore.

A panel of sustainability experts evaluated 34 nominations in categories aligning with the strategic goals of both the European Union (EU) Commission's European Green Deal and Singapore's Green Plan 2030. The winners in each category were:

- ESG Communications - Standard Chartered
- ESG Investments - Nanyang Technological University Singapore
- Sustainable Business Innovation - Delivery Hero (Singapore) foodpanda
- Social Sustainability - BASF South East Asia Pte Ltd
- Sustainable Transportation & Logistics - DHL Express Singapore Pte Ltd

A special shoutout went to the Swedish Chamber of Commerce in Singapore for the inaugural Green Initiative of the Year Award.

Alongside the presentation of awards, EuroCham Singapore and WWF-Singapore sealed their commitment to deepening collaboration in the areas of sustainability, conservation and sustainable finance by signing a Memorandum of Understanding.

In attendance, at this event, were also Ambassadors of EU Member States, representatives from various European Embassies and National Business Groups that represented the following countries - Belgium, Czech Republic, Denmark, Estonia, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spanish, Sweden, and Switzerland.

This event was made possible by the generous support of industry leaders, including Accenture, Airbus, ING, Ravago Manufacturing, Rothman & Roman Group, Lufthansa Group, German European School Singapore (GESS), International French School (Singapore), and Mercedes-Benz Singapore.

From left to right:

***Evelyn Tay**, Vice President, Communications and Public Affairs (APAC), foodpanda; **Fiona Tan**, Head of Public Affairs, foodpanda; **Lloyd Lowe**, Senior Regional Manager, BASF; **Lisa Ferraton**, General Manager, Swedish Chamber of Commerce; **Magnus Gustavsson**, Treasurer, Swedish Chamber of Commerce; **Heng Swee Keat**, Deputy Prime Minister and Coordinating Minister for Economic Policies; **Jens Rübbert**, President, European Chamber of Commerce, Singapore; **Tanja Petrovic**, Managing Director, Standard Chartered Bank; **Jaclyn Dove**, Managing Director, Standard Chartered Bank; **Aik Na Tan**, Senior Vice President, Administration, Nanyang Technological University Singapore; **Christopher Ong**, Managing Director, DHL Express Singapore*

GUEST JUDGES SUSTAINABILITY AWARDS 2023

Valentín de Miguel
Chief Strategy Officer, Accenture in Growth Markets

Su-Yen Wong
Chairperson, Singapore Institute of Directors

Dr S. Viswanathan
Professor of Operations & Corporate Sustainability, Nanyang Business School, Nanyang Technological University (NTU)

Prof Yeoh Lean Weng
Chief Sustainability Officer, A*STAR

Isabella Huang-Loh
Chairman, Singapore Environment Council

Jens Rübbert
President of European Chamber of Commerce, Singapore I Managing Director & Regional Head for Asia/Pacific of LBBW

CAN 'GLOCALISATION' LEAD TO A MORE SUSTAINABLE AND EQUITABLE WORLD?

BY ROLAND BUSCH, PRESIDENT & CEO, SIEMENS AG

Globalisation is at a crossroads. While it has raised millions out of poverty and boosted global trade, it came at a cost to our climate, our environment, our resilience and our communities. The pandemic and recent wars have prompted governments to rethink what is critical for the success of their economies. And businesses to rethink their value chains.

How can we seize this moment to build something better? And reshape the global economy to be more equitable and sustainable.

STILL CONNECTED, BUT CLOSER TO HOME

A better balance between global and local, so-called glocalisation, would offer the best of both worlds. Connecting to the global economy stimulates competition and innovation and gives access to other markets. Producing close to customers spreads prosperity and creates more resilient and sustainable economies. So how can we make this happen?

We can start by using technology innovations to get closer to end markets. For example, sports shoes have been made in the Far East for years. Chamatex Group is bringing sneaker manufacturing to France with its Advanced Shoe Factory 4.0. Using technologies such as digital twins and autonomous robots, they can flexibly manufacture different shoes for different brands. It's a model for affordable, low-carbon, agile production and can be deployed across other consumer goods, even food.

In the next 25 years, the earth will need to feed 10 billion people. Through vertical farming, 80 Acres Farms is aiming to grow 300 times more food than an ordinary farm, using less land, less water and being closer to cities. And we're supporting them with automation and digitalisation technologies to optimise and scale their solution.

Decarbonising our energy systems would have an even bigger impact. Just 20 years ago, the German town of Wunsiedel was struggling. Businesses were closing and jobs were scarce. But Marco Krasser, head of the local utility, envisioned an energy industry that would revive his town's fortunes. And we helped him to realise it. As a result, Wunsiedel has built a reliable, green energy supply and a thriving future by harnessing solar and wind power with a microgrid, battery storage and a green hydrogen plant.

MAKING NEW PRODUCTS FROM OLD ONES

However, we need to use our planet's resources wisely to secure everyone's future. Today, less than 9% of natural resources are recycled.

With digital twins, we can design things better so they don't end in landfills – as we did with our Mireo trains, which are 95% recyclable. With 3D printing, we can manufacture goods faster with less waste. And with the help of technology, we can recycle more.

Swedish battery developer Northvolt intends to do just that. Its new gigafactory in Sweden will make the world's greenest batteries. Its Chief Digitalization Officer, Mikael Söderberg, told us about their plans. By 2030, half of their raw materials should come from old batteries. And we're helping them to achieve this through state-of-the-art technologies.

THE INDUSTRIAL METAVERSE IS COMING

All of the examples mentioned were only possible with technology, with combining hardware and software, the real and the digital worlds.

More and more, these two worlds are converging. That's why I believe the defining technology of the next 20 years will be the industrial metaverse. An always-on, immersive world seamlessly connected to the real world. People can gather there to build things or solve problems as if they were physically there together.

No matter the factory's location, experts can analyse any issues impacting its operations in a physics-based, photo-realistic virtual reality. They can try out solutions using simulation. They can even travel back in time to find out what caused the problem.

ANTICIPATING AGEING SOCIETIES

For ageing societies facing future labour shortages, this notion will be key.

We can prepare for such a future. Take our work with Mercedes-Benz. It plans to make production more efficient and sustainable. Their Berlin factory is part of this transformation. Now a digital hub for new technologies, it's also a place for learning. Here, employees can use technologies such as augmented reality and simulation to acquire new skills.

Glocalisation offers a chance to restore the trust of local communities in the global economy. It can provide a pathway to a more sustainable world. Globalisation isn't going away – it's changing. And I'm convinced this brings new opportunities to shape it into something better.

EU REGULATIONS

EU'S CARBON BORDER ADJUSTMENT MECHANISM (CBAM)

CONTENTS

UNDERSTANDING THE EU'S CBAM INITIATIVE

The European Union (EU) has been tightening its measures to meet climate goals, while other countries have been slower to act. To address this gap, the EU introduced the Carbon Border Adjustment Mechanism (CBAM), designed to fairly price the carbon emissions from carbon-intensive goods entering the EU and encourage cleaner industrial production outside the EU. CBAM will be fully implemented in 2026, following a transitional phase from 2023 to 2025. This gradual introduction of the CBAM is aligned with the phase-out of the allocation of free allowances under the EU Emissions Trading System (ETS) to support the decarbonisation of EU industry.

Starting in 2026, under the CBAM definitive regime, EU importers of covered goods will need to register with national authorities and purchase CBAM certificates, with prices based on the weekly average auction price of EU ETS allowances, measured in €/tonne of CO_2 emitted. Importers will also be required to declare the carbon emissions embedded in their imports and surrender the corresponding number of certificates each year. However, if they can prove that a carbon price has already been paid during the production of the imported goods, they can deduct that amount from the certificates they need to submit.[1]

On 1 October 2023, the CBAM began its transitional phase, with the first reporting period for importers ending on 31 January 2024. This gradual introduction provides a smooth, predictable transition for both EU and non-EU businesses, as well as public authorities.[2]

Initially, CBAM will cover imports of carbon-intensive goods at high risk of carbon leakage, such as cement, iron and steel, aluminium, fertilisers, electricity, and hydrogen. Once fully implemented, it will capture over 50% of emissions from sectors covered by the EU Emissions Trading System (ETS).[3]

THE ENVIRONMENTAL OBJECTIVE OF CBAM

The Carbon Border Adjustment Mechanism (CBAM) is designed primarily to address carbon leakage, ensuring that companies do not move production to countries with less stringent climate policies to avoid the EU's carbon regulations. Its objectives include promoting fair competition between EU and non-EU businesses and supporting the EU's goal of achieving climate neutrality by 2050. By imposing a carbon price on specific energy-intensive imports, CBAM incentivises foreign producers to adopt cleaner industrial practices. Importantly, CBAM is applied to companies, not countries, ensuring that products entering the EU are subject to the same environmental standards as those produced within the EU. The mechanism also complements the EU's Emissions Trading System (ETS) by aligning carbon costs for both domestic and foreign producers, promoting global efforts toward climate change mitigation.[4]

Although the EU's ETS effectively addresses carbon leakage by distributing free carbon emission allowances to producers of carbon-intensive goods, its efficiency in promoting advancements in production technologies or investments in green production remains indirect and constrained. The CBAM aims to complement these ef-

1 https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en
2 https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en
3 https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en
4 https://taxation-customs.ec.europa.eu/system/files/2023-11/CBAM%20Frequently%20Asked%20Questions_November%202023.pdf?trk=article-ssr-frontend-pulse_x-social-details_comments-action_comment-text

forts by serving as a direct environmental tool. By aligning the costs of carbon emissions between domestic producers and foreign competitors, CBAM incentivises global partners to adopt comparable environmental standards. This approach not only mitigates carbon leakage but also encourages international trade to become more environmentally sustainable.[5]

Countries outside the EU that export goods subject to CBAM engage in discussions with the EU to understand its implications on their exports and trade relations. These conversations often lead to adjustments in their climate policies on carbon pricing mechanisms to remain competitive. Producers in countries with emission trading schemes or other direct carbon levies can deduct these costs from their CBAM obligations. This also means if a country has a domestic carbon price that matches the EU's, its products are exempt from CBAM.

CBAM not only addresses immediate concerns like carbon leakage but also enhances global cooperation in achieving climate objectives by promoting greener practices and equitable trade policies worldwide.

THE SECTORS IN THE SCOPE OF CBAM

The CBAM will initially impact imports from non-EU countries that are notably carbon-intensive. This includes specified goods from sectors such as cement, electricity, fertilisers, aluminum, iron, steel, and hydrogen. The impacted sectors were selected based on three criteria: a high risk of carbon leakage, covering more than 45% of CO_2 emissions from ETS sectors, and practical feasibility.[6]

During the transitional period, direct emissions (scope 1) are counted for steel, iron, aluminium, electricity, and hydrogen, though for cement and fertiliser, indirect emissions (scope 2) are also counted. The impact of scope 2 obligations is determined by the carbon intensity of the national/regional grid, and can be mitigated through power purchase agreements with renewable energy producers.

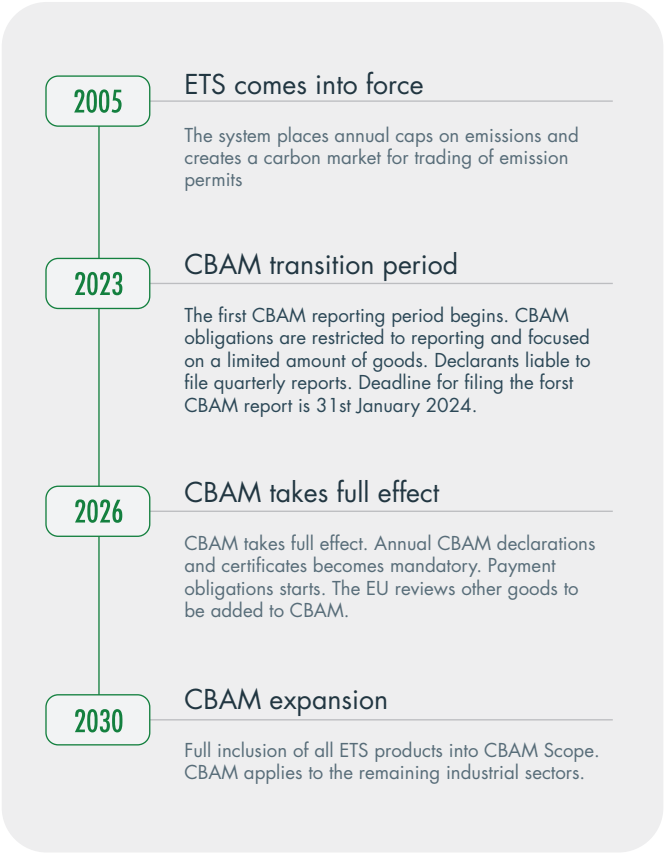
The EU is planning to assess and potentially expand coverage of the CBAM by 2030, aiming to include over half of emissions in the EU ETS sectors by the full phase-in of CBAM in 2034.[7]

CBAM TRANSITIONAL PHASES & TIMELINE

The implementation of CBAM is divided into two phases: the transitional phase, spanning from 2023 to 2025, and the definitive regime, which begins in 2026. CBAM entered into application in its transitional phase on 1 October 2023. The goal of this period is to pilot and learn from the process, gathering valuable information on embedded emissions to refine methodologies for the definitive regime.

- On 16 May 2023, regulations for revising the European Union Emission Trading System (EU ETS) and the new EU Carbon Border Adjustment Mechanism (CBAM) were published in the Official Journal of the European Union.
- A transitional period will apply for EU CBAM from 1 October 2023 to 31 December 2025, with solely quarterly reporting obligations; from 2026 onward, purchasing CBAM certificates will be required.
- The EU ETS will be extended in the aviation and maritime sectors; new ETS II will cover fuels for transportation and heating.
- Free allowances under the EU ETS will be phased out starting in 2026.
- Businesses (EU and non-EU) are advised to assess the potential impact and prepare for new CBAM reporting obligations starting later this year.[8]

Figure: CBAM Timeline[9]



- On the 2nd of October 2024 it was announced that the European Commission will propose a delay of CBAM by 12 months under pressure from commodity-producing countries and industries. The EU Deforestation Regulation (EUDR), orig-

5 https://taxation-customs.ec.europa.eu/system/files/2023-11/CBAM%20Frequently%20Asked%20Questions_November%202023.pdf?trk=article-ssr-frontend-pulse_x-social-details_comments-action_comment-text
6 https://www.eeas.europa.eu/sites/default/files/documents/2023/Carbon%20Border%20Adjustment%20Mechanism.pdf
7 https://www.pwc.com/gx/en/services/tax/esg-tax/cbam-supply-chain-imperatives.html#:~:text=The%20CBAM%20currently%20covers%20the,in%20of%20CBAM%20in%202034.
8 https://globaltaxnews.ey.com/news/2023-0925-final-regulations-published-for-new-eu-carbon-border-adjustment-mechanism-cbam-and-eu-emission-trading-system-revisions-cbam-transition-period-begins-1-october-2023
9 https://www.anthesisgroup.com/regulations-hub/carbon-border-adjustment-mechanism/#:~:text=CBAM%20Timeline%20%26%20Transition%20Phase&text=The%20inaugural%20report%20submission%20is,the%20fourth%20quarter%20of%202025.

inally set for December 30, will now need approval from the European Parliament and member states. Concerns over penalising small farmers and disrupting trade have been raised by countries like Brazil and Indonesia, along with industry fears about supply disruptions and inflation.

THE ACTORS IN CBAM

The implementation of the CBAM involves several key actors, each playing a critical role in its execution and impact.

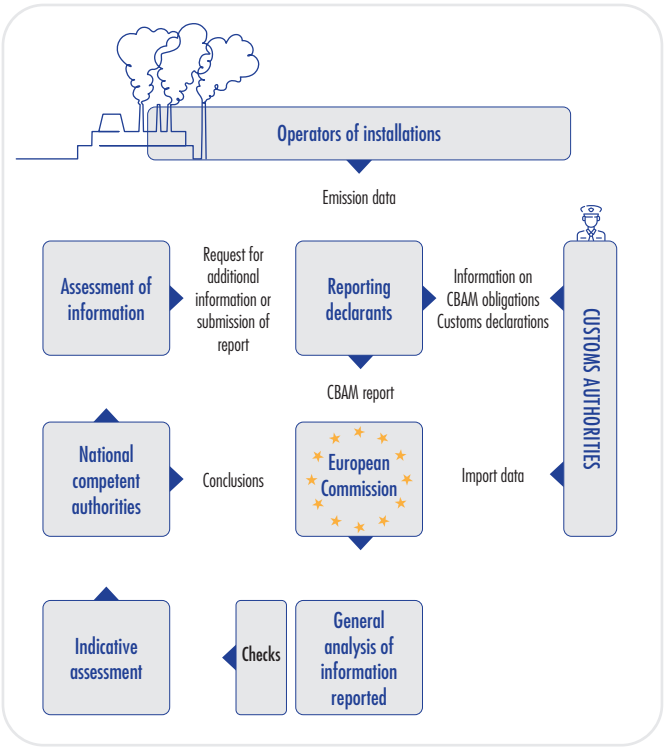
The **European Commission** overseas CBAM's overall design, implementation, and management at the EU level. It sets rules, calculates carbon benchmarks, and issues CBAM certificates, ensuring compliance and effectiveness.

EU Member States designate **National Competent Authorities (NCAs)** responsible for overseeing CBAM within their territories. NCAs manage registration, reporting, and verification processes for CBAM certificates submitted by declarants or importers.

Declarants or importers are entities responsible for importing goods into the EU covered by CBAM. They register with NCAs, submit quarterly reports detailing embedded emissions and import quantities, and offset their imports' carbon footprint by purchasing and surrendering CBAM certificates.

Independent verification bodies verify data accuracy and completeness in declarants' or importers' reports. They validate the carbon content of imported goods, ensuring adherence to CBAM requirements and standards.

Figure: Actors in CBAM[10]



FOUR STEPS FOR CBAM REPORTING

Step 1: Carbon impact assessment

The first step is to ascertain which products fall under the CBAM. This involves gauging the carbon content embedded in imports, which is determined by the greenhouse gases (GHG) released during their production.

Step 2: Pricing the CBAM

Every emission tied to the stipulated products will have an associated carbon price. This is derived from the weekly average auctioning price of EU ETS allowances, expressed in € per tonne of CO_2 emitted.

Step 3: Emissions and the role of CBAM certificates

Importers, either directly or through representatives, must register with national authorities and then purchase CBAM certificates. These certificates are crucial as they not only validate the import of goods regulated under CBAM but also confirm that the associated carbon emissions have been accounted for and compensated at the applicable carbon price. National authorities play a key role by managing the registration process, issuing certificates, and verifying the accuracy of declarations to ensure compliance with the regulation.

Step 4: Border adjustment

When goods are imported, their carbon pricing is validated. Based on the pre-bought CBAM certificates, the appropriate carbon tax is then applied.[11]

CBAM Certificates and the Link with the EU Emissions Trading Scheme (ETS)

CBAM and EU ETS are both designed to reduce carbon emissions, however they address different purposes. While EU ETS put a price on carbon emissions within the EU by creating a market for emissions allowances, the CBAM aims to standardise the carbon cost burden across imported goods. By giving a price to selected imports, CBAM ensures parity in carbon expenses between domestic and imported products.

Under the CBAM, EU importers are indeed required to acquire CBAM certificates, with each certificate corresponding to one tonne of greenhouse gas emissions associated with the imported CBAM goods. Therefore, the quantity of CBAM certificates must match the total emissions embedded in the imported CBAM goods. Additionally, the price of these certificates will be determined by the average trading price of EU ETS allowances from the week preceding the import.

10 https://customs-taxation.learning.europa.eu/pluginfile.php/32843/mod_resource/content/1/CBAM_Webinar_Transitional%20Registry.pdf
11 https://plana.earth/policy/cbam

THE MEANING OF THE CBAM FOR ASEAN ECONOMIES

While the initial implementation of CBAM may disrupt trade dynamics between the EU and its ASEAN partners, causing varying impacts across the region, over time CBAM holds promise to significantly drive decarbonisation efforts within ASEAN's industrial sectors. While some ASEAN countries face the repercussions of CBAM, none significantly rely on CBAM-affected exports for their global Gross Domestic Product (GDP), this is because their exports are diversified and not uniquely dependent on the EU market.

However, CBAM implementation faces challenges due to disparities in carbon pricing mechanisms across ASEAN countries and its perception in the region. The development of carbon pricing mechanisms in ASEAN is predominantly driven by individual countries rather than through a coordinated regional approach like the EU's CBAM. This regional variation necessitates a thorough regional understanding for effective CBAM implementation.

Thus, when it comes to carbon pricing, countries can be grouped into three, the first category countries where pricing instruments are fully implemented, countries where pricing is planned or under consideration, and countries where pricing mechanisms are not considered or are still not a priority in financing climate mitigation. Due to the various stages of engagement with carbon pricing policies across ASEAN, it may take longer to adjust and comply with CBAM.

THE IMPACT OF CBAM ON ASEAN EXPORTERS

The impact of CBAM on ASEAN exporters varies significantly at different levels. At the national level, the direct effects of CBAM appear minimal. For instance, in 2022, trade covered by CBAM products accounted for 0.9% of Vietnam's GDP, 0.17% in Indonesia, 0.35% in Malaysia, and 0.97% in Thailand.[12] However, the impact of CBAM is expected to be more pronounced at the company and industry-specific levels.

The CBAM Exposure Index, is a tool developed by the World Bank Group, which helps identify the potential impact of CBAM on different countries and sectors. This index is designed to compare how CBAM affects countries based on criteria such as carbon emissions intensity and the volume of CBAM-covered exports to the EU. While the CBAM Exposure Index focusses on the absolute measure of exposure of sectors and countries to CBAM-related impacts, the Relative CBAM Exposure Index compares this exposure against a reference point. This comparative approach helps identify countries with an excess of carbon emissions to the EU average. A negative index value indicates relatively clean exports, therefore competitive in the EU market.

When analysing the Relative CBAM Exposure Index in the ASEAN region, one may notice that while Vietnam, Thailand, Singapore, and the Philippines present a negative index, indicating relatively clean exports and competitiveness in the EU market, countries like Indonesia and Malaysia have a positive index. This positive index suggests these countries have a higher carbon intensity in their exports compared to the EU average, potentially impacting their competitiveness in the European market. Therefore, as suggested by the map, the regional impact of CBAM is limited.

However, the impact of CBAM becomes significantly pronounced when analysed by sector and specific products such as Iron and Steel, Cement, and Aluminium.

In the iron and steel sector the following Southeast Asian countries are impacted by CBAM: Vietnam (0.88)[13], Indonesia (0.44), Thailand (0.28), and the Philippines (0.31). Similarly, in the cement industry, Malaysia (8.80)[14] and Vietnam (8.56) emerge as the most impacted countries within ASEAN and even globally. In the aluminum industry, Indonesia (0.69)[15] stands out with a notable regional and also global impact from CBAM.

OPPORTUNITIES AND CHALLENGES FOR BUSINESSES IN ASEAN

The impact of CBAM on ASEAN exporters highlights the growing importance of environmental sustainability in international trade. While the immediate economic effects at the national level appear modest, industries like iron and steel, cement, and others with high CO_2 emissions intensities face significant challenges under CBAM regulations. These sectors may need to adopt cleaner technologies and practices to comply with rigorous environmental standards.

For ASEAN businesses, this shift presents both challenges and opportunities.

On one hand, complying with CBAM regulations may impose significant administrative burdens. Businesses will need to navigate complex reporting requirements and possibly undergo audits to verify the carbon intensity of their exports. This could require substantial investments in monitoring systems, data collection, and compliance expertise, adding to operational costs and potentially diverting resources from other business priorities.

On the other hand, implementing CBAM could lead to increased financial burdens for businesses and exporting countries. Apart from the direct cost of paying the carbon price on imported goods, there are significant upfront investments required to adapt to CBAM requirements. Businesses may need to invest in upgrading technology and infrastructure to reduce carbon emissions and meet EU standards. These investments can be substantial and may strain financial resources, particularly for smaller enterprises and developing countries. Moreover, the uncertainty surrounding future carbon prices and compliance costs under CBAM may hinder long-term planning and investment decisions, affecting economic stability and growth prospects.

12 Towards low carbon trade: is the ASEAN ready? The EU CBAM and impact on ASEAN trade, International Trade Centre. https://intracen.org/news-and-events/events/towards-low-carbon-trade-is-the-asean-region-ready
13 The CO_2 emissions intensity of exports index for the iron and steel industry ranges from 0 to 2.14.
14 The CO_2 emissions intensity of exports index for the iron and steel industry ranges from 1.52 to 14.05.
15 The CO_2 emissions intensity of exports index for the aluminum industry ranges from 0 to 1.02.

In addition to the potential administrative burden imposed by CBAM, concerns have been raised regarding its compliance with WTO rules. According to a publication by the World Economic Forum[16], CBAM could potentially violate World Trade Organization (WTO) fundamental principles such as the non-discrimination rule, which requires imported products from different WTO members to be treated equally. Additionally, there is concern about the national treatment rule, which stipulates that foreign products cannot be disadvantaged compared to domestic products. These issues highlight the importance of ensuring that CBAM implementation aligns with international trade regulations to avoid potential disputes and uphold fair trade practices globally.

However, amidst these challenges, there are significant opportunities for ASEAN businesses to innovate and streamline their operations. Companies that develop efficient carbon accounting systems and transparent reporting mechanisms can gain a competitive advantage. By demonstrating a strong commitment to sustainability and compliance with CBAM standards, these businesses can enhance their reputation and appeal to environmentally-conscious consumers and investors. This proactive approach not only ensures compliance but also positions ASEAN businesses at the forefront of sustainable practices, fostering long-term growth and resilience in the global market. Therefore, effectively managing the administrative burden of CBAM compliance will be crucial for ASEAN businesses to capitalise on the opportunities presented by this regulatory shift.

CONCLUSION

In conclusion, the implementation of the EU's CBAM will have at a certain extent an impact on ASEAN businesses, targeting sectors like cement, iron and steel, aluminum, fertilisers, and electricity. While CBAM presents challenges related to increased costs, trade impacts, and economic disparities, it also offers opportunities for sustainable growth and policy development. By strategically addressing these challenges, ASEAN businesses can leverage CBAM to drive sustainability and remain competitive in the global market.

CORPORATE PREPAREDNESS FOR CBAM

RESPONSE FROM AN ANONYMOUS MEMBER OF EUROCHAM

As a global chemical company headquartered in Europe we strongly support the goals of the Paris Climate Agreement and the EU Green Deal. As a company we aim to achieve net-zero GHG emissions by 2050 worldwide through new production technologies, circular economy projects and renewable energy initiatives.

The Carbon Border Adjustment Mechanism (CBAM) is intended as a policy tool designed to prevent carbon leakage and ensure a level playing field for European industries by imposing a carbon price on imports of certain goods. In its current design and implementation, we doubt that this target will be achieved via CBAM. From our perspective CBAM will increase production costs for companies in Europe given the parallel phase out of the EU ETS free certificates. At the same time there is still no carbon leakage mechanism defined to protect CBAM goods exported from the EU – putting the competitiveness of European companies further at risk. The reporting requirements of CBAM are immense (e.g. a CBAM report per product consists of about 200 data points), increasing the bureaucratic burden and furthermore costs for companies - as not only data has to be collected but also processes and IT systems have to be adapted. Another challenge is the data availability especially from 3rd party suppliers which often neither have the knowledge nor the resources to gather the required data. This can lead to sanctions for companies especially when the input of standard values is not allowed.

The planned CBAM revision in 2025 should be used to critically assess the impact of CBAM and define together with the industry a realistic way forward. We as a company committed to climate protection are willing to support.

RESPONSE FROM STX GROUP

STX Group is a global leader in trading environmental commodities and providing climate solutions. Their international team of specialists improves market liquidity by utilising a broad network that connects over 7,000 projects and counterparties worldwide.

Feedback from their clients, especially EU companies working with non-EU suppliers, indicates that the primary challenge with the CBAM is not financial but administrative and logistical. The paperwork and bureaucracy involved with CBAM often outweigh the financial costs, leading many companies to adapt their supply chains by choosing European suppliers instead.

According to STX, non-EU exporters, particularly from the Balkans, are less concerned about the requirement to prepare CBAM reports. Instead, their focus is on the slow implementation of domestic carbon pricing mechanisms in their home countries. These exporters are keen for local emissions trading systems (ETS) to be introduced, as this would exempt them from CBAM obligations.

RESPONSE FROM KPMG

KPMG is a global professional services firm offering Audit, Tax, and Advisory services to many of the world's largest organisations. With over 150 years of experience, KPMG is dedicated to driving positive change and promoting a sustainable future. Their services include climate change management, energy efficiency, and developing sustainable strategies. Internally, KPMG strives to reduce its environmental impact by embedding ESG principles in its operations through a multi-year investment programme, as outlined in its Impact Plan.

The EU's Carbon Border Adjustment Mechanism (CBAM) could have significant implications for ASEAN by linking market access to carbon intensity. It targets high-carbon goods such as cement, steel, and aluminium, key exports for Vietnam, Indonesia, and Thailand. Without adopting carbon pricing systems and decarbonisation strategies, ASEAN nations risk higher compliance costs and losing access to the EU market. However, CBAM could also drive decar-

16 When two global agendas collide: How the EU's climate change mechanism could fall afoul of international trade rules, World Economic Forum, July 2021. https://www.weforum.org/agenda/2021/07/how-the-eus-carbon-border-adjustment-mechanism-could-fall-afoul-of-wto-regulations/

bonisation across these industries, aligning them with low-carbon standards and helping them comply with EU regulations, which can boost global competitiveness. While the short-term impact of CBAM might be unclear, in the medium term, as CBAM becomes more entrenched, it could lead to higher costs for businesses, particularly as EU carbon prices rise. ASEAN countries will need to balance these risks by establishing carbon markets to avoid double taxation and supporting sustainable development.

Immediate action should focus on capacity-building for carbon accounting and reporting. Long-term strategies could include carbon pricing and investment in low-carbon technologies. ASEAN could also benefit from international financial support, such as the Just Energy Transition Partnership (JETP), which helps Indonesia and Vietnam transition to clean energy. These funds can aid in adopting low-carbon technologies, ensuring regional industries remain competitive. Foreign direct investment (FDI) will also be essential for financing green industrial practices. A major concern is the impact on SMEs, which may struggle without access to carbon markets or low-carbon support. Regional governments will need to assist SMEs in building capacity and provide financial aid for their low-carbon transitions. Companies adopting greener practices will gain a competitive edge, particularly in the EU, where demand for environmentally responsible products is increasing. ASEAN governments should encourage early alignment with EU standards to position their industries as leaders in sustainability.

In conclusion, although CBAM presents compliance challenges, it offers ASEAN an opportunity to speed up decarbonisation efforts. By implementing carbon pricing, investing in low-carbon technologies, and leveraging financial support, ASEAN can mitigate CBAM risks, boost competitiveness, and contribute to global climate goals. Public-private partnerships and regional collaboration will be crucial for successful integration and maintaining EU market access.

THE EU'S CORPORATE SUSTAINABILITY DUE DILIGENCE DIRECTIVE (CSDDD)

CONTENTS

INTRODUCTION

While international treaties and conventions on human rights primarily target states, emphasising their duty to protect these rights effectively, there has been an important shift over the past decade towards extending this responsibility to include corporations. Companies are now recognised alongside states to have a duty to respect human rights, leading to the adoption of due diligence practices to ensure these rights are upheld in business operations. Despite the introduction of voluntary guiding principles by the UN in 2011, there remains a significant need for binding legislation to prevent businesses from negatively impacting human rights. The EU's Corporate Sustainability Due Diligence Directive (CSDDD) has emerged as a crucial regulatory framework in this context, mandating that businesses within the EU adhere to strict human rights and environmental standards throughout their supply chains. This directive aims to hold companies accountable for their impacts on both people and the planet, ensuring that ethical practices are not just encouraged but enforced.

UNDERSTANDING THE EU'S CSDDD

On 25 July 2024, the Directive entered into force. The aim of this Directive is to foster sustainable and responsible corporate behaviour in companies' operations and across their global value chains. The new rules will ensure that companies in scope identify and address adverse human rights and environmental impacts of their actions inside and outside Europe.[1]

The CSDDD is part of a broader framework of EU regulations and directives and complements and interacts with several other key EU initiatives, including the Corporate Sustainability Reporting Directive (CSRD), the EU Taxonomy Regulation, and the Sustainable Finance Disclosure Regulation (SFDR).

The CSDDD focusses on operational due diligence and accountability, ensuring companies address human rights and environmental impacts within their supply chains. Meanwhile, the CSRD emphasises transparent reporting of sustainability practices. The EU Taxonomy Regulation provides a classification system for environmentally sustainable activities, guiding investment decisions. The SFDR ensures that financial market participants integrate sustainability into their investment strategies and disclosures. Together, these directives and regulations drive systemic change towards more sustainable business practices, greater transparency, and better-informed investment decisions, ultimately contributing to the EU's broader objectives of environmental protection, social responsibility, and sustainable economic growth.

CSDDD'S SCOPE

CSDDD applies to large EU limited liability companies and partnerships with more than 1,000 employees and a net turnover exceeding EUR 450 million worldwide. Additionally, the directive will cover large non-EU companies operating within the EU with a net turnover of over EUR 450 million generated within the EU.

While micro companies and SMEs are not directly covered by the proposed rules, the directive includes provisions to support and protect these smaller entities. These measures aim to facilitate compliance and minimise the burden on both large companies and their smaller business partners within the value chain, ensuring a balanced approach to sustainability and due diligence requirements.

1 https://commission.europa.eu/business-economy-euro/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en

Although the Directive originates from the EU, its impact will be felt globally, as companies operating within the EU must ensure compliance across their entire value chain, regardless of location.

Though, the final text of the CSDDD narrows the scope from the entire "value chain" to the "chain of activities." This includes the activities of upstream business partners involved in the production of goods or services and downstream business partners in charge of distribution, transport, or storage for the company. The disposal of products and downstream services activities are excluded. Business partners encompass direct partners with commercial agreements and indirect partners involved in related business operations.

THE OBLIGATIONS

Under the Corporate Sustainability Due Diligence Directive (CSDDD), large companies operating in the EU are required to actively identify and address adverse human rights and environmental impacts within their operations, subsidiaries, and throughout their global value chains. This obligation includes mitigating and preventing harm related to labor rights, environmental degradation, and other human rights concerns. Companies must also adopt transition plans for climate change mitigation, in line with the 2050 climate neutrality goals set out in the Paris Agreement.

The directive sets a gradual phase-in for application based on companies' size and turnover following this timeline after entry into force of the directive:

- 3 years for companies with more than 5 000 employees and €1 500 million in turnover
- 4 years for companies with more than 3 000 employees and €900 million in turnover
- 5 years for companies with more than 1 000 employees and €450 million in turnover[2]

Under the CSDDD, companies have several key obligations. These obligations require companies to identify, prevent, mitigate, and, where necessary, cease any adverse impacts related to their activities. This includes addressing potential and actual harms within their operations, subsidiaries, and throughout their value chains, both upstream and downstream.

Specifically, companies are tasked with implementing a due diligence process that involves continuous monitoring of risks to human rights and environmental standards. This process must include assessing potential adverse effects, taking appropriate measures to address identified risks, and evaluating the effectiveness of these actions. Furthermore, companies are required to integrate sustainability considerations into their corporate governance structures, ensuring that management and supervisory boards are involved in overseeing these efforts.

In addition to due diligence, the directive imposes climate-related obligations. Companies must develop and adopt transition plans aligned with the EU's 2050 climate neutrality goals, which include intermediate targets in accordance with the European Climate Law. These plans should outline how the company will mitigate its impact on climate change and work toward reducing greenhouse gas emissions across its operations and value chains.

The directive also establishes legal accountability for companies that fail to comply. Businesses can face civil liability if they do not effectively prevent or mitigate adverse impacts, and member states are required to set up national supervisory authorities to monitor compliance. Administrative sanctions, including fines, can be imposed on companies that violate these obligations.

This regulatory framework aims to ensure that large companies contribute to a sustainable economy, improving transparency, resilience, and trust across global value chains, while offering better protection for both people and the environment.

APPLICATION TO FINANCIAL INSTITUTIONS

The EU's Corporate Sustainability Due Diligence Directive (CSDDD) also applies to financial institutions, including banks, insurance companies, and asset managers. These entities are required to integrate human rights and environmental due diligence into their operations, covering both their own activities and, in some cases, their upstream supply chains. However, the downstream activities of financial institutions, such as the use of financial products or services by customers, are generally excluded from the scope.

Financial institutions must assess and address potential adverse human rights and environmental impacts that may arise from their lending, investment, and financial advisory services. They are also required to implement measures to prevent and mitigate these risks, such as adjusting investment practices or working with business partners to improve sustainability.[3]

DUE DILIGENCE STEPS

The due diligence process set out in the CSDDD covers the six steps defined by the OECD Due Diligence Guidance for Responsible Business Conduct:

1. integrating due diligence into policies and management systems,
2. identifying and assessing adverse human rights and environmental impacts,
3. preventing, ceasing or minimising actual and potential adverse human rights, and environmental impacts,
4. assessing the effectiveness of measures,
5. communicating,
6. providing remediation.[4]

2 https://kpmg.com/se/sv/home/nyheter-rapporter/2024/05/csddd-final-approval-by-council.html
3 https://finance.ec.europa.eu/document/download/c4e40e92-8633-4bda-97cf-0af13e70bc3f_en?filename=240807-faqs-corporate-sustainability-reporting_en.pdf
4 https://www.corporate-sustainability-due-diligence-directive.com/

First, companies must adopt a due diligence policy that clearly outlines their strategy for responsible business conduct. This policy should be integrated into corporate policies and updated annually.

Second, companies are required to identify potential adverse human rights and environmental impacts arising from their activities, including operations, subsidiaries, and business partnerships within the value chain.

Third, to prevent and mitigate these impacts, companies must develop and implement a prevention plan. This includes seeking contractual assurances from business partners and making necessary investments, particularly to support SMEs.

Fourth, companies must establish a complaints procedure, allowing affected parties and organisations to report actual or potential negative impacts.

Fifth, the effectiveness of due diligence measures must be monitored at least every 12 months or following significant changes in the company's operations.

Finally, companies are required to communicate pertinent due diligence information through their annual reports as mandated by the CSRD. Companies not covered by CSRD regulations must publish an annual statement on their website.

OVERSIGHT AND ENFORCEMENT

The oversight and enforcement of the CSDDD will be managed primarily by national supervisory authorities designated by each Member State. These authorities will have extensive powers, including the ability to demand information from companies, conduct investigations, and enforce remedial actions. In cases of non-compliance, the supervisory bodies will have the authority to instruct companies to rectify violations, order them to stop ongoing infringements, and prevent future occurrences. Penalties can include fines of up to 5% of a company's net worldwide annual turnover.

In addition, the supervisory authorities can implement interim measures in cases where there is an imminent threat of severe and irreversible damage. When deciding on penalties, the authorities will take into account the company's due diligence efforts, such as investments made in mitigating risks, supporting SMEs, collaborating with other entities, and prioritising the most severe and probable adverse impacts.[5]

BENEFITS AND POTENTIAL RISKS

The CSDDD presents different benefits and opportunities for various stakeholders engaged in climate change initiatives.

For companies, the CSDDD offers several benefits. First, it improves risk management by ensuring a structured approach to identifying and mitigating sustainability risks throughout their supply chains. Moreover, compliance improves a company's reputation. By adhering to the CSDDD criteria the company improves access to capital by attracting socially responsible investors.

As for stakeholders, the CSDDD ensures the protection of rights by requiring companies to uphold human rights standards across their operations and supply chains. It promotes environmental sustainability by encouraging companies to reduce their environmental footprint and adopt sustainable practices. Moreover, the directive increases transparency and accountability as companies disclose their sustainability efforts and impacts, allowing stakeholders to make informed decisions and hold companies accountable for their social and environmental responsibilities.

Nevertheless, businesses which aren't prioritising sustainable practices may face financial and non-financial consequences. Indeed, national regulators will be authorised to examine potential violations of the CSDDD and enforce penalties which may include publicly identifying non-compliant companies and individuals, as well as imposing fines (up to 5% of the company's global annual turnover). On the other hand, member states are also required to establish a legal framework for civil liability, ensuring that companies can be held accountable for damages resulting from their intentional or negligent failure to fulfil due diligence obligations.

IMPLEMENTATION CHALLENGES AND COMPLIANCE GAPS

Implementing the CSDDD poses several significant challenges for companies. Managing complex global supply chains is one of the primary difficulties, as companies often struggle to identify and assess human rights and environmental impacts across all tiers of their supply networks. This process can be particularly resource-intensive for small and medium-sized enterprises (SMEs), which may lack the necessary financial and human resources to conduct thorough due diligence and implement corrective measures effectively.

Another challenge is the lack of detailed guidance provided by the directive, leaving companies without specific, actionable instructions to ensure compliance. Additionally, the varying implementation of the directive across different EU member states can lead to legal and regulatory fragmentation, complicating compliance efforts for multinational companies operating in multiple jurisdictions.

Engaging with a wide range of stakeholders, such as employees, local communities, and NGOs, is also complex and time-consuming, requiring the establishment of effective communication channels. Moreover, prioritising adverse impacts based on severity and likelihood is difficult, especially when dealing with diverse issues across various geographies and sectors.

Accurate and comprehensive data collection on human rights and environmental impacts is crucial yet challenging, necessitating robust data management systems to ensure transparent and reliable reporting. Companies also face potential civil liability and associated financial risks, underscoring the importance of compliance to avoid legal repercussions. Addressing these challenges requires sig-

5 https://www.nortonrosefulbright.com/en-sg/knowledge/publications/61fcd06c/eu-corporate-sustainability-due-diligence-directive

nificant investment in due diligence processes, effective stakeholder engagement, and clear strategies for managing and reporting sustainability impacts.

CORPORATE PREPAREDNESS FOR CSDDD

RESPONSE FROM KPMG

KPMG is a global professional services firm that provides Audit, Tax, and Advisory services to many of the world's largest organisations. With over 150 years of experience, KPMG is committed to driving positive change and creating a sustainable future.Their services include climate change management, energy efficiency, and sustainable strategy development. Internally, KPMG is committed to reducing its environmental impact and embedding ESG in its operations through its multi-year investment programme, as outlined in its Impact Plan.

ASEAN companies are under growing pressure as the Corporate Sustainability Due Diligence Directive (CSDDD) by the EU, with its phased introduction beginning in 2027. This directive requires businesses trading with the EU or operating within its jurisdiction to conduct comprehensive due diligence on their environmental and human rights impacts. It obliges companies to assess not only their own practices but also their chain of activity to ensure adherence to stringent standards. For ASEAN firms in sectors such as palm oil, electronics, and textiles, this adds complexity and potential costs. However, it also provides an opportunity to improve sustainability practices and gain a competitive edge in global markets that increasingly prioritise ethical sourcing and corporate responsibility. By complying with the CSDDD, ASEAN companies can attract sustainability-focussed investors, access new markets, and enhance their brand reputation. The directive's requirements extend across supply chains, increasing operational complexity, especially for industries like Indonesia's textiles and Vietnam's electronics. Yet, companies that invest in sustainable supply chain management can unlock new opportunities in markets that value responsible sourcing. For example, the palm oil sector within the region, which has faced some environmental concerns, may find value in addressing these issues proactively.

ASEAN governments can also support compliance efforts by creating certification systems tailored to different industries and aligned with EU standards. Sectors such as agriculture and manufacturing would benefit from industry-specific frameworks that streamline the due diligence process while ensuring companies maintain market access. Green financing mechanisms, including low-interest loans and grants, can also assist businesses in transitioning to meet CSDDD requirements. Singapore's green finance initiatives offer a strong model for incentivising sustainability across the region.

Furthermore, capacity-building programmes are essential to equip businesses with the skills necessary for sustainable supply chain management. ASEAN governments should invest in training to enhance expertise in sustainability reporting and compliance. Public-private partnerships can further aid in developing digital platforms for supply chain traceability. Technologies like blockchain can help businesses monitor compliance and document their sustainability efforts in real time, building trust with global stakeholders.

Through collaboration between governments, businesses, and financial institutions, ASEAN can ease the burden of compliance and enable companies to thrive in a global market that values sustainability. In the long term, compliance with the CSDDD could drive innovation in green technologies. ASEAN companies, especially in sectors like Thailand's solar energy, can attract investment by positioning themselves as leaders in sustainability, paving the way for sustainable growth and enhanced competitiveness.

RESPONSE FROM FRIESLANDCAMPINA

FrieslandCampina is a Dutch multinational dairy cooperative and one of the world's largest dairy companies, owned by 18,261 member farmers across 12,104 farms. The cooperative produces a wide range of dairy products, including milk, cheese, yogurt, and infant nutrition, and operates in over 100 countries. The company is committed to sustainability through its "Nourishing a Better Planet" initiative, which focusses on three main areas: Better Climate, Better Sourcing and Better Packaging.

FrieslandCampina is committed to providing accessible nutritious dairy products that are in balance with the planet and people. Conducting a human rights and environmental due diligence (HREDD), allows a company to identify and better understand the potential impact it may have in its chain and supports the HREDD overall goal of reducing negative impact on the planet and people.

The concept of a HREDD as outlined in the EU Corporate Sustainability Due Diligence Directive (CSDDD) is not new. International standards such as the OECD guidelines and UN guiding Principles on Business and Human Rights already describe the process. However, the CSDDD sets standards mandatory for companies to take responsibility in their chain of activities. Nevertheless, the CSDDD can be primarily seen as an opportunity to achieve a more sustainable value chain. It will not only impact upstream business, but also downstream as the CSDDD applies to that as well. This chain responsibility creates opportunities for the sustainable transition of businesses.

In addition to opportunities, it also brings challenges. Currently, there is no industry standard on how an adequate HREDD should be conducted. This may result in companies creating and implementing their own due diligence processes that slightly differ from other companies, all depending on the materiality and resources of a company. The potential differentiation of used processes and material topics, business partners in the supply chain will face various requests all for the same purpose. This can lead to an inefficient administrative process and higher costs. At FrieslandCampina, we believe in partnership and collaboration with all stakeholders, including SMEs, governments and NGOs, to establish an international standard operating procedure that allows everyone to conduct an impactful and effective HREDD.

EUROPEAN UNION DEFORESTATION REGULATION (EUDR)

CONTENTS

UNDERSTANDING THE EUDR

The European Union Deforestation Regulation (EUDR) marks a key step in tackling global deforestation and forest degradation. On 25 July 2024, the Directive on corporate sustainability due diligence came into force, promoting responsible corporate behaviour across global value chains. It requires companies to address human rights and environmental impacts both within and outside Europe. Member States must transpose the Directive into national law by 26 July 2026, with a phased rollout starting in 2027 and full compliance by 26 July 2029. From this date, companies must ensure their products do not contribute to deforestation or forest degradation.

This Directive introduces a corporate due diligence duty. The key aspects of this duty include identifying and addressing potential and actual adverse impacts on human rights and the environment within a company's own operations, its subsidiaries, and, where relevant, throughout its value chain, including business partners. Additionally, large companies are required to develop and implement a climate transition plan, aligned with the 2050 climate neutrality goal of the Paris Agreement, along with intermediate targets set by the European Climate Law.[1]

THE PURPOSE OF THE EUDR

The EUDR aims to combat global deforestation and forest degradation by ensuring that products sold in or exported from the EU do not contribute to these issues. The regulation specifically targets commodities linked to deforestation, such as palm oil, soy, coffee, cocoa, and rubber. It requires companies to prove that their products do not come from recently deforested land, reducing greenhouse gas emissions and biodiversity loss.

In concrete, the EUDR aims to ensure that the products Europeans buy, use, and consume do not contribute to deforestation or forest degradation, both within the EU and globally. It seeks to cut carbon emissions from the EU's consumption and production of these commodities by at least 32 million metric tonnes annually. Additionally, it addresses deforestation driven by agricultural expansion and the degradation of forests, specifically targeting the commodities covered by the regulation.[2]

This initiative supports the EU's broader environmental goals, such as those outlined in the European Green Deal and Biodiversity Strategy.

The primary purpose of the EUDR is to reduce the EU's ecological footprint and influence global markets towards sustainable practices. By targeting both illegal and legal deforestation, the EUDR aims to preserve critical ecosystems, support climate change mitigation efforts, and uphold the EU's commitment to environmental sustainability. Additionally, the regulation seeks to encourage producer countries to adopt sustainable land-use practices and improve governance.

Although the EUDR primarily applies to products entering the EU market, its influence extends globally by promoting responsible sourcing practices across international supply chains.

1 https://commission.europa.eu/business-economy-euro/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en
2 https://environment.ec.europa.eu/topics/forests/deforestation/regulation-deforestation-free-products_en

Definition of Global Deforestation

Global deforestation means deforestation taking place worldwide (both in the EU and outside) due to the conversion of forest to land for agricultural use, whether human-induced or not.

Deforestation and forest degradation are among the main drivers of climate change and biodiversity loss - the two key global environmental crises of our time.

The main cause of deforestation and forest degradation worldwide is the expansion of agricultural land for the production of commodities such as soy, beef, palm oil, wood, cocoa, rubber or coffee. As a major economy and consumer of these commodities, the EU is contributing to deforestation and forest degradation worldwide. The EU, therefore, has the responsibility to contribute to ending it.

By promoting the production and consumption of 'deforestation-free' commodities and products and reducing the EU's impact on global deforestation and forest degradation, the Regulation is expected to bring down EU-driven greenhouse gas emissions and biodiversity loss.[3]

THE SCOPE OF THE EUDR

The regulation covers seven key commodities—palm oil, cattle, soy, coffee, cocoa, timber, and rubber, along with derived products like beef, furniture, and chocolate. These were identified as the main drivers of deforestation due to agricultural expansion, based on a detailed Impact Assessment. This analysis, using scientific data and previous research, identified the commodities through which European production and consumption have most contributed to global deforestation and forest degradation. A subsequent cost-benefit analysis further refined the selection to ensure EU policy intervention would be as efficient as possible. The selection process was objective, treating commodities equally, whether produced within or outside Europe. The scope of regulated commodities will be updated regularly to reflect evolving deforestation patterns.[4]

THE ACTORS

The actors of the European Union Deforestation Regulation (EUDR) encompass various entities and individuals involved in the importation, trade, and placement of specific commodities within the EU market.

1. Producers

Producers are the starting point of the supply chain. They are the ones who grow, harvest, or extract the commodities that are eventually sold in the EU. For example, a farmer growing soybeans in Brazil or a rubber plantation owner in Southeast Asia would be considered producers under the EUDR. These individuals or companies are responsible for ensuring that their products are grown on land that has not been deforested after December 31, 2020, as per the regulation's cut-off date.[5]

2. Operators

Operators are the next link in the chain. They are responsible for placing products on the EU market or exporting them out of the EU. In simple terms, an operator could be a company that buys soybeans from the Brazilian farmer and sells them to food manufacturers in the EU. These operators must conduct due diligence to ensure that the products they handle comply with EUDR requirements. This means they need to verify that the products are deforestation-free and legally produced.[6]

3. Traders

Traders are entities that buy and sell commodities within the EU market but do not directly import or export them. Imagine a European food processing company that buys rubber from an EU-based distributor to make tires. In this case, the distributor is a trader under the EUDR. Traders are required to keep records of where their products come from, ensuring transparency in the supply chain.[7]

4. Customs Authorities

Customs Authorities work at the EU's borders to monitor and control the entry and exit of goods. They ensure that the necessary due diligence statements accompany products entering the EU. If a shipment of cocoa lacks the proper documentation, Customs Authorities can stop it until compliance is confirmed.[8]

5. Competent Authorities

Furthermore, **EU Member States' authorities and the European Commission** are also key actors in the EUDR. Their roles are crucial for the effective implementation and enforcement of the regulation.

EU Member States' authorities are responsible for enforcing the EUDR. They will carry out regular, often unannounced inspections to ensure compliance with the regulation. These authorities have

3 https://green-business.ec.europa.eu/deforestation-regulation-implementation/definitions-and-obligations_en
4 https://green-business.ec.europa.eu/deforestation-regulation-implementation/scope_en
5 https://www.forestcomply.com/blog/key-actors-in-eudr-compliance
6 https://www.forestcomply.com/blog/key-actors-in-eudr-compliance
7 https://www.forestcomply.com/blog/key-actors-in-eudr-compliance
8 https://www.forestcomply.com/blog/key-actors-in-eudr-compliance

the power to take corrective actions, such as banning non-compliant products, imposing fines for repeated violations, and confiscating goods or revenues from non-compliant products. If a product is deemed to pose a significant risk of non-compliance, authorities can prevent it from entering the market until the issue is resolved.[9] Additionally, they provide support and guidance to companies, especially small and medium-sized enterprises (SMEs), to help them understand and meet their obligations under the EUDR.

The European Commission plays a central role in the coordination and oversight of the EU Deforestation Regulation (EUDR). It is responsible for developing the detailed rules, regulations, and guidelines to clarify how the EUDR should be implemented and enforced. The Commission also facilitates cooperation between national authorities across EU Member States to ensure consistent application of the regulation. Furthermore, it monitors the overall implementation of the EUDR, collecting data from Member States and assessing its effectiveness. Based on these assessments, the Commission can propose updates and amendments to improve the regulation's efficiency and address any issues that arise.

THE DUE DILIGENCE PROCESS

The due diligence process involves three primary steps for EU Operators:

1. Information Collection: Operators must collect relevant data on the product, including its type, quantity, supplier, country of production, and geolocation coordinates of the land where it was produced. This ensures traceability and legal compliance of the product.
2. Risk Assessment: Using the collected information, operators must assess the risk of deforestation or forest degradation associated with the product. This involves verifying the compliance of products against the set criteria to ensure they meet regulatory standards.
3. Risk Mitigation: If there is a risk identified, operators must implement proportionate measures to mitigate it and ensure the risk is reduced to a negligible level. This includes documenting all mitigation efforts taken to achieve compliance.[10]

The regulation mandates that operators and traders must perform due diligence to evaluate and manage the risks associated with deforestation and degradation within their supply chains. As a result, these stakeholders are required to provide comprehensive data outlining the journey of materials through the supply chain, along with identified risks and the measures taken to mitigate them. Additionally, operators and traders must establish mitigation procedures and take necessary actions to reduce deforestation risks to negligible levels.

The EUDR also includes provisions that provide exemptions for operators and traders based on the size of their business. For instance, operators and non-SME traders are obligated to thoroughly review their supply chains to eliminate deforestation and unlawful practices. In contrast, SME traders face less stringent requirements—they are only required to maintain specific information and disclose it upon request. Moreover, SMEs benefit from certain exemptions; they are not required to submit a separate due diligence declaration for products already covered by another market participant's statement. Instead, SMEs need to provide the reference number of the existing due diligence statement from previous market participants in the supply chain, along with corresponding reference numbers for product batches that have undergone inspection.

RISK-BASED DUE DILIGENCE

EUDR establishes a risk classification system for countries, assigning them into one of three categories: low, standard, or high risk, based on their deforestation risk.

This classification helps determine the level of due diligence required from companies sourcing products from these regions.

1. **High-risk countries** require enhanced scrutiny, with stricter due diligence obligations, including more extensive documentation and independent verification.
2. **Standard-risk countries** follow regular due diligence requirements.
3. **Low-risk countries** are subject to simplified due diligence, as they pose minimal risk of contributing to deforestation.

This benchmarking system allows targeted checks on products from high-risk areas while streamlining procedures for low-risk regions. The classification is based on factors such as deforestation rates, expansion of agricultural land, and other environmental risks. The European Commission updates these classifications periodically based on data and assessments from member states and industry reports.[11]

DEFORESTATION DYNAMICS IN SOUTHEAST ASIA

Countries in Southeast Asia, like Indonesia, Malaysia, Vietnam, and Thailand, hold about 15%[12] of the world's tropical forests, making it a critical zone for deforestation concerns. It's the region with the highest deforestation rates, and witnesses a loss of forests equivalent to at least 1.2%.[13]

Balancing economic growth with environmental preservation is a pressing issue for Southeast Asia. The region's rapid urbanisation, agricultural expansions, logging activities, and infrastructure projects have led to extensive deforestation, resulting in the depletion of vital ecosystems like tropical rainforests and mangroves. Deforestation contributes significantly to climate change by releasing substantial amounts of carbon dioxide into the atmosphere.

9 https://orbify.com/blog/10-things-you-should-know-about-the-eu-deforestation-regulation-eudr
10 https://green-business.ec.europa.eu/deforestation-regulation-implementation/due-diligence_en
11 https://www.proforest.net/fileadmin/uploads/proforest/Documents/Publications/EU-deforestation-regulation-Key-principles-and-recommendations.pdf
12 Deforestation in Southeast Asia : Causes and Solutions, Earth-org, march 2022. https://earth.org/deforestation-in-southeast-asia/
13 Deforestation in Southeast Asia : Causes and Solutions, Earth-org, march 2022. https://earth.org/deforestation-in-southeast-asia/

ASEAN INITIATIVES COMBATING DEFORESTATION

Recognising the urgency of the situation, ASEAN member states have implemented various regulations aimed at combating deforestation, focussing on traceability, sustainable practices, and monitoring/enforcement mechanisms.

These efforts aim to ensure transparency in supply chains, promote environmentally friendly agricultural methods, and establish mechanisms to monitor and enforce regulations against deforestation.

ASEAN initiatives against deforestation:

1. **ASEAN Agreement on Transboundary Haze Pollution (AATHP)**: Signed in 2002, is a legally binding agreement aimed at preventing and mitigating haze pollution caused by land and forest fires.[14]
2. **ASEAN Peatland Management Strategy (APMS)**: A strategy to sustainably manage peatlands, reduce fires, and haze through capacity building and sustainable practices. Initially implemented from 2006 to 2020, the APMS promotes awareness, enhances capacity building, and fosters regional cooperation.[15]
3. **ASEAN Coordinating Centre for Transboundary Haze Pollution Control**: Facilitates regional cooperation in managing forest fire impacts.
4. **The ASEAN Haze-Free Roadmap** serves as a strategic framework to combat transboundary haze pollution in the ASEAN region. It outlines collaborative, action-oriented efforts aimed at achieving a haze-free ASEAN, focussing on peatland management, reducing forest fires, strengthening legal frameworks, and enhancing public awareness.[16]
5. **ISPO (Indonesian Sustainable Palm Oil) and MSPO (Malaysian Sustainable Palm Oil)** are national certification schemes created to promote sustainable palm oil production in Indonesia and Malaysia, respectively. Both certifications help meet international sustainability requirements and cover social, economic, and environmental aspects of palm oil production.[17]

POTENTIAL CHALLENGES AND OPPORTUNITIES FOR BUSINESSES

CHALLENGES

The implementation challenges and compliance gaps of the EUDR are extensive and include managing complex and fragmented supply chains, addressing infrastructure and technology deficits, ensuring data integrity and reliability, handling costs and resource constraints, facilitating coordination among diverse stakeholders, overcoming geographical and political barriers, and achieving standardisation and harmonisation. Addressing these challenges requires concerted efforts from all stakeholders, including regulatory authorities, industry participants, and technological innovators, to ensure the effective implementation and compliance with the EUDR.

COMPLEX SUPPLY CHAINS

One major implementation challenge is the complexity and fragmentation of global supply chains for commodities like palm oil, soy, cocoa, and coffee. These supply chains often involve numerous intermediaries, including smallholder farmers, processors, traders, and manufacturers, which makes tracking and verifying the

14 https://hazeportal.asean.org/action/asean-agreement-on-transboundary-haze-pollution/
15 https://environment.asean.org/fresources/detail/the-asean-peatland-management-strategy-apms
16 https://hazeportal.asean.org/action/roadmap-on-asean-cooperation-towards-transboundary-haze-pollution-control-with-means-of-implementation/
17 https://www.indonesiapalmoilfacts.com/ispo-is-now-the-worlds-largest-palm-certification-scheme/

origin of products a complex task. The diversity of supply chain actors also complicates the standardisation of traceability and due diligence processes.

LACK OF INFRASTRUCTURE AND TECHNOLOGY

Another challenge is the lack of adequate infrastructure and technology in many producing countries. In these regions, there may be insufficient systems for detailed tracking and record-keeping, and smallholder farmers often lack the necessary resources and technological capabilities to provide comprehensive traceability information. This infrastructure deficit can hinder the effective implementation of EUDR requirements.

RISK OF FRAUDULENT DOCUMENTATION OR MISREPORTING

Ensuring the integrity and reliability of data throughout the supply chain is also a significant challenge. There is a risk of fraudulent documentation or misreporting, especially in areas with weak regulatory oversight. The verification of data across multiple stages of the supply chain can be resource-intensive and complex, raising concerns about the authenticity and accuracy of the information provided.

EXTRA EXPENSES

The costs and resources required for compliance present additional barriers, particularly for small and medium-sized enterprises (SMEs). Implementing traceability systems, training staff, and maintaining detailed records can be expensive and challenging for smaller businesses, which may struggle to meet the EUDR's rigorous requirements. This financial burden can create compliance gaps, as SMEs might find it difficult to allocate sufficient resources for full compliance.

TRACEABILITY CHALLENGES

Coordination and cooperation among stakeholders in the supply chain pose another challenge. Effective traceability and due diligence require close collaboration between producers, traders, and regulatory authorities. Ensuring that all parties adhere to the same standards and share information transparently can be difficult, especially across different countries with varying regulatory environments. Disparities in national regulations and enforcement capabilities can lead to inconsistencies and gaps in compliance.

Standardisation and harmonisation of traceability systems and protocols are crucial but challenging to achieve. The lack of universally accepted standards can result in inconsistencies and gaps in traceability information, making it difficult to ensure uniform compliance across different commodities and regions. The development and adoption of harmonised standards are essential for addressing these compliance gaps.

GEOGRAPHICAL AND POLITICAL CHALLENGES

Geographical and political challenges also impact the implementation of the EUDR. Some regions where deforestation-linked commodities are produced may experience political instability, weak governance, or corruption, which can undermine traceability efforts. Additionally, remote or inaccessible areas pose logistical challenges for monitoring and verifying compliance, further complicating the implementation process.

FINANCIAL RISKS

The implementation of the EUDR introduces significant financial risks that were previously limited. The EUDR also introduces penalties for non-compliance and sanctions including fines amounting to up to 4%[18] of their EU revenue, confiscation of profits derived from affected products, and temporary bans on placing these commodities on the market. Therefore, investors should carefully monitor businesses that source from these regions and verify the adequacy of their due diligence measures.

18 The EU Deforestation Regulation : Getting started now, pwc, march 2024. https://www.pwc.com/gx/en/issues/esg/eu-deforestation-regulation.html#:~:text=Controls%20and%20sanctions,-The%20EUDR%20requires&text=The%20EUDR%20also%20introduces%20corrective,confiscation%20of%20products%20and%20income.

Implementation Challenges and Compliance Gaps

Data from Sustainalytics utilising ESG Ratings[19] illustrates these challenges, revealing that despite 66% of companies implementing deforestation programmes, only 20% demonstrate strong or very strong implementation. This disparity shows the significant gap between striving to meet regulatory standards and effectively implementing them in practice. Currently, only 13% of companies have traceability programmes covering their operations, direct suppliers and third-party suppliers and only 17% of companies conduct adequate monitoring of their anti-deforestation initiatives, with just 8% equipped to investigate incidents and implement corrective actions.

OPPORTUNITIES

Despite the challenges, the regulation also presents opportunities.

The implementation opportunities of the EUDR include promoting sustainable supply chain practices, spurring technological advancements, fostering capacity building and collaboration, enhancing market competitiveness, aligning global policies, and driving positive environmental impact. These opportunities can lead to more sustainable business practices, greater transparency and accountability in supply chains, and significant contributions to global efforts to protect forests and combat climate change.

ENHANCE SUSTAINABILITY AND CORPORATE RESPONSIBILITY AND ADVANCE TECHNOLOGIES

The EUDR presents several implementation opportunities that can significantly enhance environmental sustainability and corporate responsibility. By requiring companies to conduct due diligence and ensure their products do not contribute to deforestation, the EUDR incentivises businesses to adopt more sustainable sourcing practices. This can lead to technological advancements. The EUDR's requirements can spur the adoption of advanced technologies such as blockchain, satellite monitoring, and geographic information systems (GIS) to improve traceability and transparency in supply chains. These technologies can provide real-time data and verification, making it easier to monitor compliance and ensure that commodities are sourced sustainably. The integration of these technologies can also enhance the efficiency and accuracy of supply chain management, benefiting businesses and the environment.

ENHANCE CAPACITY BUILDING AND COLLABORATION

The EUDR also creates opportunities for capacity building and collaboration among stakeholders. By promoting the adoption of standardised traceability systems and protocols, the regulation encourages collaboration between producers, traders, regulatory authorities, and non-governmental organisations. This collaborative approach can lead to the sharing of best practices, knowledge transfer, and the development of joint initiatives aimed at preventing deforestation. Such partnerships can strengthen the overall effectiveness of the EUDR and contribute to broader efforts to protect forests globally.

ENHANCE MARKET COMPETITIVENESS

Additionally, the EUDR can enhance market competitiveness for businesses that prioritise sustainability. Companies that comply with the regulation and demonstrate their commitment to sustainable sourcing can gain a competitive advantage in the marketplace. Consumers are increasingly aware of environmental issues and prefer to support businesses that align with their values. By adhering to the EUDR, companies can build stronger brand loyalty, attract environmentally conscious customers, and potentially command premium prices for their products.

A MODEL FOR OTHER REGIONS AND COUNTRIES

The regulation also offers opportunities for policy alignment and harmonisation. The EUDR can serve as a model for other regions and countries to develop similar regulations, promoting a global approach to combating deforestation. Harmonising regulations across different jurisdictions can simplify compliance for multinational companies and create a level playing field, encouraging widespread adoption of sustainable practices. This can lead to a more coordinated and effective global response to deforestation.

DRIVE POSITIVE ENVIRONMENTAL IMPACT

Finally, the EUDR provides an opportunity to drive positive environmental impact. By reducing the demand for commodities linked to deforestation, the regulation can help decrease the rate of forest loss and degradation. Protecting forests is crucial for biodiversity conservation, climate change mitigation, and the livelihoods of communities that depend on forest ecosystems. The EUDR can contribute to these broader environmental goals by ensuring that the EU market supports sustainable and responsible sourcing practices.

EMPOWERING BUSINESS COMPLIANCE

EUROPEAN COMMISSION'S REGULATORY SUPPORT AND GUIDANCE

The European Commission (EC) offers comprehensive regulatory support and guidance for implementing the EUDR through various tools and resources. This includes detailed guidelines for national authorities, operators, and stakeholders to ensure proper compliance with the regulation. The EC also provides ongoing updates, including recommendations for best practices and compliance strategies, to facilitate the regulation's effective enforcement. For further details, visit the EC's official Green Business Portal.
You can find more information here:
https://environment.ec.europa.eu/topics/forests/deforestation/regulation-deforestation-free-products_en

19 Navigating the EU Regulation on Deforestation-Free Products : 5 Key EUDR Questions Answered About Company Readiness and Investor Risk. https://www.sustainalytics.com/esg-research/resource/investors-esg-blog/navigating-the-eu-regulation-on-deforestation-free-products--5-key-eudr-questions-answered-about-company-readiness-and-investor-risk

CORPORATE PREPAREDNESS FOR EUDR

CHALLENGES ARE BREWING FOR WILMAR

Wilmar, a Singaporean food processing and investment holding company with over 300 subsidiaries, is facing substantial challenges due to the European Union's new Regulation on Deforestation-Free Products (EU DR). This regulation, along with stricter EU policies on biofuels, complicates the palm oil market by imposing stringent requirements to ensure that supply chains do not involve products linked to deforestation. These efforts are part of a wider European initiative to limit the use of products associated with environmental degradation, such as those found in detergents and shampoos. Consequently, European importers are increasingly steering away from palm oil, foreseeing more obstacles for products derived from it, including specialty fats and biodiesel used in vehicles.

Wilmar has opened a new sea jetty in Rotterdam to reduce logistics costs. However, the increasing regulatory environment in Europe poses ongoing challenges for Wilmar and other palm oil suppliers, potentially reshaping their operations and market strategies in the region.*

*Source: The Business Times article published on Mon, Aug 26, 2024, by Elysia Tan

RESPONSE FROM COCOASOURCE

Cocoasource, established in 2007 and headquartered in Switzerland, is a prominent commodity trading company serving the global industry. With subsidiaries in Ivory Coast, Ghana, Togo, Uganda, DR Congo, and Sierra Leone, the company excels in sourcing and delivering traceable cocoa beans while implementing sustainability initiatives directly at the source. Beyond cocoa, Cocoasource also engages in the trade of cashew nuts through its Swiss headquarters and rubber through Cocoasource Pte in Singapore. The company has expanded its operations beyond the cocoa supply chain and is now actively promoting sustainable rubber production. Cocoasource is dedicated to enhancing transparency and fostering strong relationships between suppliers and buyers within the rubber supply chain.

According to Cocoasource, the EUDR poses significant challenges for the natural rubber industry, which is still in the early stages of implementing sustainability measures. The complexity of natural rubber supply chains, which involve numerous actors and extensive geographical networks, complicates efforts to gather accurate data and geolocate production sites. Additionally, sustainability initiatives in the natural rubber sector have only recently started to gain traction, creating further obstacles to meeting new regulatory standards.

Economic considerations exacerbate these challenges. With natural rubber prices hovering around $1.60 per unit, stakeholders are often hesitant to invest in costly transformations without clear financial incentives. This issue is particularly pressing for small-scale producers, who represent about 85% of the market and frequently lack the financial resources and technical expertise needed to comply with new regulations. The traditional nature of natural rubber production, often managed by family-run businesses, adds another layer of complexity to implementing these regulations.

The EUDR aims to address environmental and social issues by enforcing stringent traceability and sustainability standards throughout the supply chain. For many small producers in Southeast Asia, however, meeting these demands is a substantial challenge due to their limited resources and capabilities. The absence of effective benchmarks for assessing regional situations further complicates enforcement. Conversely, the EUDR presents an opportunity for family-run businesses to achieve a higher premium through successful transformation.

It is crucial to introduce a transition period with flexible implementation guidelines for the regulation. Such a period would provide stakeholders with the necessary time to adapt to new requirements while allowing the EU to develop a better understanding of regional nuances and deforestation challenges. Flexibility in the implementation process is essential to accommodate the varying capacities of different stakeholders and to facilitate a smoother transition.

Engaging private sector actors in sustainability efforts and providing targeted support to small producers can drive meaningful change and enhance the integration of sustainable practices within the supply chain. By adopting a progressive approach to regulation, the EU can balance the need for compliance with practical realities, ensuring that all stakeholders can transition effectively while contributing to the broader goals of the EUDR.

RESPONSE FROM KPMG

KPMG is a global professional services firm that provides Audit, Tax, and Advisory services to many of the world's largest organisations. With over 150 years of experience, KPMG is committed to driving positive change and creating a sustainable future.Their services include climate change management, energy efficiency, and sustainable strategy development. Internally, KPMG is committed to reducing its environmental impact and embedding ESG in its operations through its multi-year investment programme, as outlined in its Impact Plan.

Under the new EU deforestation-free regulation, millions of small-scale farmers in Southeast Asia can potentially risk losing access to European forest commodity supply chains. This comes since smallholders are crucial to forest-related commodities, but may face challenges such as technical capacity and financial resources when it comes to meeting the regulation's stringent due diligence standards. Furthermore, the EU Deforestation Regulation (EUDR) requires detailed proof that commodities were not produced on recently deforested land, creating significant barriers. This could lead to exclusion from EU markets, decreased exports, and income loss for millions.

Hence, a potential solution lies in capacity building and financial support, with ASEAN governments establishing programmes to educate smallholders on sustainable agricultural practices and digital traceability tools. Indonesia's Timber Legality Assurance System (SVLK), under the EU's Forest Law Enforcement, Governance and Trade (FLEGT) licensing scheme, has improved market access for Indonesian timber. Similarly, green financing mechanisms, like the Green Climate Fund, could provide low-interest loans or grants to help smallholders transition to EUDR compliance. Such financial support can bridge gaps for smallholders investing in sustainable practices and improved traceability infrastructure. The complexity of tracing forest product origins, particularly in regions like Vietnam where products pass through processing hubs, complicates EUDR implementation. To address this, ASEAN could introduce regional certification schemes similar to Indonesia's SVLK, making compliance more attainable. In addition, digital platforms can enhance transparency by using blockchain technology or mobile apps to track commodity origins, offering affordable solutions for smallholders.

Public-private partnerships will be essential, particularly as governments encourage collaboration between public institutions and the private sector to co-finance traceability infrastructure. Large corporations can partner with local farmers to help them meet EUDR standards, similar to the FLEGT partnerships between European timber producers and private sectors. Despite these challenges, the EUDR offers an opportunity for reform in ASEAN. It could drive legal changes, such as strengthening land tenure rights and preventing land grabbing. By collaborating with the EU, ASEAN countries can innovate sustainable production methods and ensure transparency in compliance. These efforts will protect smallholders' market access, prevent export declines, and foster responsible practices within forest commodity sectors. In conclusion, while the EUDR poses challenges, it provides ASEAN the chance to promote sustainable, transparent practices and secure long-term market access.

RESPONSE FROM AN ANONYMOUS MEMBER OF EUROCHAM

Although we are less than 100 days before the entry into application of the EU Deforestation Regulation, there is still a need for better guidance on various aspects of the regulation. While we have invested extensive resources into EUDR compliance, we urgently require clarification to ensure we meet all requirements with certainty.

THE EU "FIT FOR 55" INITIATIVE

THE IMPACT ON THE AVIATION SECTOR AND THE CHALLENGES OF SUSTAINABLE AVIATION FUEL (SAF)

CONTENTS

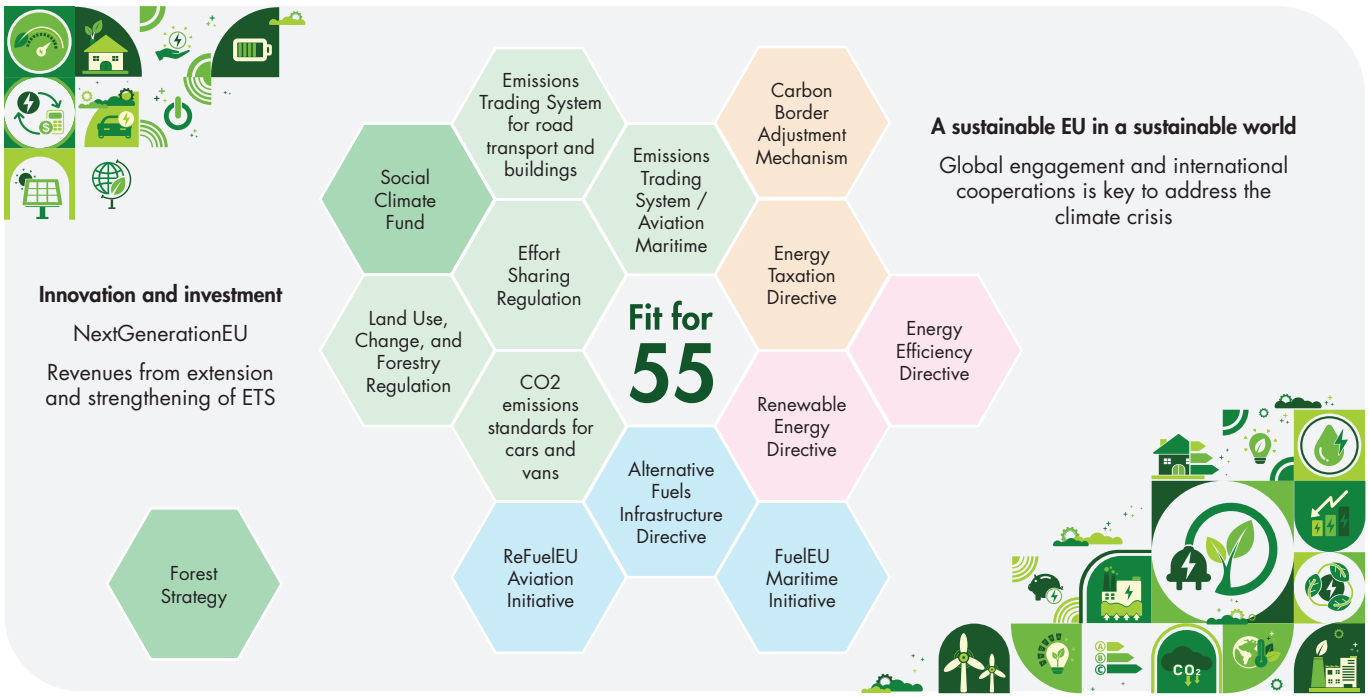
UNDERSTANDING THE "FIT FOR 55" INITIATIVE

The European Union's "Fit for 55" initiative is a comprehensive package of policy proposals aimed at reducing the EU's greenhouse gas emissions by 55% by 2030, compared to 1990 levels. It is a key component of the European Green Deal, which seeks to make Europe the first climate-neutral continent by 2050. This initiative spans various sectors, including energy, transport, and agriculture. Key measures include reforming the EU Emissions Trading System (ETS), increasing renewable energy use, improving energy efficiency, and introducing carbon pricing for maritime and aviation sectors.[1]

The European Union's "Fit for 55" initiative is a commendable and necessary response to the pressing challenges of climate change. Recognising the need for increased attention to our environment, the EU has once again positioned itself as a frontrunner in global efforts to reduce greenhouse gas emissions. The initiative builds upon the EU's long history of leadership in environmental policy, aiming to make Europe the first climate-neutral continent by 2050.

The purpose behind "Fit for 55" is both vital and commendable. With the pressing need to combat climate change, bold and decisive measures are necessary. The EU's commitment serves as a strong model, inspiring other regions to adopt similar ambitious actions.

Figure: Delivering the European Green Deal [2]



1 https://climate.ec.europa.eu/news-your-voice/news/delivering-european-green-deal-2021-07-14_en
2 https://www.eeas.europa.eu/sites/default/files/documents/2023/Carbon%20Border%20Adjustment%20Mechanism.pdf

THE IMPACT OF "FIT FOR 55" ON THE AVIATION INDUSTRY

One of the critical sectors addressed by "Fit for 55" is transportation, particularly aviation, which is a significant source of emissions. The initiative introduces several measures aimed at reducing the carbon footprint of air travel, with a strong emphasis on the adoption and use of Sustainable Aviation Fuel (SAF).

While the overarching objectives of the initiative are broadly supported and the EU's leadership in this area is recognised, it remains important to ensure that the measures implemented do not disproportionately impact European businesses. As the EU continues to set ambitious environmental standards, consideration must be given to the potential economic repercussions, particularly in industries like aviation, where competition is intense and global. In this context, the members of the Aerospace & Air Travel Committee of EuroCham have raised certain challenges and potential unintended consequences of the "Fit for 55" initiative, particularly concerning regulations related to Sustainable Aviation Fuel (SAF).

SPECIFIC REGULATIONS UNDER ReFuelEU AVIATION[3]

Under the "Fit for 55" framework, the ReFuelEU Aviation initiative mandates increased use of SAF, a biofuel from sustainable sources. This regulation aims to reduce the aviation sector's reliance on fossil fuels and promote a transition to greener alternatives, lowering carbon emissions from air travel.

The specific regulations under ReFuelEU Aviation include:

SAF blending mandates: Airlines operating in the EU will be required to use a minimum percentage of SAF in their fuel mix, starting at a modest level and gradually increasing over the coming years. This mandate is designed to stimulate demand for SAF and drive investment in its production and supply chain.

- **2025**: Airlines will be required to use a minimum of 2% SAF in the total fuel supplied for flights departing from EU airports.
- **2030**: This percentage increases to 5%, with a specific requirement that 0.7% of the total fuel be composed of synthetic aviation fuels, also known as e-fuels, which are produced using renewable energy.
- **2035**: The SAF blending mandate rises to 20%, including a 5% requirement for synthetic fuels.
- **2040**: The SAF blending requirement further increases to 32%, with 8% from synthetic fuels.
- **2045**: The mandate continues to escalate, requiring 38% SAF, with 11% from synthetic fuels.
- **2050**: The final target is set at 63% SAF, with 28% from synthetic fuels.

SAF only for flights departing from the EU: The mandate applies only to the first leg of flights departing from EU airports, meaning that airlines must ensure compliance when fueling in Europe but not necessarily when flying into Europe.

Carbon pricing: The initiative also integrates the aviation sector into the EU Emissions Trading System (ETS), which imposes a cost on carbon emissions. This is intended to incentivise airlines to reduce their carbon footprint and adopt cleaner technologies and fuels.

Collaboration: The successful implementation of ReFuelEU Aviation requires the collaboration of all parties in the supply chain, in particular aviation fuel suppliers, EU airports and airlines. More than 95% of air transport departing from EU airports will be covered by this new Regulation.[4]

- Aviation fuel suppliers at EU airports will gradually increase the share of SAF blended with conventional aviation fuel.
- Aircraft operators departing from EU airports must refuel with the aviation fuel necessary to operate the flight. This avoids the excessive emissions related to extra weight and minimises the risks of carbon leakage caused by so-called 'tankering' practices.
- EU airports must facilitate access to the necessary infrastructure to deliver, store and refuel aircraft with SAF.[5]

3 https://transport.ec.europa.eu/transport-modes/air/environment/refueleu-aviation_en
4 https://transport.ec.europa.eu/transport-modes/air/environment/refueleu-aviation_en
5 https://transport.ec.europa.eu/transport-modes/air/environment/refueleu-aviation_en

Definition of SAF[6]

- Synthetic aviation fuels from renewable hydrogen and captured carbon (in the meaning of Article 2(36) of Renewable Energy Directive (RED) and limited to liquid drop-in fuels only);
- Advanced biofuels from waste and residues notably (produced from feedstock listed in Part A of Annex IX, in the meaning of Article 2(34) of RED);
- Biofuels produced from oils and fats notably (such as from feedstock listed in Part B of Annex IX, in the meaning of Article 2(33) of RED);
- Recycled carbon aviation fuels in the meaning of Article 2(33) of RED.

Definition of eSAF[7]

- Electro-SAF (eSAF) is produced through the synthesis of renewable electricity, hydrogen, and captured carbon dioxide (CO_2). Unlike biofuels, eSAF relies on renewable energy rather than biological feedstocks, providing an additional pathway to reduce carbon emissions in aviation. Like SAF, eSAF must meet strict lifecycle emissions savings thresholds but offers a scalable, energy-based solution for decarbonising aviation.

Aviation fuel suppliers may also decide to comply with the minimum shares by using:

- Renewable hydrogen for aviation as defined in Article 3(16) of ReFuelEU Aviation;
- Synthetic low-carbon aviation fuels and low-carbon hydrogen produced from non-fossil sources, and meeting a lifecycle emissions savings threshold of 70%.

CHALLENGES AND CONCERNS IN THE AVIATION INDUSTRY

While the "Fit for 55" initiative is widely supported, it is equally important to ensure that the measures do not place an undue burden on European businesses. It is also crucial to consider the potential economic impacts on industries such as aviation, where competition is both intense and global.

1. **Infrastructure and Supply Chain**

   - **Insufficient SAF production capacity**: A key challenge is the limited production capacity for SAF. The aviation industry requires a consistent, large-scale fuel supply, but the current SAF infrastructure cannot meet the demands outlined by the "Fit for 55" initiative. This shortfall may lead to supply shortages, increased costs, and challenges for airlines in meeting mandated percentages.

   - **Supply chain complexity**: The logistics of distributing SAF to various EU airports present significant hurdles. Integrating SAF into the existing fuel supply chain demands considerable investment in infrastructure, such as blending facilities, storage, and transportation networks. These complexities and costs may impede the rapid adoption of SAF, especially for smaller or regional airports.

2. **Market Distortions**

   - **Competitive disadvantage**: SAF mandates apply only to flights departing from EU airports, resulting in higher operational costs for EU airlines, which must use SAF, currently pricier than conventional jet fuel. In contrast, non-EU airlines, benefiting from less stringent environmental regulations, may offer lower fares, thereby increasing their market share and undermining the competitiveness of European carriers.

   - **Impact on long-Haul flights**: Long-haul flights, being more fuel-intensive, may be particularly affected by SAF mandates. The increased costs of compliance could render these routes less economically viable for EU airlines, potentially leading to reduced services or a shift in operations to non-EU carriers.

3. **Counterproductive Outcomes**

   - **Increased stopovers**: Airlines may opt to make additional stopovers outside the EU for refueling, avoiding compliance with SAF mandates. This could result in longer flight times, increased fuel consumption, and ultimately increased carbon emissions, undermining the initiative's environmental goals.

   - **Carbon leakage**: Carbon leakage occurs when policies designed to reduce GHG emissions in one region inadvertently lead to increased emissions elsewhere. This happens when businesses relocate to areas with less strict environmental regulations to escape higher compliance costs. In aviation, if passengers or freight operators choose non-EU airlines or airports for lower travel costs, the emissions intended for reduction in the EU may simply shift to other regions, effectively "leaking" emissions outside the EU.

6 https://transport.ec.europa.eu/transport-modes/air/environment/refueleu-aviation_en
7 https://www.bp.com/en/global/air-bp/news-and-views/views/what-is-esaf.html

RECOMMENDATIONS TO ENHANCE THE CURRENT SAF LANDSCAPE

To scale SAF to the levels required by Fit for 55, attract the necessary investment of billions of euros for new SAF capacity projects, and achieve competitive pricing to minimise market distortions, the following recommendations are proposed:

PROMOTE A GLOBAL APPROACH

- Collaborate with International Bodies (ICAO & UN): The EU can advocate for the enhancement of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) by pushing for more ambitious emissions reduction targets, including the integration of SAF mandates and stronger offsetting requirements. This approach would promote a consistent strategy for SAF usage among airlines worldwide, levelling the playing field between EU and non-EU carriers. By harmonising carbon accounting standards for aviation across borders, the EU and ICAO can ensure that emissions reductions in the EU are not offset by increases elsewhere.

- Bilateral and Multilateral Agreements: The EU could negotiate bilateral or multilateral agreements with key aviation partners, such as the U.S., Asia, and other major global hubs to align policies on SAF and carbon reductions. This effort could encourage other regions to adopt SAF mandates, including mutual recognition of SAF production, facilitating the development of sustainable global supply chains. Additionally, the EU could work with these countries to establish common SAF quality standards, ensuring that all regions utilise the same methodologies for emissions reduction comparability.

- Implement Carbon Border Adjustment Mechanisms (CBAM) for Aviation: the EU could collaborate with partner countries to implement reciprocal CBAM agreements for all flights between the regions. This would impose equivalent costs on non-EU airlines that do not meet similar SAF mandates or emissions reduction targets when operating in the EU.

- Promote Transparency and Accountability: A global framework must incorporate robust transparency and accountability mechanisms to ensure that all airlines, whether EU or non-EU, adhere to the same standards, including Global Carbon Tracking Systems and independent Third-Party Verification.

- Partner with regional association: Collaborating with regional organisations like the Asia SAF Association (ASAFA) (www.asiasaf.org) could facilitate initiatives between the EU and other regions. ASAFA is an independent non-profit association dedicated to promoting a regional approach to SAF in Asia, uniting the entire SAF ecosystem to focus on regional policies, technologies, expertise, innovations, production, certifications, and financing. This partnership would align well to advance SAF on a global scale.

SUPPORT FINANCING

- Innovate by funding engineering studies: To drive SAF deployment, investors typically require Front-End Engineering and Design (FEED) studies before committing capital, which can cost over 30 million EUR. However, investors are hesitant to fund these studies for technologies not yet proven at scale. Horizon Europe is focussed on earlier stages, and the Innovation Fund does not cover FEED studies. Expanding the Innovation Fund to include FEED financing, or creating a separate fund for this purpose, could help bridge the "valley of death" where projects struggle to secure funding.

- Extend ETS SAF allowances until 2040: Advanced biofuels and synthetic aviation fuels still present too much risk for significant capital investment. The European Investment Bank's loan programme and the Innovation Fund help reduce capital costs, but long-term revenue certainty is key for SAF project financing. The ETS SAF allowances programme supports SAF purchases by reducing costs until the 200 million allowances run out, likely by 2030. Extending this programme to 2040, when the market is expected to mature, would provide the long-term revenue security needed for SAF facility development.

DEVELOP SAF DIVERSITY

- Confirm the eSAF sub-mandate: No final investment decisions (FIDs) have been made for eSAF facilities, which have lead times of over four years. The next two years are critical for ensuring facilities are operational in time for ReFuelEU. Industry concerns persist that the sub-mandate could be removed during the 2027 ReFUelEU revision or that penalties for non-compliance may not be enforced. The confirmation of the eSAF mandate and its enforcement structure beyond 2027 are key to maintain.

- Introduce an advanced biofuels sub-mandate: To meet SAF requirements under ReFuelEU post-2030, advanced biofuels must scale up, as waste oil supply is limited. Currently, advanced biofuels (Annex IX-A) face an uneven playing field compared to relative to Annex IX-B biofuels and eSAF. The introduction of a sub-mandate for advanced biofuels, aligned with the eSAF 2% sub-target under RED II by 2030 should address this imbalance and avoid market distortions.

CONCLUSION: A CALL FOR EVOLUTION ACCORDING TO THE GLOBAL MARKET NEEDS

The "Fit for 55" initiative marks a major step toward reducing aviation's environmental impact. However, stakeholder concerns highlight the need for a more global approach that reflects the international nature of the industry.

To address these challenges, the EU should engage in global discussions to harmonise environmental regulations across regions. This would help mitigate competitive disadvantages for EU airlines, create a level playing field, and prevent carbon leakages.

Additionally, substantial financial support is essential, including incentives to drive innovation and investments in SAF production. The EU must ensure ongoing funding beyond 2030 to ensure airlines have access to sufficient and competitively priced SAF.

CORPORATE RESPONSES FROM THE AVIATION INDUSTRY

RESPONSE FROM LUFTHANSA

A competitive & sustainable aviation sector.

The EU must promote the competitiveness of its network airlines and guarantee a level playing field in a global context by making EU climate legislation effective and Carbon Leakage proof.

Lufthansa Group has set itself concrete climate protection goals aligned with the Paris Agreement and the EU's emission reduction targets. By 2050, Lufthansa Group aims to operate CO_2-neutrally, with more fuel-efficient aircraft, the use of Sustainable Aviation Fuel (SAF), the expansion of intermodal transport, and innovative operational measures.

Legislation should support the decarbonisation of aviation in a competition-neutral manner. This is currently not guaranteed. ReFuelEU Aviation in its current design significantly weakens the competitive position of globally operating EU airlines. With its blending mandate for SAF, the Regulation makes traffic via EU-hubs massively more expensive and one-sided. This is because long- and short-haul connections starting within the EU require the use of more expensive SAF. Connections via hubs right behind EU-borders are hardly affected: If passengers change flights outside EU-borders to reach a long-haul destination, only the first shorter transfer flight requires SAF fueling. Especially non-EU airlines with hubs in Istanbul, Doha and Dubai benefit from this situation and can offer significantly lower ticket prices.

The EU must urgently act to restore a global level playing field in aviation. It is therefore crucial that the Regulation's review process is used to rectify this imbalance and ensure comparable treatment of non-EU airlines and their EU counterparts. Only in this way competitiveness and sustainability will go hand in hand.

RESPONSE FROM AIR FRANCE-KLM

The EU network airlines emphasise the necessity of global climate action to maintain a level playing field. The Air France-KLM Group supports the International Civil Aviation Organisation (ICAO) Long Term Aspirational Goal (LTAG) for net-zero carbon emissions by 2050 and advocate for ambitious global decarbonisation efforts, such as a worldwide ICAO Sustainable Aviation Fuel (SAF) blending mandate. We also call for increased ambitions in the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as global carbon pricing would help to gradually close the gap in climate ambitions between the EU and the rest of the world. However, a unilateral decision to expand the EU Emission Trading System (EU ETS) to non-EU destinations, would pose a serious threat to these global objectives.

Air France-KLM further supports any mechanism that could compensate for the impacts generated by the Fit for 55 Package obligations, as they involved a shift of traffic towards non-EU hubs, thereby causing carbon leakage and distortion of competition. For instance, Air France-KLM considers that transport services (including aviation) could be integrated in the second phase of the Carbon Border Adjustment Mechanism (CBAM) to ensure fair pricing and tackle carbon leakage.

AFKL supports that, should a taxation on kerosene be introduced, it should be at a global level to maintain an international level playing field. Key parameters should consider the amount of SAF production globally available, and accessibility to all players. To make the necessary investments for decarbonisation of aviation available, it is a precondition that all revenues from the global kerosene tax are used to make the sector more sustainable, for example by making sustainable fuels for aviation (SAF) more affordable or to stimulate new technologies.

Third-country airlines operating in the EU should adhere to European social standards and requirements, considering the right for every worker to decent working conditions. This is crucial to ensure a level playing field. As we provide decent pay and labour conditions to our staff, it is only fair that non-EU airlines must also adhere to fundamental social rights, if they have access to the EU market.

SOUTHEAST ASIA'S TRANSITION-ORIENTED TAXONOMIES

EuroCham SINGAPORE

NATIXIS
CORPORATE AND INVESTMENT BANKING

TAXONOMIES

SETTING THE TONE: SOUTHEAST ASIA'S TRANSITION-ORIENTED TAXONOMIES

Within financial institutions, sustainable finance teams use ESG data and sustainability criteria daily to advise clients on their transition plans and structure sustainable finance transactions (loans or bonds). Taxonomies play a crucial role in activities carried out by numerous banks, particularly by the Green and Sustainable Hub ("GSH") of Natixis CIB. While Natixis' GSH has traditionally focussed on assessing the implications of the European Union Taxonomy for Sustainable Activities and supporting its adoption and effective use, the bank is also actively contributing to and advising on the development of international, regional, and national frameworks – more details can be found in our flagship report, "The New Geography of Taxonomies." The rise of taxonomies in Southeast Asia is a noteworthy trend, and we would like to share some insights on their scope and unique features.

DEVELOPMENT OF LOCAL TAXONOMIES FROM WEST TO EAST

Since the first green taxonomy was published in 2012 by the Climate Bonds Initiative, taxonomy development has evolved and expanded from Europe to Asia, the Americas, Africa, and the Middle East. Today, there are 22 green and sustainable taxonomies at various stages of implementation, with another 18 under development. The proliferation of national taxonomies can be attributed to the need to capture local specificities and meet local climate, environmental, and social objectives. This shift reflects the recent broadening of taxonomies' scope from purely green to sustainable and transitional.

Each jurisdiction has distinct features in taxonomy development and the selection of economic activities. Sectoral prioritisation considers greenhouse gas (GHG) emission profiles, contributions to GDP, and climate and sustainable development commitments, all from a context-specific perspective. In Latin America, for example, Mexico has prioritised social categories, while Colombia and Panama have identified agriculture and land-use change as eligible sectors. In the Asia-Pacific region, ASEAN countries have prioritised transition categories, with early coal phase-out included as eligible by Singapore and Indonesia. The choice of sectors and activities reflects those with the most significant contributions to mitigation, adaptation, and broader environmental objectives.

Taxonomies have various potential uses, with the most common being labelled issuances, investment strategies, reporting, and policymaking. Financial institutions can use taxonomies to originate and structure green and sustainable banking products (such as use-of-proceeds/sustainability criteria bonds, loans, and credit) to meet issuers' and investors' needs. Taxonomies are also a useful tool for issuers to identify eligible projects and assets, and to communicate their environmental and social attributes, including preparing sustainability and impact disclosure reports. Investors can use taxonomies to identify securities that meet their green or sustainability criteria, design investment policies, and disclose their exposure to sustainability topics. Finally, policymakers and regulators may use taxonomies to introduce requirements and incentives to influence project pipelines (supporting green projects and dissuading brown ones), enhance disclosures, and adjust collateral requirements.

As taxonomies develop and multiply, interoperability becomes crucial to avoid the risk of multiple, contradictory, or competing definitions of what qualifies as sustainable. Interoperability does not mean copying and pasting environmental objectives, economic sectors, and technical screening criteria from one taxonomy to another, but rather ensuring that guiding principles, methodologies, metrics, and thresholds are aligned and comparable when defining eligibility. While challenges remain in achieving full interoperability, many jurisdictions are leveraging the Climate Bonds Initiative, the ASEAN, and the European Union Taxonomies, adapting environmental objectives, technical screening criteria, and environmental and social safeguards to their national contexts or preferences.

EMERGENCE OF TAXONOMIES IN SOUTHEAST ASIA

The Asia-Pacific region hosts the highest number of existing and upcoming green and sustainable taxonomies. Of the 22 current taxonomies, 12 are from Asia-Pacific, and out of the 18 in development, 6 originate from this region. Countries including Indonesia, Malaysia, Singapore, Thailand, the Philippines, Bangladesh, South Korea, China, Mongolia, Sri Lanka, and Hong Kong have all developed national taxonomies, alongside the ASEAN regional taxonomy. Australia, New Zealand, Cambodia, Fiji, India, and Vietnam are in the process of developing their taxonomies. The first taxonomies in Southeast Asia were published in 2021 (Malaysia and ASEAN), followed by others in 2022 (Indonesia), 2023 (Thailand and Singapore), and 2024 (Philippines). While their objectives, scope, sectors, and approaches vary, they are generally aligned with each other and with other international and regional taxonomies – see Table 1.

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Table 1. Benchmark of Existing Taxonomies in Southeast Asia

	STATUS	SCOPE	ENVIRONMENTAL OBJECTIVE	SECTORS	TSC[1]
INTERNATIONAL AND REGIONAL TAXONOMIES					
European Union	Mandatory	Sustainable	**6 EOS:** Mitigation; Adaptation; Water and Marine Resources; Circular Economy; Pollution Prevention and Control; and Biodiversity	**9 SECTORS:** Energy; Forestry; Environmental Protection & Restoration Activities; Manufacturing; Water Supply, Sewerage, Waste Management and Remediation; Transport; Construction/Real Estate; ICT; Professional, Scientific, and Technical Activities	
ASEAN	Voluntary	Sustainable	**4 EOS:** Mitigation; Adaptation, Healthy Ecosystems and Biodiversity Resource Resilience and Transition to a Circular Economy	**9 SECTORS:** Agriculture, forestry/fishing, manufacturing, electricity, gas, steam and air conditioning supply, transportation/storage, construction/real estate, water supply, sewerage and waste management, Information, and communication (ICT), Professional, scientific, and technical activities, Carbon capture, utilisation, and storage (CCUS)	

1 Technical Screening Criteria (TSC) for ASEAN and Indonesia are in amber as they are only available for certain activities. The ASEAN Taxonomy has TSC in the Plus Standard for electricity, gas, steam and air conditioning supply, construction and real estate and transport and storage. The Indonesian Taxonomy has TSC for Electricity, Gas, Steam and Air Conditioning Supply and TSC for Mining and Quarrying Activities

CBI	Voluntary	Green	**1 EO:** Mitigation	**8 SECTORS:** Energy, Transport, Water, Buildings (commercial and residential), Land Use and Marine Resources, Industry, Waste, and ICT
SOUTHEAST ASIA				
Indonesia	Voluntary	Sustainable	**4EOS:** Mitigation; Adaptation; Ecosystems and Biodiversity; Resource Resilience and the Transition to a Circular Economy;	**05 SECTORS:** Energy; Agriculture; Waste; Forestry and Other Land Uses (FOLU), Industrial Processes and Production Use
Malaysia	Voluntary	Green	**2 EOS:** Mitigation Adaptation	**7 SECTORS:** Renewable Energy, Energy Efficiency, Transport, Building, Manufacturing, Waste, Forestry
Philippines	Voluntary	Sustainable	**2 EOS:** Mitigation Adaptation	**17 SECTORS:** Energy; Transport; Waste; Industry; AFOLU; Coastal and Marine Resources; Agriculture, Fisheries and Food Security; Water Resources; Health; Ecosystem and Biodiversity; Cultural Heritage, Population Displacement and Migration; Land Use and Human Settlements; Livelihood, and Industries; and Energy, Transport and Communications; ICT; Professional, Scientific, and technical activities; and CCUS.
Singapore	Voluntary	Sustainable	**5 EOS:** Mitigation; Adaptation Healthy ecosystems and biodiversity; Resource resilience and circular economy; and Pollution Prevention and Control	**10 SECTORS:** Energy; Transport; Real Estate/Construction; Industry; Forestry; Carbon Capture and Storage; Information and Communication Technology; Waste; Water; and Agriculture
Thailand	Voluntary	Green	**1 EO:** Mitigation	**2 SECTORS:** Energy Transport

Source: Natixis GSH 2024

The objectives outlined in the taxonomies define their scope. In Southeast Asia, the primary focus is on climate mitigation and adaptation, though healthy ecosystems, biodiversity, and resource resilience/circular economy are the two most commonly cited non-climate objectives. Frequently, taxonomies prioritise mitigation and adaptation, with other environmental objectives incorporated over time. The rationale for establishing climate objectives lies in their critical role in decarbonisation and achieving the Paris Agreement targets. The Philippines Taxonomy highlights the decision to initially focus on climate mitigation and adaptation, with plans to incorporate ecosystem and biodiversity, as well as circular economy considerations, in future iterations. Similarly, Thailand has prioritised mitigation as an objective but anticipates including other objectives in future updates.

The selection of economic sectors and activities that substantially reduce GHG emissions is also consistent among Southeast Asian taxonomies. The usual sectors—energy, transport, buildings, manufacturing, waste/water, and land use—are included. However, there are discrepancies in the overall number of sectors covered and their granularity, influenced by national climate and environmental priorities and the approaches adopted in setting criteria to identify eligible activities. The two main approaches observed in the region, used individually or in combination, are a principles-based approach, which sets guiding principles without quantitative thresholds, and a technical criteria-based approach, which defines quantitative thresholds considering minimum performance levels and environmental safeguards ("do no significant harm"). ASEAN and Indonesia combine these two approaches, while Malaysia and the Philippines adopt a principles-based approach, and Singapore and Thailand a technical screening criteria approach.

FROM AMBER TO GREEN, THE NEED TO INTEGRATE TRANSITION INTO TAXONOMIES

A distinctive feature of the two adopted approaches is the use of a "traffic light" classification system, which allows for a less binary classification. Instead of only aligning green activities, it also includes transitioning (amber) and excluded (red) activities. Reflecting ASEAN's critical objective to transition its energy system (with 23% of the energy mix currently comprising coal), the ASEAN Taxonomy was the first in the region to introduce this concept within a multi-tiered approach (principle and criteria-based standard). This model has since been adopted by Indonesia, the Philippines, Singapore, and Thailand. There are subtle differences among the taxonomies in how they define green, amber, and red activities. However, there is a general consensus that green activities are those that substantially contribute to GHG emission reductions or align with a 1.5°C trajectory, while amber activities are transitional—they are not yet aligned with a 1.5°C trajectory but are progressing toward green within a defined timeframe.

Table 2. Definition of Green, Amber, and Red within Traffic Light Systems

	GREEN	AMBER	RED
ASEAN	Activities with GHG emission levels aligned to the Paris Agreement (1.5°C-aligned) *Ex: trains and wagons with zero direct tailpipe CO_2 emissions*	Activities that support a transition to green within a defined timeframe or the NDC *Ex: direct emissions from freight rail are not zero but below 25gCO_2e/tkm by 2027*	Activities are not aligned with environmental goals *Ex: new roads and road upgrade*
Indonesia	Activities that limit temperature rise below 1.5°C in line with the Paris Agreement, including Indonesia's NZE in 2060 (or earlier) and fulfil social aspects *Ex: gas power facility with a lifecycle GHG emission <100gCO_2e/kWh*	Activities not in line with commitments to limit global temperature rise and not on a NZE pathway but moving towards green within a specified timeframe, that enable significant emission reduction and sustainability of other activities *Ex: gas power facilities with a lifecycle GHG emissions ≥100gCO_2e/kWh <510gCO_2e/kWh*	No red category
Philippines[2]	Activities that make substantial contribution to one of the stated environmental objective (EO), meet DNSH and MSS *Ex: Floating solar power project as it makes substantial contribution to climate mitigation, does no harm (DNSH) to other EOs, and meets local regulation.*	Makes substantial contribution to an EO but causes significant harm to other another, yet this harm can be remediated in 5 to 10 years. *Ex: Hydropower as it shifts power generation to renewables, but may impact biodiversity and cause methane emissions, causing significant harm, but that can be remediated.*	Does not serve any EO and does not meet essential DNSH and MSS criteria *Ex: Real Estate and Construction that cause significant harm through construction waste and do not meet regulation that address community rights.*
Singapore	*Activities that substantially contribute to mitigation (near zero emission/ 1.5°C aligned pathway)* *Ex: average carbon intensity of energy used to power the desalination plant ≤ 350gCO_2/me3 of potable water produced*	Activities not presently on a 1.5°C pathway but that are moving towards green within a defined timeframe or are facilitating significant emission reduction in the short term (sunset date) *Ex: energy consumption of desalination plants must be <3.5kWh/m3 of potable water produced by 2025, then lowered to <3 kWh/m3 (2025-2030), and then to <2.5 kWh/m3 (2030-2035)*	Ineligible activities that do not comply with green or amber criteria or are directly unsustainable (incompatible with 1.5°C). *Ex: Desalination systems do not meet green or amber criteria*

2 The Philippines uses principle-based questions that are sector agnostic and have to follow a set of questions on the relevant environmental objective, compliance with national legislation, DNSH, remedial measures to transition and minimum social safeguards.

 Thailand	Activities that substantially contribute to climate change/net zero by 2050 or limit global warming below 1.5°C *Ex: conversion of existing natural gas power plants to use green hydrogen leading to an emission intensity ≤100gCO_2e/kWh (2022-2040)*	Activities that have not reached net zero but can be improved with reliable decarbonisation pathway and prescribed sunset dates *Ex: retrofit of existing natural gas plants that lead to lifecycle emission intensity ≤381gCO_2e/kWh (2022-2025), ≤225 gCO_2e/kWh (2026-2030), ≤191g gCO_2e/kWh (2031-2035), ≤148 gCO_2e/kWh (2036-2040)*	Activities that are harmful to decarbonisation *Ex: new natural gas-based power plants with construction permit after 31 Dec 2023*

Source: Prepared by Natixis GSH 2024 considering taxonomies definitions

Transition is a common theme among Southeast Asian taxonomies due to the region's unique decarbonisation challenges. Although there are no dedicated or standalone transition taxonomies, the integration of such classifications through a "traffic light" system allows for a more nuanced approach that addresses the complexities of transition. This includes activities that are aligning with a 1.5°C or well-below 2°C pathway or activities that will be phased out within a set timeframe (e.g., early coal phase-out). The inclusion of phase-out activities as green, particularly in Indonesia, has sparked criticism, as there is still no universal definition for transition, which could lead to confusion among market players about what is required to achieve net zero by 2050. Nonetheless, there are specific requirements for developing a transition plan when considering coal phase-out—a topic with its own complexities.

The integration of transition into taxonomies is crucial to addressing local decarbonisation challenges and redirecting investments to hard-to-abate sectors that require rapid decarbonisation. However, further comparison of the scope and criteria is necessary to better understand transition pathways across jurisdictions. Transition taxonomies and their various approaches (e.g., traffic light, criteria-based, measures-based, whitelist, managed phase-out) can play a central role in clarifying what qualifies as a transition and, by informing transition plans and strategies, help avoid transition-washing. Taxonomies will continue to be a valuable tool for issuers, investors, and other market players, and Natixis's CIB GSH will remain actively involved in international and local initiatives, such as the International Capital Market's Climate Transition Finance Handbook and the Australian Taxonomy Technical Expert Working Group, to provide market guidance.

SUSTAINOVATIVE TECHNOLOGY

AI'S ROLE IN ACHIEVING SUSTAINABILITY - BALANCING INNOVATION WITH ENVIRONMENTAL STEWARDSHIP

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CONTENTS

INTRODUCTION

AI is reshaping sustainability efforts across industries. On the one hand, it is becoming an important tool for businesses to drive sustainability efforts: in an Accenture survey, 70% of companies that reported having successfully reduced emissions in their production and operations said they had used AI to achieve this reduction.[1] On the other hand, the rise of AI brings its own set of environmental challenges. For example, the immense computational power required to train and deploy advanced AI models contributes significantly to carbon emissions. Large-scale data centres, which often rely on fossil fuels, consume massive amounts of energy—on a scale comparable to that of entire nations—to sustain AI operations.

Embracing sustainable AI practices is crucial for companies to not only reduce their carbon footprint but also achieve their broader net-zero ambitions. These practices include intelligent use of energy-efficient hardware and software, optimising AI models, adopting green data practices and load shifting based on renewable energy mix. Sustainable technology is not optional. It's vital for organisations seeking to lead in both technological innovation and environmental stewardship.

The unique challenge of balancing innovation with sustainability that the AI boom presents is not limited to individual companies. Governments too are gaining awareness and stepping in to demonstrate how the two can coexist. For instance, Singapore is fast emerging as one of the leaders in sustainable technology initiatives (see box on Singapore's digital sustainability initiative). The city-state is actively promoting green innovation and investing in technologies that reduce emissions and support renewable energy. As a hub for sustainable development, Singapore is leveraging its expertise to pioneer smart city solutions, green infrastructure, and sustainable manufacturing practices. Its commitment to achieving net-zero emissions by 2050, supported by policies like the Green Plan 2030, highlights the critical role that government and private sector collaboration can play in accelerating progress toward sustainability.[2]

Since no single organisation can hope to address global sustainability challenges and create impact at scale on its own, companies must rethink their use of technology to drive urgent action beyond the boundaries of their own organisations. Singapore's whole-of-nation sustainability movement[3] shows how a comprehensive multi-stakeholder approach to sustainable technology could work. Building on this model of putting sustainability at the core of everything, businesses need to consider the two key dimensions of sustainable technology:

1. Sustainability in technology - measuring the environmental impacts of technology, and working to ensure it's designed, developed and deployed sustainably.
2. Sustainability by technology—using technology innovation to drive sustainability initiatives and transform the business model.

1 https://www.accenture.com/content/dam/accenture/final/a-com-migration/pdf/pdf-177/accenture-tech-sustainability-uniting-sustainability-and-technology.pdf#zoom=40
2 https://www.mse.gov.sg/resource-room/category/2022-10-25-press-release-on-singapore-commits-to-achieve-net-zero-emissions-by-2050
3 https://www.greenplan.gov.sg/

Singapore's Digital Sustainability Initiative[4]

The Infocomm Media Development Authority (IMDA) and the Government Technology Agency (GovTech) have introduced digital sustainability initiatives for greening the information and communications technology (ICT) sector and leveraging digital solutions to support broader sustainability efforts. These initiatives align with the Singapore Green Plan 2030 and the public sector's goal of reaching net zero emissions by around 2045.

Among them is IMDA's $30 million Green Computing Funding Initiative (GCFI) to co-develop innovative solutions for the sector. Green computing initiatives include inviting industry partners to participate in trials to develop software that reduces energy consumption and lowers IT costs. IMDA is also advancing the use of ICT to support businesses in their sustainability efforts. Through its Advanced Digital Solutions (ADS) programme, IMDA has identified nine digital solutions focussed on sustainability, including resource optimisation and carbon management tools. These solutions help companies improve productivity, reduce costs and access new markets, while cutting emissions.

GovTech initiatives aim to strengthen partnerships to engage the broader ecosystem and create solutions and best practices for digital sustainability.

SUSTAINABILITY IN TECHNOLOGY

Digital transformation comes with a significant side effect: an ever-increasing demand for power as the global population generates more data than ever. Add to this, the AI transformation, which according to Accenture's estimates, companies are achieving 16 months faster than their digital transformation.[5] While generative AI applications like ChatGPT, DALL-E and Stable Diffusion are proving to be valuable assets in addressing complex global challenges, such as improving climate action, driving responsible production and protecting sensitive data, they present notable challenges. Apart from their well-known social implications, these tools raise concerns about job displacement, the creation of disinformation and the tremendous amounts of energy required for the development, training and operation of these AI systems. The environmental impact of AI goes beyond emissions and has implications for water, waste and nature and biodiversity (see table 1 for metrics that measure these implications).

Table 1 – Metrics to measure the environmental impact of AI development and use

CATEGORY	METRICS
Energy usage	Total energy consumption Power usage effectiveness Total renewable energy consumption Renewable energy factor Floating point operations per second per watt Energy reuse factor Server utilisation
Carbon emissions CO_2eq	GHG emissions Carbon usage effectiveness Total carbon offsets Embodied emissions
Water	On-site water consumption (scope 1 and 2) On-site water withdrawal Water intensity factor Operational water consumption
Waste	Total waste generated Waste diverted Waste diversion rate
Local ecosystem	Mean species abundance Land use change Land use intensity Outdoor noise

Source: Derived from Schneider Electric analysis, https://www.se.com/ww/en/insights/sustainability/technology-and-innovation/guide-to-environmental-sustainability.jsp

4 https://www.imda.gov.sg/resources/press-releases-factsheets-and-speeches/press-releases/2024/new-initiatives-to-drive-digital-sustainability
5 https://www.accenture.com/content/dam/system-files/acom/custom-code/ai-maturity/Accenture-Art-of-AI-Maturity-Report-Global-Revised.pdf#zoom=40

Towards sustainable AI with the EU AI Act

The EU Artificial Intelligence Act represents a significant regulatory step forward by incorporating environmental sustainability into AI systems, positioning the EU as a global leader in sustainable AI governance. Article 40 of the Act establishes a framework for developing harmonised standards to improve AI systems' resource performance, with an emphasis on energy efficiency. It outlines a process where the European Commission will ask standardisation bodies to develop standards that address the energy consumption of both high-risk AI systems and general-purpose models throughout their lifecycles.[6]

Global data centres' electricity use is expected to double by 2026 from 460 TWh in 2022, according to the International Energy Agency (IEA). Much of this projected increase comes from AI workloads and the amount of data feeding into the models.[7]

The first step towards sustainable usage is estimating the energy consumption of AI and machine learning (ML) models. This can be challenging; besides most AI companies do not measure or disclose this information.[8] Energy usage during deployment is even less understood than during the training phase.

However, there are tools available to help address this issue. The ISO-Standard Software Carbon Intensity (SCI) specification from the Green Software Foundation provides a reliable method for establishing a carbon emissions baseline for a software system, which can be used for comparison over time or across different applications. It is a score rather than a total; lower numbers are better than higher numbers. This specification is focused on helping users and developers understand how to improve software to reduce or avoid the creation of emissions.[9] The Green Algorithms project offers a simple calculator to estimate the total emissions of an AI project.[10] Additionally, cloud providers like Amazon Web Services, Google Cloud Platform, and Microsoft Azure offer carbon accounting tools tailored to their services. Researchers at Stanford, in collaboration with industry stakeholders, have also developed a lightweight framework for the accurate and straightforward reporting of energy, compute and carbon impacts of machine learning systems.[11]

Singapore's Green Data Centre Roadmap

The Green Data Centre Roadmap by Singapore's Infocomm Media Development Authority (IMDA) outlines a sustainable growth plan for data centres. It aims to boost energy efficiency and expand capacity through green energy solutions. Key initiatives include achieving a Power Usage Effectiveness (PUE) of 1.3 or lower, adopting energy-efficient infrastructure and collaborating with industry to drive innovation and use of low-carbon energy sources. This roadmap supports Singapore's digital economy ambitions while addressing resource challenges in data center growth.

The Green Data Centre Standard developed by IMDA aims to reduce energy consumption and operating costs for data centres. It is based on the ISO 50001 energy management system, tailored for Singapore's needs, and uses the Plan-Do-Check-Act (PDCA) methodology for continuous improvement. The standard includes metrics to track energy efficiency and offers industry best practices to enhance the design and management of data centres.

GREENING THE AI LIFECYCLE

While measurement can reveal the current status and help organisations track progress, moving the needle on AI-related carbon emissions requires addressing each step of the development, implementation and adoption life cycle.

We recommend an approach that emphasises three actions: Rethink, reuse, and reduce (see Figure 1). Applied across the AI life cycle, these actions can generate more value from less data, cut costs and reduce AI's environmental impact.[12]

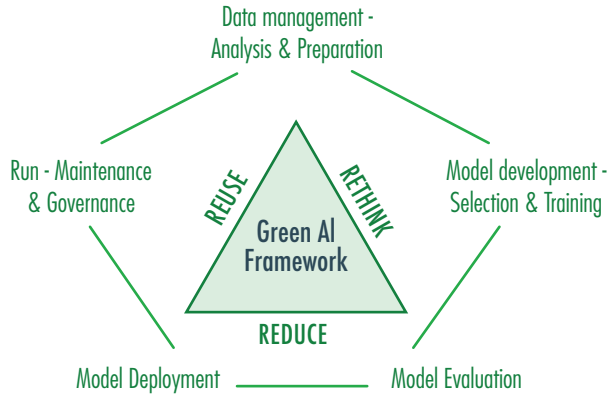


Figure 1 – A lifecycle approach to mitigation

6 https://www.europarl.europa.eu/doceo/document/TA-9-2024-0138_EN.html
7 https://iea.blob.core.windows.net/assets/6b2fd954-2017-408e-bf08-952fdd62118a/Electricity2024-Analysisandforecastto2026.pdf
8 https://mashable.com/article/ai-environment-energy
9 https://sci.greensoftware.foundation/
10 https://www.green-algorithms.org/
11 http://stanford.edu/%7Ephend/papers/ClimateML.pdf
12 https://sloanreview.mit.edu/article/how-developers-can-lower-ais-climate-impact/

RETHINK

More energy-efficient approaches to AI don't always require significant compromises on the quality of AI models. For example, researchers from Google and University of California, Berkeley have shown that the carbon footprint of large language models can be reduced by 100 to 1,000 times with the appropriate choice of algorithms, customised hardware and energy-efficient cloud data centres.[13] An experiment with a Kaggle dataset of nature scenes found that training a model on 70% of the data reduced accuracy by less than 1% but cut energy consumption by 47%.[14] It also revealed that one-time data learning is more energy-efficient than continuous learning and that retraining is only necessary when training data exceeds a certain threshold. Federated machine learning, which allows models to be trained on data from multiple sources without sharing the data itself, improves model quality while reducing costs and energy consumption by minimising the data each organisation needs to generate and store.

Data quality is as important as quantity. Class-imbalanced datasets, such as those with more white Caucasian males than dark-skinned Asian women, require three times the energy and twice the data to achieve the same accuracy as balanced datasets.[15] Ensuring data quality helps achieve performance goals with less energy. While deep learning, which is energy-intensive, can benefit from techniques like pruning, which reduces model size and improves efficiency. Sparse modeling offers an alternative for low-power applications with limited datasets. Businesses should carefully choose the most appropriate AI technique for their needs, as simpler predictive models are often more efficient and greener than energy-consuming generative AI models.

REUSE

Transfer learning allows a model trained on one task to be repurposed for a related task, significantly reducing computation and data storage costs and emissions. In training a computer vision model, Accenture found that transfer learning required 22 fewer epochs (an epoch refers to one complete pass of the entire training dataset through the learning algorithm) and was four times faster in reaching the same accuracy (95%) compared to training from scratch, while consuming 99.3% less energy. For language models, transfer learning techniques' energy consumption varies: pretraining on specific tasks with reduced datasets is less energy-intensive than pretraining on full-domain datasets, and task-adaptive pretraining improves model performance with lower perplexity scores.

During deployment, distilling the knowledge from a large teacher model into a smaller student model can further reduce energy consumption. In our experiment, the student model used 2.7 times less energy during inference than the teacher model. However, this approach may not be effective if the original model requires frequent retraining, as the smaller model would also need retraining, potentially negating the energy savings.

REDUCE

New approaches are emerging to reduce the energy consumption of Graphics Processing Units (GPUs) commonly used in model training. Researchers at Harbin Institute of Technology and the University of Leeds have developed GPOEO, a micro-intrusive GPU energy optimisation framework that adjusts energy settings based on task patterns. This method requires minimal intervention—users only need to mark the start and end of the code to be optimised—after which GPOEO monitors workload patterns and configures the optimal energy settings. Researchers claim GPOEO can significantly reduce GPU energy consumption without impacting performance.[16]

Once models are deployed, hardware choices like using GPUs and Tensor Processing Units (TPUs) instead of Central Processing Units (CPUs) can further cut energy use. Cloud providers already offer energy-optimised computing. Upgrading to the latest versions of virtual machines can halve energy consumption and emissions at the same or lower cost. To ensure that AI has a net positive impact on the planet, organisations must consider the energy and carbon footprint of their AI initiatives. Leaders should prioritise energy awareness and mitigation as key objectives in AI development and deployment.

CASE STUDY: GREEN SOFTWARE FOUNDATION

Accenture and Microsoft- along with GitHub and Thoughtworks are founding members of the Green Software Foundation (GSF), which aims to build an ecosystem of people, standards, tooling and practices to reduce carbon emissions generated by software development. It's the first such industry consortium born out of a desire to meet the ICT sector's goal of achieving a 45% reduction in greenhouse gas emissions by 2030.[17]

13 https://arxiv.org/abs/2104.10350
14 https://www.kaggle.com/
15 https://sloanreview.mit.edu/article/how-developers-can-lower-ais-climate-impact/
16 https://arxiv.org/pdf/2201.01684.pdf
17 https://greensoftware.foundation/manifesto

The ecosystem has grown considerably, welcoming members such as Mercedes-Benz, Amadeus, HSBC and NTT DATA, among many others. Singapore was the first country to join the foundation, with Infocomm Media Development Authority and GovTech becoming members. Avanade, BCG X, Intel, Siemens and UBS also joined founding members on the Steering Committee to help chart the foundation's path forward.[18]

Dedicated working groups at the GSF are focused on developing standards and tooling to measure application-level carbon intensity and environmental impacts; create patterns for greening AI, and training resources for green software design and engineering. For example, ISO-certified (ISO/IEC 21031:202) Software Carbon Intensity technical specification aims to define a methodology for calculating the rate of carbon emissions for a software system. The aim is to overcome the problems of opaque metrics and inconsistency in how we calculate emission reduction.[19] The SCI score is especially valuable because it equips CIOs with a tangible tool while implementing green initiatives. Using the index, the CIO can measure the SCI score for every application and set specific goals to mitigate emissions.[20]

SUSTAINABILITY BY TECHNOLOGY

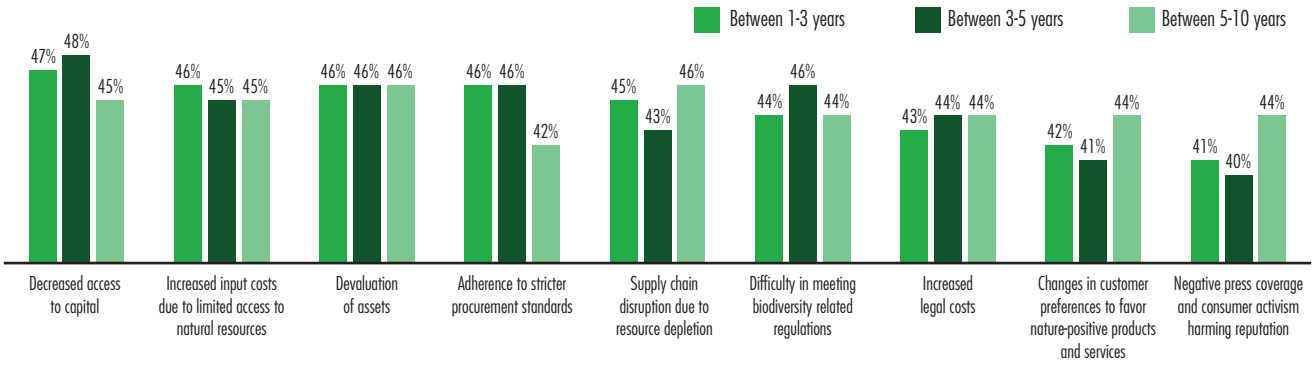
While technology contributes to escalating sustainability challenges, it is also emerging as a critical enabler of the transition to a greener future. Industries worldwide are turning to innovative technological solutions to tackle pressing issues ranging from carbon emissions to resource scarcity to rising energy consumption.

At the heart of this transformation are AI, cloud computing, blockchain, analytics, the Internet of Things (IoT) and synthetic biology. These technologies can drive significant progress in sustainability by optimising resource use, enhancing energy efficiency and creating new, sustainable production methods.

RESHAPING SUSTAINABILITY WITH AI AND SYNTHETIC BIOLOGY

In the face of climate change and the environmental crisis, which are altering production capacity[21] and exacerbating shortages of raw materials,[22] companies have no choice but to embrace the "bio-industrial revolution" or risk dealing with price increases and regulatory penalties. Other concerns that surfaced in Accenture's Biodiversity Needs Tech Survey of 1,495 executives across 16 countries and 19 industries in 2023 include supply chain disruptions due to resource depletion stemming from biodiversity loss, decreased access to capital, devaluation of assets and increased legal costs (see Figure 2).

Figure 2 – Key concerns for business executives from nature and biodiversity loss



Source: Accenture, Biodiversity needs tech survey, 2023

The bio-industrial revolution offers a path to create both economic and environmental value by leveraging biological processes—such as using microorganisms or enzymes—to produce chemicals, fuels and materials. Take the example of Biomason.[23] The biotechnology company is using its proprietary technology to battle carbon emissions. The company uses microorganisms to grow carbon-capturing synthetic concrete that is stronger than traditional concrete. Basecamp Research leverages AI to discover novel proteins that form the basis for nov-

18 https://greensoftware.foundation/
19 https://greensoftware.foundation/articles/sci-specification-achieves-iso-standard-status
20 https://www.cio.com/article/2515772/green-software-foundation-on-a-mission-to-decarbonize-software.html
21 https://www.sciencedirect.com/science/article/pii/S0095069620300838
22 https://e360.yale.edu/features/how-climate-change-is-disrupting-the-global-supply-chain#:~:text=As%20the%20ripple%20effects%20of,are%20probable%20consequences%2C%20Mims%20said.
23 https://www.forbes.com/sites/johncumbers/2022/05/16/concrete-has-a-dirty-little-secret-can-biology-solve-it/?sh=4d9a6ad253a0

el raw materials, thus resolving critical supply shortages.[24] Eat Just-owned GOOD Meat creates synthetic meat by painlessly extracting animal cells and cultivating them in controlled environments.[25] This shifts agricultural production from traditional farms to more sustainable, laboratory-based methods using the latest technology.

Together, synthetic biology and AI promise a future where supply constraints and raw material shortages are overcome with less ecological impact as companies take control of their supply chains and drive resiliency, innovation and value.

ACCELERATING THE ENERGY TRANSITION WITH AI

Energy companies are increasingly adopting AI to enhance the efficiency and sustainability of their operations to maximise the efficient use of current resources as they transition to renewable sources. AI is already transforming key areas, such as reducing carbon emissions, preventing cyber threats and predicting mechanical failures.[26] Generative AI can help the energy sector reduce greenhouse gases, increase energy efficiency and create new low-carbon innovations and solutions. It can be used to predict energy demand or boost the production of renewable energy by optimising design (like locating solar panels or designing blades for wind turbines) based on weather patterns.

Take the case of Duke Energy, one of the largest US energy holding companies, which prioritises reducing methane emissions as part of its commitment to future generations. The company worked with Accenture to develop a cloud platform that monitors baseline methane emissions from natural gas distribution assets (such as pipelines and gas metres), using satellite monitoring, analytics and AI. The solution quantifies and prioritises findings in graphic dashboards, making data easily consumable at multiple levels of the organisation. Once scaled across all asset types, emission categories and jurisdictions, the platform will help Duke Energy's natural gas business reduce methane emissions and achieve its net-zero methane goals for 2030. Importantly, this solution has the potential to accelerate the journey to net zero for the industry.[27]

INFUSING AI INTO NATURE AND BIODIVERSITY CONSERVATION

Technology plays a crucial role in helping organisations bridge the information gap as they try to address their nature-related interdependencies. AI-powered systems can detect and interpret complex patterns that are beyond the capabilities of the human brain. Insights from these analyses can help businesses anticipate risks such as supply chain disruptions or increased costs resulting from biodiversity loss, enabling proactive decision-making.

Today, companies are increasingly leveraging AI to drive their biodiversity initiatives. Beyond ecosystem monitoring and conservation, AI enhances business decision-making by integrating diverse data sources and offering specific, actionable insights. For example, AI tools are being used to map ecosystem changes and consolidate data across business units, leading to more informed strategies.[28]

Potential use cases for advances in AI, such as generative AI, are still waiting to be explored. For example, generative AI can produce synthetic data based on small biodiversity datasets.[29] This synthetic data can then potentially be used to create traditional AI platforms or sophisticated digital twins for biodiversity preservation and restoration. The BioDT project, funded by the European Union, is currently developing a digital twin prototype for advanced modelling, simulations and predictions for evidence-based biodiversity restoration.[30]

CASE STUDY: ROCHE'S USE OF AI TO ACHIEVE SUSTAINABILITY GOALS

Roche, a global healthcare leader, is leveraging cutting-edge technologies such as AI to enhance both its healthcare services and its commitment to sustainability. As part of its broader Environmental, Social, and Governance (ESG) strategy, Roche has adopted AI not only to drive innovation in drug discovery, clinical trials, diagnostics and supply chain management but also to reduce its carbon footprint and contribute to the United Nations' Sustainable Development Goals (SDGs). The company has realised several key benefits through these AI implementations that embed sustainability principles into business operations, contributing to environmental and social benefits:

- Predictive healthcare: AI systems developed by Roche contribute to sustainability by improving health outcomes, reducing the need for repeat treatments, and minimising waste in the healthcare process. For example, predictive healthcare models can anticipate disease

24 https://www.basecamp-research.com/who-we-are
25 https://www.goodmeat.co/process
26 https://www.ft.com/content/07671f2e-d7b4-4f94-836c-eb0be9f6b605
27 https://www.accenture.com/us-en/case-studies/utilities/duke-energy-powers-ai-platform
28 https://cmr.berkeley.edu/2023/09/biodiversity-needs-ai-infusing-intelligence-into-biodiversity-preservation-and-restoration/
29 https://www.technologyreview.com/2022/02/23/1044965/ai-synthetic-data-2/
30 https://biodt.eu/

outbreaks and enable preventive measures, thus reducing the environmental burden associated with reactive treatments. AI accelerates the identification of potential drug candidates by analysing vast biological datasets to promote good health and wellbeing. Predictive models also assist in optimising the drug development pipeline, thus reducing the time and resources required to bring new therapies to market.

- Low-carbon clinical trials: Roche has collaborated with the Sustainable Healthcare Coalition (SHC) on the Industry Low Carbon Clinical Trials (iLCCT) initiative. This collaboration is focussed on measuring and reducing the carbon footprint of clinical trials, including patient travel, lab kit design and waste management. Roche is creating a roadmap for decarbonising clinical trials, setting a precedent in the healthcare sector. AI also helps improve patient recruitment by matching patients more efficiently to trials, leading to faster and more targeted enrollment. Additionally, AI enhances data analysis from trials, resulting in quicker and more accurate insights into drug efficacy and safety.

- Diagnostics: AI-powered imaging tools help detect diseases like cancer with high precision, and AI supports personalised medicine by tailoring treatments based on individual patient data.

- Supply chain: AI-driven predictive maintenance optimises equipment uptime, while AI enhances demand forecasting, reducing waste and improving inventory management.

- Energy-efficient infrastructure: Roche's Tower 2 in Basel serves as a testament to the company's commitment to sustainability. The tower was built using innovative techniques and energy-efficient concepts, consuming the equivalent energy of just one LED bulb per square metre. The construction aligns with Roche's goal of reducing greenhouse gas emissions and optimising resource use.

Roche is also fully aware of the environmental impact of AI systems, particularly the energy consumption associated with data processing and AI training models. To address these concerns, Roche aimed to continuously reduce the impact of our business operations and has taken some steps to embed sustainable practices into its AI development and usage. It's crucial to continually assess emerging technologies for their potential to provide energy-efficient solutions. Truly understanding the energy consumption of future chips will be key in making informed decisions that support both innovation and environmental responsibility.

Roche's integration of AI into its operations serves as an example of how technology can drive both innovation and sustainability. By embedding AI into its drug development, clinical trials and diagnostics processes, Roche is not only improving healthcare outcomes but also reducing its environmental impact. Through strategic collaborations and a clear focus on sustainable practices, Roche continues to lead the healthcare industry in both AI innovation and the pursuit of ESG goals.[31] [32] [33]

31 https://www.roche.com/stories/harnessing-the-power-of-ai
32 https://www.roche.com/stories/future-innovation
33 https://www.roche.com/investors/updates/inv-update-2023-11-21

CONCLUSION

Sustainable technology has become critical for addressing environmental challenges and shaping the future of industries. Advanced technologies, such as AI and synthetic biology, offer significant potential to enhance resource efficiency, reduce emissions and minimise environmental impacts. However, these innovations also present challenges related to energy consumption and sustainability.

To achieve meaningful progress towards net-zero targets, it is crucial to focus on minimising the environmental footprint of technology while using it to drive sustainable solutions. This requires adopting efficient practices across the entire technology lifecycle, from development to deployment, and embracing innovative approaches that align with both environmental and business objectives.

Collaboration among sectors, alongside clear regulatory frameworks, will play a pivotal role in accelerating the transition toward a more sustainable future. Technology must be positioned at the centre of efforts to create a resilient and sustainable world, driving action beyond individual organisations and industries. The path forward demands bold action, innovation, and a relentless focus on integrating sustainability into every aspect of technological advancement.

APPENDIX

Pillar description: Sustainovative Technology

This pillar focusses on Technology – providing solutions to help society become more sustainable, more efficient and shrink their carbon footprint. Technology must aim to address an urgent twofold imperative: A "With Technology" approach, which signifies a collaborative approach that involves integrating technology seamlessly into existing processes; and a "By Technology" approach where technology takes on a central role, acting as the driving force behind desired outcomes.

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LEAD AUTHORS

Alison Kennedy, APAC Sustainability and Enterprise Reinvention Lead, Accenture
Sanjay Podder, Global Lead - Tech Sustainability Innovation, Accenture
Shalabh Kumar Singh, Principal Director, Accenture Research
Giju Mathew, Senior Principal, Accenture Research

CONTRIBUTION & REVIEW

Matthew Robinson, Managing Director, Accenture Research
Arun VT, Senior Manager, Accenture
Nele Cornelis, Executive Director, EuroCham Singapore

EDITORIAL SUPPORT

Ramani Moses, Senior Editor, Accenture Research
Tanya Sahni, Advocacy and Programmes Manager, EuroCham Singapore

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1. INTRODUCTION

A 'supply chain' refers to the system and resources required to move a product or service from supplier to customer. The 'value chain' concept builds on this to also consider how value is added to the product or service along that chain.[1] Amongst several attributes such as efficiency, innovation and collaboration, a strong value chain is also defined by its capacity to adapt to changes. This entails having the capability to mitigate risks and disruptions whilst creating value in areas such as closing material loops and addressing ethical concerns. In today's globalised and dynamic world, value chains face a growing and formidable challenge - the escalating climate crisis.

The 2023 annual report from the U.N. Environment Programme confirmed that we are experiencing a concerning acceleration in the frequency and intensity of climate-related events, with temperatures already surpassing 1.5°C above pre-industrial levels on 86 days of the year.[2] The 1.5°C scenario is a physical limit beyond which our planet's systems enter a danger zone of cascading climate tipping points that propel further warming. Monthly or annual exceedances are early signs of overshoot, which may culminate in severe and irreversible impacts. The impacts of climate change are already being felt. According to the World Meteorological Organisation (WMO), the number of extreme weather events has increased by a factor of five in the past fifty years.[3] Failure to significantly reduce global greenhouse gas (GHG) emissions by 2030 will make it exceedingly difficult to limit global warming to the 1.5°C or 2°C targets set by the 2015 Paris Agreement.

The impacts are also being felt by corporates around the world. A climate risk study conducted by the Business Continuity Institute in 2023 found that, amongst all operations, supply chain disruptions were the most cited effect of extreme weather events, resulting in several cases of transport routes and production facilities being shut down.[4] Ports, rail lines, highways, and other transportation and supply infrastructure are vulnerable to climate-risks such as raising sea levels, which are estimated to raise as much as two to six feet by the year 2100.[5] Around 90% of the world's freight moves by ship, and inundations are expected to threaten most of the world's coastal ports. This is especially relevant in Asia, where many countries are island or coastal economies, leaving them exposed to risks such as flooding and rising sea levels. Climate risks may also disrupt local communities in many ways, which can affect a supplier's labour force. For example, climate change may aggravate disease vectors that worsen worker health and put additional stress on public health infrastructure.[6] Impacts can consequently materialise in the form of interruptions to operations at unpredictable intervals and severity.

Combined, the associated environmental risks are estimated to cost companies worldwide as much as USD 120 billion by 2026.[7] To limit global warming and avoid the worst impacts of climate change, companies must act and prioritise decarbonisation efforts across their value chains.

1 https://www.cisl.cam.ac.uk/education/graduate-study/pgcerts/value-chain-defs
2 https://www.unep.org/resources/emissions-gap-report-2023
3 https://wmo.int/media/news/weather-related-disasters-increase-over-past-50-years-causing-more-damage-fewer-deaths
4 https://resiliencefirst.org/sites/default/files/2023-
5 https://e360.yale.edu/features/how-climate-change-is-disrupting-the-global-supply-chain
6 https://www.bsr.org/reports/BSR_Climate_and_Supply_Chain_Management.pdf
7 https://www.cdp.net/en/articles/supply-chain/environmental-supply-chain-risks-to-cost-companies-120-billion-by-2026

Value chain emissions, also known as Scope 3 emissions, refer to GHG emissions associated with a company's activities beyond its direct operations and purchased energy. The GHG Protocol subcategorises Scope 3 emissions into various sources such as purchased goods and services, and waste generated in operations.[8] In 2021, research by environmental NGO, CDP, found that emissions from supply chains are 11.4 times greater than emissions from direct operations.[9] Value chains are thus a crucial area of action for a company to become environmentally sustainable in the long term.

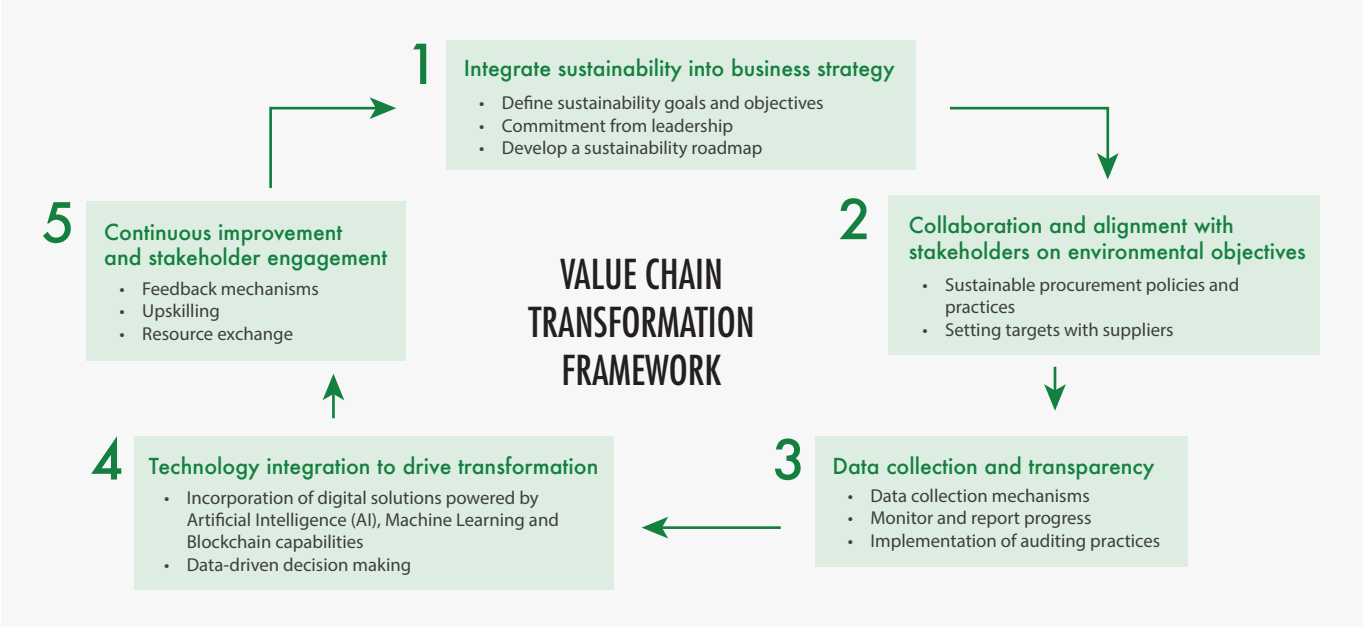
Regulators are also recognising the importance of greener and more resilient value chains. Various laws and regulations have been established, or are being deliberated, to drive climate action across corporate value chains. One of the most significant recent legislations set in motion is the European Union's (EU) Corporate Sustainability Due Diligence Directive (CSDDD) where companies with a presence in the EU are required to identify, prevent and remedy ESG-related risks in their supply chains - placing an emphasis on their environmental and ethical sourcing practices. This growing emphasis on accountability is also driven by a burgeoning demand for transparency and disclosure by various stakeholders. Governments and Investor, in particular, are actively embarking on efforts to enhance the environmental performance of companies such that they remain competitive and resilient.[10] In Singapore's 2024 Budget speech, the Prime Minister and Minister for Finance, Mr Lawrence Wong, emphasised that sustainability would be key for local companies to remain competitive in global value chains. This, because multi-national enterprises (MNEs) are already working to reduce their carbon footprints and are therefore expecting suppliers to do the same.[11] This is especially relevant in recognition of Singapore's status as a major trade hub in Southeast Asia, and the city state's national target to achieve net-zero emissions by 2050.

Taking all the above into consideration, it has become a business imperative for companies with a presence in Europe and Singapore to focus on the sustainability profile of their value chains and work with likeminded partners who share the same strategies and priorities.

2. IMPROVING ENVIRONMENTAL PERFORMANCE ACROSS GLOBAL VALUE CHAINS

For companies that wish to improve resilience, mitigate climate-related risks, and create value, a strategic focus on sustainability is essential. This approach does not only involve evaluating and improving environmental performance of core operations, but also extending these considerations to their value chain. By acknowledging and addressing environmental issues associated with their suppliers, logistics, and production processes, companies can create a more comprehensive and effective sustainability strategy. This holistic perspective ensures that all stages of operations, both direct and indirect, contribute to enhancing resilience against climate-related risks, and also creates value by reinforcing commitment to sustainability. This can be achieved through several methods. In the following section, we present a holistic value chain transformation framework as an example that companies can follow to improve their environmental performance and mitigate risks to create value within their own value chains. The framework includes the following five steps:

Figure 1: Value Chain Transformation Framework



8 https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf
9 https://cdn.cdp.net/cdp-production/cms/reports/documents/000/005/554/original/CDP_SC_Report_2020.pdf?1614160765
10 https://www.channelnewsasia.com/singapore/budget-2024-singapore-introduce-new-refundable-tax-credit-attract-high-quality-investments-4128701
11 https://www.mof.gov.sg/docs/librariesprovider3/budget2024/download/pdf/fy2024_budget_statement.pdf

STEP 1: INTEGRATE SUSTAINABILITY INTO BUSINESS STRATEGY

To begin embedding sustainability objectives into the value chain, companies must first integrate sustainability into their core business strategy. This involves establishing clearly defined sustainability goals and targets that align with the company's vision and mission.[12] Best-practice targets should be set in alignment with national or regional targets that are specific, measurable, time-bound and science-based. For example, as part of the EU Green Deal, the EU has set a target of reducing GHG emissions by at least 55% by 2030[13] and being climate-neutral (net-zero greenhouse gas emissions) by 2050.[14] To prepare for potential stricter policies and regulations to support these targets, companies can mitigate risk and increase preparedness by aligning their own targets accordingly. Companies with operations extending to Southeast Asia and Singapore should also consider the national initiatives and targets across all jurisdictions in which they operate. For example, Singapore has set a target of achieving net zero emissions by 2050[15] and involvement by the corporate sector will be crucial for achieving this.

Leadership commitment is vital in this endeavour and the senior management should champion sustainability goals and targets by incorporating them into the company's core values and strategic objectives. Developing a detailed sustainability roadmap with specific and measurable short-term and long-term milestones, a clear execution plan, responsibilities, and resource allocation is also essential. A clear and systematic roadmap can guide a company to successfully embed its sustainability initiatives across all aspects of its operations – both direct and indirect.

STEP 2: COLLABORATION AND ALIGNMENT WITH KEY STAKEHOLDERS ON ENVIRONMENTAL OBJECTIVES

To achieve environmental objectives that stretch beyond a company's direct operations, it is essential for all relevant stakeholders to be involved and aligned on these objectives. Value chain sustainability should not be pursued as a standalone initiative but as a multi-faceted and collaborative effort considering the length of the value chain – from product development, procurement, production, logistics and distribution to after-sales service and end-of life operations such as return, reuse, and recycling.[16] It is therefore important for companies to cascade their targets throughout their supply chain. This involves close collaboration with suppliers and other partners in the value chain to set expectations and ensure their alignment and contribution towards these targets. A key initial step here is for companies to first assess its current suppliers to identify the primary contributors to their environmental footprint and prioritise emissions reduction and improvements for this segment. Companies can achieve this through a mapping exercise starting with Tier 1 suppliers and branching downstream to develop a clear overview and gain insights into the overall environmental footprint of its value chain.[17] For many companies, the majority of Scope 3 emissions will come from a smaller sub-set of suppliers. Identifying this smaller group of suppliers will make the subsequent engagement more manageable. When engaging suppliers on environmental initiatives, it is important to also consider their current level of maturity. Unlike many larger MNEs, smaller suppliers may not have the resources or experience to implement environmental initiatives. To ensure effective engagement and implementation, companies should therefore provide opportunities for training and collaboration, as well as developing policies and practices that accounts for their suppliers' different stages of maturity. These can be effective ways for the company to extend impact beyond its direct operations.[18] We provide real-world examples of how this can be achieved through case studies later in this chapter.

When onboarding new suppliers, companies should also consider establishing procurement policies that promote sustainable practices and incorporate sustainability criteria into their supplier selection and evaluation processes. These policies should ensure that all suppliers align and adhere to your company's environmental, governance, and social standards.

By setting expectations, fostering partnerships and providing support, companies can drive collective action and improve the environmental performance and resilience of their value chain.

STEP 3: DATA COLLECTION AND TRANSPARENCY

Once a company has embedded sustainability objectives and initiatives into its value chain, measuring and understanding performance will be key. We cannot manage what we do not understand, and we cannot understand what we do not measure. Effective data collection can be achieved by implementing standardised systems and frameworks to collect data on defined sustainability metrics such as carbon emissions, waste management, and water usage. In doing so, companies can gain meaningful insights and take control of their impacts and risks by optimising value chain operations and making adjustments to improve efficiency.[19] Some examples of environmental topics and corresponding metrics to track performance across value chains are illustrated in Table 1.

12 https://www2.deloitte.com/uk/en/insights/environmental-social-governance/integrating-sustainability-into-business-strategy.html
13 https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-targets_en#:~:text=In%202023%2C%20the%20EU%20adopted,climate%2Dneutral%20continent%20by%202050
14 https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2050-long-term-strategy_en#:~:text=The%20EU%20aims%20to%20be,to%20the%20European%20Climate%20Law%20
15 https://www.nccs.gov.sg/singapores-climate-action/singapores-climate-targets/overview/
16 https://www2.deloitte.com/content/dam/Deloitte/de/Documents/energy-resources/Deloitte_Sustainable%20Value%20Chain%20Transformation.pdf
17 https://www.oracle.com/sg/scm/supply-chain-transparency/
18 https://hbr.org/2020/03/a-more-sustainable-supply-chain
19 https://www2.deloitte.com/content/dam/insights/us/articles/supply-chain-transparency/DUP785_ThePathtoSupplyChainTransparency.pdf

Table 1: Examples of key sustainability areas and metrics to understand impacts across the value chain

AREA	METRIC
Carbon footprint	Total GHG emissions (CO_2e) in direct and indirect operations (Scope 1,2,3) Emissions per product unit
Energy usage	Total energy consumption Percentage of renewable energy used
Water usage	Total water consumption Water usage per product unit
Waste	Total waste generated Waste diverted from landfill (recycling, composting)
Material use	Raw material usage Percentage of recycled materials used Material efficiency (waste per unit of production)
Operational efficiency	Production costs Resource efficiency (cost per unit produced)

Tracking and monitoring value chain emissions, or Scope 3 emissions, is a critical component of an organisation's overall sustainability efforts to reduce its environmental impact, manage risks, and create value. To effectively collect Scope 3 emissions data, companies must develop capabilities that enable them to work closely with their value chain partners. A key starting point would be to adopt a recognised GHG accounting and reporting standard such as the GHG Protocol for all its suppliers. The GHG Protocol's Corporate Value Chain (Scope 3). Accounting and Reporting Standard is considered one of the key global standards for measuring and managing Scope 3 GHG emissions, helping companies assess and report the emission footprint of their entire value chain and identify where to focus reduction activities.[20] These standards enable companies to collect data from suppliers in a standardised and consistent manner, and to identify emissions hotspots in the value chain. To increase the quality and reliability of the data, companies should ensure that the data is collected in a manner that is traceable and verifiable.

STEP 4: TECHNOLOGY INTEGRATION TO DRIVE TRANSFORMATION

Advancements in technology and digital solutions can be a gamechanger in accelerating and improving sustainability efforts across the value chain by enabling high quality and consistent disclosures from supply chain partners, facilitating more streamlined collaboration, as well as identifying areas for improvements.

Examples of areas where technology can be integrated to improve environmental performance, create value and overcome challenges across the value chain are shown in Table 2 below.

Table 2: Examples of technological solutions to support value chain transformation

AREA OF TRANSFORMATION	CHALLENGE	TECHNOLOGICAL SOLUTIONS
Supplier selection and engagement	Collecting consistent and reliable data on your suppliers' environmental impact and performance can be a resource-intensive and time-consuming process. The lack of transparency and direct control can hinder proper assessment and compromise sustainability efforts. European MNEs with extensive networks of suppliers across Asia Pacific are a case in point, given geographical distances, language barriers, and varying standards and practices.	**Emerging Generative AI algorithms** can analyse large volumes of publicly available data to generate actionable insights.[21] By analysing a wide range of factors such as supplier certifications, environmental performance, and ethical practices, companies can identify suppliers that align with their company's sustainability goals and priorities. Furthermore, **centralised communication platforms and cloud-based supply chain solutions** can facilitate training, resource sharing and engagement between companies and their suppliers in a standardised manner, promoting collaboration and effective data exchange.

20 https://ghgprotocol.org/scope-3-calculation-guidance-2
21 https://www2.deloitte.com/us/en/blog/business-operations-room-blog/2023/generative-ai-in-procurement.html

Data collection, analysis and disclosure	Despite companies recognising the need for comprehensive and accurate disclosures, many struggle to achieve it. According to a survey by Deloitte, 35% of executives cited accuracy and completeness of data as their biggest challenge for generating high-quality ESG reports.[22] In particular, companies face challenges in collecting Scope 3 data as they rely on third-party partners to provide the data in a comprehensive, standardised and timely manner.	**Reporting software and cloud-based solutions** enable companies to streamline data collection and analysis data on key sustainability metrics such as carbon emissions, energy consumption, and waste generation. By leveraging, software with defined metrics and templates, companies can collect data from their suppliers in a more standardised, timely, and effective manner. Leveraging technology also enables companies to improve the transparency and verifiability of their Scope 3 emissions data. **Generative AI algorithms** can analyse large volumes of data collected throughout the supply chain, identifying patterns and generating actionable insights. This allows companies to analyse their performance in real-time, draw comparisons across time periods and locations, and identify low-hanging fruits for emissions reduction.[23]
Life-cycle assessment (LCA) and product design	LCAs must account for all phases of a product's life cycle, from raw material extraction to disposal. This complexity can make the process resource-intensive and time-consuming.	**Supply chain management technologies equipped with Artificial Intelligence (AI) and/or Internet of Things (IoT)-enabled devices** can track the origin of ingredients and raw materials, thereby enabling complete supply chain traceability. By considering factors such as materials used, manufacturing processes, transportation, and end-of-life disposal, **generative AI algorithms** can also generate key insights to optimise product design and reduce overall environmental footprint.[24]
Managing and mitigating climate-risks	Companies' exposure to climate-risks is growing as the frequency of extreme weather events increase and regulations become stricter. For example, water shortages from droughts may cause production disruptions; whereas extreme weather events such as floods may disrupt the movement of goods and services.	A variety of **scenario modelling tools, sensing and analytical tools** can help companies better understand how they might be impacted in different climate scenarios. Through advanced scenario modelling, the potential impacts and likelihood of heatwaves, droughts, hurricanes and floods under different future scenarios can be examined using global climate models.[25] By analysing data from various sources such as weather conditions, geopolitical factors, and market trends, **generative AI algorithms** can help companies proactively identify and respond to potential disruptions. Such predictive capabilities can also enable value chains to become more agile and resilient as companies are better able to predict and adjust for potential issues or risks.[26]

STEP 5: CONTINUOUS IMPROVEMENT AND STAKEHOLDER ENGAGEMENT

As discussed in this paper, embedding sustainability into the value chain often requires considerable effort and collaboration, and it must be considered as an iterative journey. As such, the development of an ecosystem of support and collaboration should be established to promote ongoing communication, collaboration, and guidance, as summarised in Figure 2 below. This will enable partners across the value chain to understand where the areas for improvement are and how they can progress and create value in their own sustainability journey.[27] By embedding these practices, companies can create additional value across their value chain by becoming more effective, less harmful to the environment, and more resilient to disruptions.

22 https://www2.deloitte.com/content/dam/Deloitte/us/Documents/audit/us-survey-findings-on-esg-disclosure-and-preparedness.pdf
23 https://www.thomsonreuters.com/en-us/posts/technology/ai-supply-chains/
24 https://www.thomsonreuters.com/en-us/posts/corporates/digital-transformation-supply-chain-transparency/
25 https://www2.deloitte.com/fi/fi/pages/manufacturing/articles/supply-chain-innovation-and-sustainable-value-creation.html
26 https://hbr.org/2023/09/using-technology-to-improve-supply-chain-resilience
27 https://initiatives.weforum.org/net-zero-supply-chain-support-hub/3-4

Figure 2: Support levers for suppliers

3. CASE STUDIES

In the following case studies, we explore how companies with operations in both Europe and Singapore can enhance performance and create value across their value chains through an increased focus on sustainability efforts and initiatives.

UNILEVER

ABOUT THE ORGANISATION

Unilever is one of the world's leading suppliers of Beauty & Wellbeing, Personal Care, Home Care, Nutrition, and Ice Cream products, with sales in over 190 countries and products used by 3.4 billion people every day.[28] With a workforce of 128,000 employees, the company achieved €59.6 billion (US$63.7 billion) in sales in 202328.

Sustainability is at the heart of Unilever's strategy and is guided by the company's Climate Transition Action Plan (CTAP) 29.[29] This comprehensive initiative includes ambitious science-based targets to reduce greenhouse gas (GHG) emissions across its operations and value chain by 2030. Unilever also has a long-term ambition to reach net zero GHG emissions across its entire value chain by 2039.

The company's near-term GHG reduction targets, approved by the Science Based Targets Initiative (SBTi), include:

Operations (Scope 1 & 2)

- Reduce in absolute terms operational (Scope 1 and 2) GHG emissions by 100% by 2030 against a 2015 baseline
- Reduce in absolute terms operational (Scope 1 & 2) GHG emissions by 70% by 2025, against a 2015 baseline (achieved in 2023)

Value Chain (Scope 3)

- Reduce absolute energy and industrial Scope 3 GHG emissions from purchased goods and services (associated with ingredients, packaging), upstream transport and distribution, energy and fuel-related activities, direct emissions from use of sold products (associated with HFC propellants), end of life treatment of sold products, and downstream leased assets (associated with ice cream retail cabinets) by 42% by 2030, from a 2021 baseline
- Reduce absolute Scope 3 forest, land, and agriculture (FLAG) GHG emissions from purchased goods and services (associated with ingredients) by 30.3% by 2030, from a 2021 baseline

To achieve their targets, Unilever is making significant investments to decarbonisation its manufacturing, its value chain, as well as making collaborative efforts to shape industry norms and advocate for supportive policies. To progress towards their near-term Scope 3 GHG reduction targets, Unilever's priority action areas include: A supplier climate programme, reformulating products, forest-risk commodities, regenerative agriculture, chemical ingredients, packaging, logistics, ice-cream cabinets, and aerosol propellants, as highlighted in Figure 3 below. The company estimates that its planned actions have the potential to deliver around two-thirds of the emissions reductions needed to meet its Scope 3 targets.

In the following section, we explore the above mentioned priority areas and discuss initiatives and challenges faced by Unilever in their sustainable value chain journey.

28 https://www.unilever.com/files/92ui5egz/production/b09c3510ee7cec58440d5f044f02bdefe85aa186.pdf
29 https://www.unilever.com/files/92ui5egz/production/2a44a1a76f4899f09a2d745ccdd86d0b65185eb5.pdf

Figure 3: Unilever emissions reduction initiatives in the wider value chain

SUPPLIER CLIMATE PROGRAMME

Unilever's Supplier Climate Programme works to accelerate the transition of key suppliers to a position of climate leadership through setting science-based emissions reduction targets, publicly tracking progress, and sharing Product Carbon Footprint (PCF) data. This initiative includes co-funding supplier access to expert support, sharing best practices, and guiding GHG reduction plans. Unilever is also working to empower its procurement team to integrate emission data and reduction into their strategies.

REFORMULATING PRODUCTS

Unilever sees reformulating products as crucial for reducing emissions across its value chain while maintaining product quality and consumer satisfaction. Some of the key initiatives to achieve this include reformulating home care products with lower GHG ingredients and scaling supply of innovative laundry capsules. In nutrition, the company has placed an emphasis on plant-based ingredients like low-oil mayonnaise and vegan options, aiming for global scalability. Plant-based ice cream, including Ben & Jerry's in Europe, is expanding, alongside research into low-GHG alternatives for palm oil in soap bars.

FOREST-RISK COMMODITIES

Unilever recognises the importance of addressing GHG emissions from their key forest-risk commodities – palm oil, paper and board, tea, soy, and cocoa – and is prioritising a deforestation-free supply chain. By the end of 2023, enhancements in monitoring and infrastructure had enabled the company to achieve 97.5% deforestation-free order volumes. Some of the key initiatives to achieve this included partnering with Google Cloud to enhance traceability and transparency of Unilever's palm oil supply chain through use of satellite technology and promoting sustainable practices among suppliers and smallholder-farmers.

Unilever is investing in landscapes near its sourcing locations, focussing on nine million hectares of land in Latin America, Southeast Asia and Africa. They aim to protect and restore over 200,000 hectares of forest with plans for 300,000 more and collaborate with initiatives like the Dove Nature Regeneration Project.

REGENERATIVE AGRICULTURE

For regenerative agriculture, Unilever is focussing on emission reductions and carbon sequestration, particularly in its soy and rapeseed oil supply chains. The company aims to scale regenerative agriculture to 650,000 hectares by 2027, with current projects expected to reach approximately €140 million (US$149 million28) in investments by 2030, highlighting the company's commitment to resilience and a sustainable value chain. Another initiative is Unilever's Lower Carbon Dairy Programme, which aims to source a significant proportion of their global dairy volume from farms with regenerative agricultural practices by 2030.

To achieve this, Unilever is making strategic investments in programme management and training to expand skilled professionals and farmer engagement. Unilever is also expanding regional partnerships in Latin America, Europe, and U.S, and collaborating with others to help achieve industry-wide understanding of regenerative agriculture principles and practices.

CHEMICAL INGREDIENTS

Unilever is actively reducing GHG emissions from key chemical ingredients such as LAS and soda ash. For example, Unilever is working with suppliers to encourage the adoption of renewable energy sourcing for LAS production and collaborating on a Flue2Chem-project to repurpose waste gases. For soda ash, Unilever plans to use natural gas and biomass while exploring green ammonia for synthetic production.

PACKAGING

Unilever is working to reduce Scope 3 GHG emissions from packaging, primarily from fossil fuel-derived plastics at creation and end-of-life stages. Progress includes increasing post-consumer recycled plastic (PCR) usage from 18% in 2021 to 22% in 2023, reducing reliance on virgin-fossil fuel derived materials. Designing recyclable packaging, advocating for improved collection, recycling and reuse infrastructure,

and scaling reusable packaging models helps minimise waste and emissions, supported by collaborations with global initiatives like the World Economic Forum and Ellen MacArthur Foundation.

Unilever also advocates for the implementation of regulated Extended Producer Responsibility (EPR) schemes to improve packaging collection and processing, as well as a global plastics treaty with uniform rules, and policies to foster an enabling environment for sustainable packaging models, such as refill-reuse systems.

OPERATIONS

Across their operations, Unilever is investing €150 million (US$160 million28) into their manufacturing decarbonisation programme over the next three years, focussing on decarbonising thermal and electrical energy, increasing the use of renewable power, and reducing emissions from refrigeration. This programme targets the transition to 100% renewable electricity, energy, and heat sources, and depends on cost-effective thermal energy solutions, local availability of sustainability sourced biofuels, and continued validity of market-based mechanisms for renewable energy (e.g., Energy Attribute Certificates (EACs).

LOGISTICS

Unilever aims to reduce emissions from its global logistics and distribution networks by enhancing network efficiency, targeting a 16% reduction in upstream transport emissions by 2026, as well as scaling electric and alternative fuel vehicles in major markets like the US, Europe, China, and Brazil post-2026. To overcome infrastructure challenges, Unilever engages with coalitions like the Smart Freight Centre, Cargo Owners for Zero Emission Vessels, and Global Maritime Forum to advocate for faster adoption of clean technologies and supportive government policies globally.

ICE CREAM CABINETS

Unilever is addressing GHG emissions from its global cabinet fleet of nearly three million ice cream freezers to enhance energy efficiency. This involves transitioning to more energy-efficient models and components that can reduce energy usage by 15-20%. Unilever also plans to adjust cabinet temperature settings, to potentially reduce energy consumption by 20-30% per freezer, while reformulating products to maintain quality at higher temperatures. Unilever plans to grant free licences for 12 reformulation patents to support industry-wide adoption of warmer cabinets.

AEROSOL PROPELLANTS IN NORTH AMERICA

Unilever uses natural hydrocarbon gases for aerosol sprays globally except in the US and Canada, due to volatile organic compound (VOC) regulations. Now that regulations in the US have changed, Unilever is working to develop aerosols using propellants with lower global warming potential, and is also engaging with stakeholders to ensure consumer acceptance of new propellant innovations.

CHALLENGES

Unilever's Scope 3 emissions, which are outside of the company's direct control, account for 98% of its GHG footprint. A large proportion of Unilever's emissions comes from raw materials and ingredients – accounting for 53% – and addressing this requires strong collaboration with stakeholders across the value chain to change the status quo.

Unilever recognises that it must use its voice to accelerate system change, which will in turn unlock faster emissions reduction opportunities. The company also emphasises the importance of collaborative efforts with governments, regulators, and industry to reform systems and enable significant emissions reductions.

LESSONS LEARNT

Unilever has gathered valuable lessons from its sustainability journey that guide its future strategies 30. The main takeaways are:

1. Focus and Prioritisation: The importance of focussing efforts on key sustainability priorities to achieve tangible outcomes, as demonstrated in achieving 97.5% deforestation-free order volumes at the end 2023.
2. Urgency and Action: Balancing long-term ambitions with accelerating short-term actions and integrating sustainability into business strategy to drive impactful change swiftly as demonstrated by having a Net Zero by 2039 ambition but also setting near-term science-based targets for reducing Scope 3 GHG emissions by 2030.
3. Systemic Change: Advocating for systemic changes beyond direct control to accelerate sustainable outcomes across value chains.

Unilever is motivated by a belief that businesses have a responsibility and opportunity to contribute positively to the society and environment in which they operate. The company has already reaped substantial benefits from its sustainability efforts, including enhanced resilience in supply chains, cost savings through efficiency improvements, and the attraction of top talent. Looking forward, Unilever sees an opportunity

to define a new era of sustainable business leadership—by accelerated delivery of sustainability goals integrated into core business performance.[30] This reflects not only internal aspirations but also external expectations from stakeholders, including investors and consumers.

CARLSBERG

ABOUT THE ORGANISATION

Founded in Denmark in 1847, the Carlsberg Group is one of the leading brewery groups in the world today. It operates in more than 125 markets worldwide,[31] offering a diverse portfolio of more than 140 beer types, including core beers, craft and specialty brews, and alcohol-free options.[32] Aligned with its purpose of 'Brewing for a Better Today and Tomorrow,' Carlsberg established its core value 'Semper Ardens', Latin for 'always burning'- reflecting its commitment to perfection in brewing, sourcing, packaging, and transportation.

In Southeast Asia, Carlsberg Malaysia Group, incorporated in 1969, was the first brewery built outside of Denmark. It is a publicly listed company in Malaysia with a state-of-the art brewery in Shah Alam producing beers, stouts, ciders, and non-alcoholic beverages for its operations in Malaysia and Singapore. It also owns a 25% stake in a beer company in Sri Lanka and has a regional presence via exports and intercompany sales to Hong Kong, Cambodia, and Laos. In 2023, the Carlsberg Malaysia Group delivered strong results, with a revenue of RM2.3 billion (approximately USD 529.6 million) and net profit of RM327.3 million (approximately USD 75 million).

TOGETHER TOWARDS ZERO & BEYOND (TTZAB) ESG PROGRAMME

Together towards ZERO and Beyond (TTZAB) ESG Programme is the Carlsberg Group's renewed commitment and response to global challenges. The programme is anchored on Carlsberg's purpose of Brewing for a Better Today and Tomorrow, outlining its ambition towards achieving its ZERO targets.

Carlsberg is committed to addressing climate change, recognising that fossil fuel emissions such as coal, oil, and gas are the primary contributors to global warming, leading to rapid changes in weather patterns and disruptions to ecosystems and human life. The company has set ambitious targets through a range of initiatives such as ZERO Carbon Footprint, ZERO Farming Footprint, ZERO Packaging Waste, ZERO Water Waste, ZERO Irresponsible Drinking, and a ZERO Accidents Culture. Adapting to local operating environments and communities, Carlsberg Malaysia Group is also committed to addressing seven key areas: Responsible Sourcing, Promoting Diversity, Equity, and Inclusion, Respecting Human Rights, Living By Our Compass and Community Engagement, Product Quality & Safety and Safeguard Our License to Operate.

As awareness of the environmental impact of packaging grows, Carlsberg Group continues to place focus on it. Packaging accounts for 45% of the CO_2 emissions in its value chain.[33] In the following section, we explore one of Carlsberg Group's ZERO targets: its ZERO Packaging Waste initiative.

ENVIRONMENTAL INITIATIVES: ZERO PACKAGING WASTE

To Carlsberg Group, achieving ZERO Packaging Waste reflects its commitment to optimising resource efficiency by reducing, reusing, recycling, and rethinking packaging materials. This dedication is aligned with its aim of promoting a circular economy, ensuring sustainable resource utilisation, and minimising waste. By 2030, Carlsberg Group aims to achieve:

ZERO Packaging Waste Targets

1. 100% recyclable, reusable, or renewable packaging
2. 90% collection and recycling rate for bottles and cans
3. 50% reduction of virgin fossil-based plastic
4. 50% recycled content in bottles and cans

Carlsberg Group works with suppliers on innovations to support their ZERO Packaging Waste ambitions by reducing material use and introducing more renewable, reusable and recyclable packaging options. To achieve its ZERO Packaging Waste targets, the global brewer has taken several actions:

30 https://www.unilever.com/news/news-search/2024/defining-a-new-era-for-sustainability-leadership/
31 https://www.carlsberggroup.com/who-we-are/about-the-carlsberg-group/global-presence/
32 https://www.carlsberggroup.com/who-we-are/about-the-carlsberg-group/
33 https://www.carlsberggroup.com/media/bg1cmygx/carlsberg-group-2023-esg-report.pdf

DESIGNING CIRCULAR PACKAGING

Carlsberg's Snap Pack, which was first introduced in 2019 in select European markets, holds cans together using innovative glue technology to replace plastic rings or shrink wrap. This solution minimises plastic use, thereby reducing overall waste. Using less material also reduces CO_2 emissions and reliance on fossil fuel-based packaging materials such as plastic.

In 2023, Carlsberg was able to reduce plastic use by approximately 76% compared with previous multipacks by using Snap Pack. Converting all four, six, and eight packs to Snap Packs has reduced 1,200 tonnes of CO_2 emissions annually, equivalent to the impact of 60 million plastic bags.

INCREASING BIO-BASED MATERIAL

Carlsberg's Fibre Bottle project was started in Western Europe in 2015, aiming to create a better beer bottle. Following testing and consumer sampling of a new bio-based and fully recyclable Gen 2.0 Fibre Bottle in 2022, Carlsberg is now working on optimisations towards Gen 3.0.

The Fibre Bottle is made primarily of natural wood fibres sourced from FSC-certified forests in Northern Europe. To promote responsible forestry practices, Carlsberg ensures that for every tree harvested, two to three trees are planted. Harvesting times are also optimised to minimise tree growth periods and maximise the efficiency of CO_2 sequestration from growing saplings.

In addition, as it is composed of a wood fibre outer shell and a plant-based Polyethylene Furanoate (PEF) polymer inner lining, the Fibre Bottle is fully bio-based without the bottle cap, and recyclable, allowing the bottle to enter conventional Polyethylene Terephthalate (PET) recycling systems or even degrade naturally. Functionally, the outer shell insulates the beer better than conventional glass or cans, keeping it colder for longer, while PEF acts as a highly effective barrier, maintaining the taste and fizziness of the beer.

ZERO PACKAGING WASTE AT CARLSBERG MALAYSIA

In Carlsberg Malaysia, the Malaysian-based brewer focusses its efforts on increasing the recyclability of packaging materials through several initiatives such as:

Improving Recyclability and Circularity

Carlsberg Malaysia's glass bottles contain up to 60% recycled materials, while cans incorporate 58% recycled aluminium. Additionally, all cans, corrugated boards, shrink and stretch wraps disposed at the brewery are recycled.

The brewer has also addressed ink usage to improve the recyclability of packaging, as printing ink significantly affects packaging recyclability. Carlsberg selected Hubergroup Eco-Offset Ink Premium Plus, switching to greener inks for its bottle labels to be Cradle-to-Cradle certified ink, which is considered more environmentally friendly.

Supporting Deposit Return Schemes

Carlsberg operations in Malaysia and Singapore also led the implementation of a Distributor Return Scheme (DRS), which involves collaborating with distributors to reclaim used bottles and ensure effective reuse or recycling of their bottles. On average, over 90% participation of returnable bottles in DRS is achieved, with 95% of returned bottles being cleaned and reused and the remaining being recycled.[34]

Additionally, in 2022, Carlsberg Malaysia launched Project CarlsBot in Sabah, a glass recycling and community empowerment programme, which seeks to address glass waste in Kota Kinabalu, Sabah.[35] Featuring the capability to pulverise a staggering 600kg of glass bottles per hour, CarlsBot not only enables the recycling of glass waste, but also transforms it into valuable resources such as cullets, coarse sand, and fine sand. This output has various applications for usage in furniture, garden pavers and even in the design of unique handicrafts.

Carlsberg Singapore also intends to support the national Beverage Container Return Scheme initiative to reduce waste incineration that is expected to commence in April 2026.

34 interactive-carlsberg_iar2023.pdf (carlsbergmalaysia.com.my)
35 https://www.carlsbergmalaysia.com.my/newsroom/two-new-carlsbot-machines-for-a-greener-sabah/

CHALLENGES

To Carlsberg, sustainability goes beyond compliance, reporting, and the net zero transition, to deliver sustainable shareholder value and creating positive impacts for consumers, customers, suppliers, employees, and communities. As stakeholders' engagement and expectations become increasingly sophisticated and demanding, Carlsberg strives to onboard key stakeholders across the value chain in a targeted yet holistic strategy deployment, rather than through siloed and piecemeal activity-based campaigns.

Navigating the dynamic, complex, and ever-evolving ESG legislations, ecosystem, green energy transition, risks and opportunities, financial-related disclosures and reporting that go beyond implementation and compliance are other challenges faced by Carlsberg Malaysia in their sustainability journey.

Below, we explore insights shared by Carlsberg Malaysia on how to overcome these challenges and be a sustainability leader.

LESSONS LEARNT

Carlsberg Malaysia's experience offers valuable insights that shape its sustainability strategy. Some of the takeaways include:

1. **Tone from the Top:** Strong support and commitment from leadership underscore the direction and significance of sustainability for the organisation.
2. **Cross-Functional Collaboration:** Sustainability is a collective effort. Many successful initiatives have emerged from collaboration across various departments.
3. **Incentive to Drive Action:** Building an effective ecosystem requires concerted effort from all stakeholders and often needs incentivisation. For example, the company's participation in the Distributor Return Scheme (DRS) encourages distributors to return empty bottles to Carlsberg Malaysia to qualify for incentivisation.
4. **Leverage Partnerships:** Partnering with organisations that share mutually beneficial objectives helps achieve optimal outcomes and provides access to shared resources and expertise.

Based on its pledge to achieve ZERO Packaging Waste, Carlsberg has implemented a range of initiatives and strategies that contributes to responsible production and more sustainable packaging and materials. As a global organisation, the company has optimised and adapted its sustainability initiatives based on the local conditions and environment in which they operate. Through various innovative solutions, partnership with suppliers, and industry-collaboration, Carlsberg has reduced waste generation, increased natural resource use, and improved packaging recyclability. As a result, it continues to reduce its overall carbon footprint, driving progress towards circularity, and strengthening business resilience.

4. SUMMARY

Companies worldwide are recognising the benefits of value chain sustainability – from creating new value to mitigating risks. European companies in Asia Pacific are well-positioned to leverage the region's growing focus on carbon neutrality. Through partnerships with local suppliers and investments in environmental initiatives, they can mitigate risks, reduce costs, and create new value.

Global leaders like Unilever and Carlsberg exemplify how integrating sustainability across the value chain not only drives operational efficiencies and cost savings, but also enhances brand reputation and resilience. Companies aiming to improve climate initiatives within their own value chains can draw insights from these case studies and adopt a holistic approach to climate action.

To achieve strong results, it is essential for companies to set targets across their value chain and implement these through close collaboration with their partners and suppliers. Tailoring engagement strategies to supplier capabilities ensures more effective implementation, especially with smaller suppliers who may be lacking resources or experience in the sustainability field. Integrating sustainability criteria into procurement policies and supplier evaluations also establishes clear expectations and can help improve overall environmental performance.

Through the strategies and initiatives discussed in this chapter, companies can navigate the complexities of climate action across global value chains, reduce environmental impacts, and emerge as leaders in shaping a low carbon future. Embracing sustainable practices in the value chain not only aligns with societal expectations and regulatory developments but also unlocks new opportunities for innovation and growth.

LEAD AUTHORS

Fredrik Andersen, Lead, Central Team for Sustainability & Climate, Deloitte Asia Pacific
Marie Reynolds, Senior Manager Climate Communications, Unilever

CONTRIBUTORS

Soma Biswas, Central Team for Sustainability & Climate, Deloitte Asia Pacific
Sharmili Pillai, Central Team for Sustainability & Climate, Deloitte Asia Pacific
Eunice Lau, Head of Communications & Corporate Affairs, Unilever Singapore
Pearl Lai, Director, Corporate Affairs & Sustainability

EDITORIAL SUPPORT

Nele Cornelis, Executive Director, EuroCham Singapore
Tanya Sahni, Advocacy and Programmes Manager, EuroCham Singapore

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INTRODUCTION

The automotive and transportation industry is about to undergo major changes. For over 100 years, the industry remained relatively unchanged, but the past decade has seen a paradigm shift. Everything that was once a bedrock of the industry has had to be scrutinised and appropriately adapted to survive the next decade. The combination of high consumer awareness regarding the harmful effects of carbon emissions and stringent regulations set by European governments on reducing emissions has acted as a wake-up call for the industry to place sustainability at the core of its business strategy. Regulators have set ambitious targets for cutting emissions across entire fleets, forcing vehicle manufacturers to drastically reduce their carbon footprints and emissions. Failure to do so results in the need to purchase carbon credits, which incurs a direct cost. As a result, carbon has shifted from being merely a topic in annual sustainability reports to an item on the profit and loss statements, gaining the direct attention of CXOs and board members alike.

The sustainability initiatives undertaken by automotive and transportation companies can be broadly classified as below

1. Carbon emissions from Well to Wheel: These are Carbon emissions incurred in mining, manufacturing, logistics and related areas.
2. Tailpipe emissions from Wheel to Grave: For ICE powered vehicles 98% of the emissions are incurred in this phase. Hence regulators have put stringent conditions on vehicle manufacturers and transportation players to reduce the emissions in this phase to zero – Hence Zero Tailpipe Emissions.
3. Biodegradation from Grave to Well: Vehicles use a wide range of materials such as metals, plastic, rubber, electronic components, resins, glues etc. Scrapped vehicles left don't disintegrate which has even higher environmental impact. The industry is therefore looking at 100% circularity as a goal.

WELL TO WHEEL EMISSIONS: HOW TO MINIMISE CARBON EMISSIONS?

The carbon emissions in this phase are classified as Scope 1 and Scope 2 emissions which are directly caused by the vehicle manufacturers' operations. They are caused by mining, steel and aluminium plants, logistics, manufacturing and assembly operations of the vehicle manufacturer as well as their entire value chain.

The major sources of emission are:

1. Process emissions: Emissions from manufacturing, production and assembly processes for vehicle manufacturers are considered as Scope 1 emissions. This is the lowest hanging fruit since all the processes, plants, and people are directly under control.
2. Value chain emissions: Vehicle manufacturers use thousands of components sourced from hundreds of suppliers. The value chain presence also covers vehicle and parts distribution, servicing and related areas. All the carbon emissions incurred by the value chain are also under scrutiny. Vehicle manufacturers are trying to reduce and manage them too. "What is measured well is managed better". Most vehicle manufacturers require all value chain members to report their carbon emissions on a periodic basis. The performance indicators don't just include cost and delivery time but carbon emission profiles too.
3. Logistics emissions: Emissions incurred during moving the men-material across the value chain are also considered as a part of scope 1 emissions. Vehicle manufacturers are therefore asking the logistics companies to play their part in reducing emissions.
4. Power generation emissions: These are classified as Scope 2 emissions since the vehicle manufacturers don't have direct control

over it. However, they are still responsible for them. Therefore, vehicle manufacturers are forced to look at sources of power that are within their control to reduce the emissions incurred.

THE VISION & STRATEGIES

"Carbon neutrality" is the vision for the industry. Most vehicle manufacturers have announced the timeline by which they hope to achieve carbon neutrality in their operations and they are working hard towards it.

One such case study from the recent past is : Renault Group has invested more than €100 million since 2020 for the transformation of the factory in Flins (in France), the first European circular economy factory for mobility. They employed 4R strategy to achieve this objective:

- ReTrofit: Extend vehicle life, develop an attractive offer for the conversion of thermal vehicles to other less-intensive energies.
- ReEnergy: Production, storage and management of green energies. A plan to reach 20,000 electric battery repairs per year by 2030 in Flins.
- ReCycle: Optimise resource management to be in line with the EU regulations for the automotive industry regarding recycling and recovery of end of life vehicles.
- ReStart: Innovation accessible to all. The site will be hosting an incubator for start-ups and partners to reinforce the specialisation of the professions present in the factory.

Key strategies to achieve carbon neutrality can be classified along the following lines:

- Eliminate: Innovative solutions are deployed to eliminate carbon emissions wherever possible. This is the best form of emission reduction strategy. A step-by-step analysis of each process and emissions incurred is needed to arrive at ways and means to eliminate the emissions. It is also important to note that even if the process is contributing to a very small percentage of emissions, if it can be eliminated, it should be eliminated. That would perhaps be the most cost-effective path towards carbon neutrality.

Some of the innovative strategies deployed to eliminate scope 1 and scope 2 emissions are:

  - Electricity sourced from renewable sources – Most companies are setting up their own solar/wind energy farms and microgrids to generate carbon emission free electricity.
  - Green Buildings: Workspaces that use sunlight, require lesser heating or cooling, using building materials that are environmentally friendly are some of the strategies used for this.
  - Electrification of material handling equipment.
  - Use of IoT and other sophisticated technologies to closely monitor and reduce emissions.

- Reduce: It is possible that in some processes carbon emissions can't be avoided but they can be reduced. For example, some manufacturing processes may emit CO_2 which is inevitable. In such cases, following strategies are deployed:

  - Carbon/CO_2 Capture and utilisation: Emitted CO_2 or Carbon may be captured and utilised for industrial purposes.

- Offset: In some cases, carbon emissions can neither be avoided nor reduced. In those cases, a carbon emissions offset strategy is used.

  - Create/invest in large scale plantations.
  - Invest in solar/wind energy projects to save carbon emissions for other companies/communities and earn carbon credits.

- Continuous monitoring using technology: Technologies such as IoT and Blockchain enable close monitoring of emissions. As the saying goes, "What is measured, is managed," so accurate and regular tracking plays a crucial role in reducing emissions.

WHEEL TO GRAVE: HOW TO CONTROL TAILPIPE EMISSIONS?

98% of the emissions across the lifecycle of a vehicle are during its usage. It is well known that the transportation sector is one of the highest contributors to carbon emissions globally. Ironically the rate of growth is also higher than growth in carbon emissions, causing a steady rise in the percentage contribution to global emissions. Since 1970 the carbon emissions from transportation have increased at a Compound Annual Growth Rate (CAGR) of 2.08% against the CAGR of overall carbon emissions of 1.78% resulting in increased contributions 18% to 21%.1

Apart from environmental impact carbon emissions also cause myriads of other problems. Deterioration of air quality causes breathing problems causing illness and downtime for productive workforce. It causes poor visibility which in some cases may be dangerous for vehicular traffic, but it adversely impacts the brand image of progressive cities. Therefore, this is an obvious target for reduction.

THE VISION & SOLUTIONS

Ideally, the vision should be zero tailpipe emissions. Most regulators are pushing the vehicle manufacturers to achieve this vision.

There are two prevalent solutions that are at different stages of evolution.

- Battery electric vehicles powered by batteries which are charged by external sources. Zero emissions are achieved immediately, as no emissions are generated. To accurately assess the vehicle's emissions, we must consider the source of electricity used for charging. While a fully renewable energy source is ideal, many regions, particularly developing countries like China and India, still rely heavily on coal for electricity generation. This significantly impacts the overall emissions associated with electric vehicles.
- Fuel cell electric vehicles : Fuel cell uses hydrogen as a fuel and the output is just water. This solution is the utopia of a circular economy. Toyota, Honda and Hyundai have running vehicles which use this technology. However, setting up hydrogen stations and transporting & delivering Hydrogen safely is still a challenge.

However, this is easier said than done, as many consumers are not yet ready for a widespread shift to Battery Electric Vehicles (BEVs). There are 3 key issues:

- Reliance on government subsidies: The vehicle price of battery electric vehicles is still quite high as compared to ICE counterparts. Most governments offered incentives to bridge the gap and hoped that the demand will take off even after the incentives are withdrawn. In most markets, unfortunately that didn't happen. Hence the sales of Battery electric vehicles is largely dependent on how much the government is ready to incentivise.
- Reluctance to change of consumer habits: Using Battery Electric Vehicle (BEV) requires a complete change in consumer habits for refuelling. Although the range's anxiety issues have reduced, the proliferation of charging networks is still not adequate. For example, BEV customers may need to chart out a completely different route to go from Location A to B considering the charging network availability.
- Lack of awareness – The adoption of EVs has been slower than expected mainly due to the lack of awareness of the technology which has put the consumer in a wait and watch situation. Awareness towards battery life, safety, charging time and actual range required for daily driving is necessary which will help increase adoption of EVs.

Market participants must therefore develop innovative solutions to address these challenges.

While some alternative technologies can significantly reduce emissions, even if they don't achieve zero emissions, they are more mature and affordable. As a result, many customers tend to favor these solutions.

- Hybrid Electric Vehicles (HEVs): HEVs offer a practical alternative to Battery Electric Vehicles (BEVs) by efficiently switching between an engine and a battery, while charging the battery internally without the need for external charging. This technology has been proven and reliable for over two decades. With its affordability and established track record, hybrid technology serves as a strong and viable option for many customers.
- Alternate fuels: In some applications, electrification or hydrogen may not be feasible. As a result, industry solutions focus on fuels that can reduce emissions, rather than waiting for technologies to evolve to zero emissions. Fuels like biofuels and Compressed Natural Gas (CNG) offer significantly better emission profiles.
- Renewable fuel: Made from waste, cooking oil residues, and animal fat, these fuels can be used directly, cutting carbon emissions by up to 90%. They present a practical alternative to hydrogen or battery electric vehicles in reducing emissions effectively.

Fuel Cell Electric Vehicle (FCEV) is considered to be the most environmentally friendly technology. It stands out because of its circular characteristics – both input and output is water. However, although the vehicle technology is proven there are many challenges in the value chain especially with hydrogen. Producing hydrogen at a mass-scale in an environmentally friendly manner, storing and transporting it safely to all the pumps and making hydrogen pumps ubiquitous are some of them. However, considering the amount of investment going into the vehicle technology and value chain some successful use cases will emerge and pave the way for mass adoption.

GRAVE TO WELL: HOW TO MINIMISE THE ENVIRONMENTAL IMPACT?

The automotive and transportation industry is also focussed on reducing the environmental impact of vehicles after they are scrapped. Simply discarding a vehicle as-is poses a significant environmental threat, as it will not degrade and could occupy landfills indefinitely, causing harm to the ecosystem. To mitigate this, vehicles must be dismantled into their core components such as metal, plastic, and rubber, with each material properly disposed of or recycled. This process ensures that environmental damage is minimised, aligning with sustainable disposal practices.

THE VISION & STRATEGIES

The vision is for 100% circularity, with zero environmental impact. This means eliminating landfills, preventing chemicals from contaminating soil, and avoiding groundwater pollution. While this is one of the most challenging goals to achieve, there are no shortcuts like offsets or financial solutions; the only path forward is through innovation. This requires a series of incremental steps, along with innovations in processes, materials, recycling, and scrapping techniques—many of which are yet to be discovered.

To achieve this, companies need to implement several strategic approaches:

- Remanufacturing: Many vehicle components, such as the engine block, starter, and alternator, can be remanufactured and repurposed for different applications. For example, an engine from a truck can be remanufactured and used as a generator. Since this is a stationary application, it simplifies maintenance and repairs, making it a practical and sustainable option for extending the life of key components.
- Refurbish : Refurbishing offers a sustainable and cost-effective option for Original Equipment Manufacturers (OEMs), providing more than a 50% cost reduction compared to newly manufactured batteries. This approach not only makes refurbished batteries a competitive alternative but also helps minimise the need for extensive mining activities. As a reliable, sustainable, and affordable solution, refurbishing aligns well with the industry's growing focus on environmental responsibility.
- Recycling: Discarded vehicles need to be carefully disassembled, with various metal and plastic components separated. By collecting all steel parts, for instance, they can be sent to foundries for use as raw materials. This process not only reduces the need for mining additional metal but also helps alleviate the pressure on landfills, contributing to more sustainable waste management.
- Use of biodegradable material: Many non-critical components in a vehicle, such as foot mats, can be made from alternative materials. Rather than using plastics that take a long time to degrade, biodegradable materials can be utilised. This switch not only enhances the vehicle's sustainability but also improves its overall circularity profile.
- Safe disposal of toxic material: Despite all efforts, some materials may neither be replaceable nor suitable for landfill biodegradation. In such cases, companies must ensure these materials are safely and responsibly disposed of to minimise their environmental impact.

CONCLUSION

Environmental sustainability is a monumental challenge for the industry, but an equally important aspect is the sustainability of the business itself. Companies must navigate this transition without sacrificing profit margins, ensuring that the long-term viability of their business is also maintained. This dual focus makes achieving sustainability goals even more complex.

New market entrants may have a distinct advantage over established players, as they aren't burdened by legacy infrastructure and associated costs. These newcomers often adopt asset-light business models, leveraging outsourced processes, which can help them meet sustainability targets more easily. In contrast, legacy players will need to intensify their innovation efforts, driving partnerships and alliances, even with competitors, to share risks and rewards in investing in cutting-edge technologies like solid-state batteries. We are likely to see increased collaboration, such as shared production facilities or retail networks.

Additionally, sustainability goals set by vehicle manufacturers will extend across the entire value chain. Part suppliers, logistics providers, and service partners will need to align with the sustainability vision of their principal companies, creating a ripple effect of environmental responsibility throughout the industry.

CASE STUDIES

For this position paper, we engaged with several key value chain players, such as Continental and DHL, who are also navigating the same industry challenges. Through these conversations, we compiled case studies that highlight how they are adapting to the evolving landscape. The following sections explore their innovative approaches and strategies in addressing these challenges.

CASE STUDY: CONTINENTAL AUTOMOTIVE

SUSTAINABILITY AS A PILLAR OF OPERATIONS, BUSINESS STRATEGY, AND CULTURE

Continental's sustainability strategy is centered around four key focus areas, each representing a bold ambition to be achieved by 2050. These pillars underpin the company's long-term approach:

100% CARBON NEUTRALITY:

Aiming for carbon neutrality along its entire value chain - including production, operations, and supply chain - by 2050, Continental is committed to reducing emissions, adopting renewable energy, and optimising energy efficiency. The company also emphasises the need for industry-wide collaboration to achieve these ambitious targets.

100% EMISSION-FREE MOBILITY:

As a key player in the mobility industry, Continental is committed to advancing emission-free mobility. The company recognises that electrification is critical to reducing global emissions and has innovative products and solutions to support the development of safe and efficient Zero Tailpipe Emission Vehicles (ZTEV).

100% CIRCULAR ECONOMY:

Continental is leading the charge towards a circular economy by developing closed-loop systems that reduce waste and increase resource efficiency. By 2050, the company aims to ensure that all products are composed of 100% recycled materials.

100% RESPONSIBLE VALUE CHAIN:

Building a responsible value chain is central to Continental's vision of sustainability. The company is actively working with customers, suppliers, and partners to ensure that all parties meet stringent environmental and social responsibility standards.

ALIGNMENT WITH THE PARIS AGREEMENT AND GLOBAL SUSTAINABILITY STANDARDS

Continental Automotive's sustainability roadmap is aligned with the Paris Agreement's goal of limiting global temperature rise to below 2 degrees Celsius. The company targets to reach CO_2-neutral production (scope 1 and 2) by 2030, followed by the reduction of total CO_2 emission from the supply chain (scope 1, 2 and 3) by 2050. The Science Based Targets initiative (SBTI) has validated this emission reduction pathway as being in line with global climate goals.

To support this mission, Continental has integrated sustainability into all aspects of its operations. In 2020, all Continental Automotive plants and major office locations began sourcing 100% of their electricity from renewable sources. Furthermore, the company has set a target to achieve carbon neutrality across all remaining energy consumption by 2040, with significant reductions being realised through energy efficiency improvements, transitioning away from fossil fuels, and offsetting any unavoidable emissions.

AUDITING AND CERTIFICATION FOR SUSTAINABILITY EXCELLENCE

By 2030, all Continental Automotive plants are expected to meet the highest sustainability standards and achieve Gold status under the company's Green Plant Label certification. Five of Continental Automotive's plants have already achieved this prestigious status, which is based on strict criteria for energy efficiency, water consumption, waste management, emissions control and R&D innovations.

A similar audit system has been implemented for office locations. The Continental office in Singapore, for example, was awarded the Gold certification under the Green Office Label for its comprehensive sustainability practices. The office met over 40 mandatory sustainability requirements, including a total ban on plastics, bike commuting facilities, and achieving carbon neutrality in Scopes 1 and 2 of the Greenhouse Gas Protocol.

INNOVATIONS SUPPORTING A SUSTAINABLE VALUE CHAIN

One of the key areas where Continental Automotive is driving innovation is in emission-free mobility. In 2023, the company recorded allocated business of €2 billion with Zero Tailpipe Emission Vehicles (ZTEV) through its suite of advanced products and solutions, including high-performance computers, electric vehicle sensors, thermal management systems, and innovative surface materials. These technologies are critical to reducing vehicle emissions and advancing the industry toward a cleaner, emission-free future.

Continental is also researching new circular economy solutions, such as in the area of printed circuit boards (PCBs). These complex electronic components are responsible for significant CO_2 emissions during production. Continental has launched several innovation projects aimed at disassembling PCBs at the end of their lifecycle, allowing for the harvesting and reuse of electronic components. By working closely with PCB suppliers, the company is exploring options to integrate recyclates, bio-based materials, and low-energy-intensity production processes, with the goal of reducing environmental impact.

COLLABORATIONS DRIVING CIRCULAR ECONOMY RESEARCH

Continental Automotive has established partnerships with leading research institutions, including the French Alternative Energies and Atomic Energy Commission (CEA) and Nanyang Technological University (NTU) in Singapore. Through these partnerships, Continental is exploring new ways to improve the circularity of PCBs. At the Singapore-CEA Alliance for Research in Circular Economy (SCARCE), researchers are developing methods to enable the disassembly of used PCBs and the automated sorting of components using machine learning. These innovations will help reduce electronic waste and promote the reuse of valuable materials, supporting Continental's commitment to a circular economy.

INNOVATING FOR THE FUTURE: SUSTAINABLE TECHNOLOGIES

GREEN CALIPER

Continental Automotive is at the forefront of developing innovative technologies that support the transition to sustainable mobility. One such innovation is the Green Caliper for electric vehicles (EVs). Compared to conventional vehicles, brakes in EVs are activated less frequently due to regenerative braking; however, because of the battery weight in EVs, the deceleration performance of the brakes often needs to be higher. Continental's newly developed Green Caliper addresses these challenges by providing a lighter and more efficient brake caliper design. This innovation not only reduces the overall weight of the vehicle, which contributes to energy savings, but also maintains the same deceleration power as conventional brakes.

AC2ATED SOUND SYSTEM

Another key innovation from Continental is the Ac2ated Sound System, which revolutionises in-vehicle audio systems. Conventional speaker systems in vehicles contribute significantly to the vehicle's weight, but Ac2ated Sound utilises compact actuators that transform interior vehicle surfaces into speakers. This reduces the weight and space associated with traditional speaker setups by up to 90%, supporting Continental's goals of reducing material usage and promoting energy efficiency.

CASE STUDY: DHL'S PATH TO SUSTAINABLE LOGISTICS

OVERVIEW

As one of the leading logistics companies in the world, DHL recognises the immense impact that transportation has on the environment. Transportation, being energy-intensive, significantly contributes to the global carbon footprint. DHL is committed to achieving net-zero carbon emissions by 2050, spearheading sustainability efforts across its global network. This case study explores the comprehensive sustainability solutions DHL is implementing, with a focus on its operations in Singapore.

SUSTAINABILITY INITIATIVES IN SINGAPORE

In 2019, DHL's Express business launched its Electrification Plan to significantly reduce its carbon footprint. By electrifying about 30% of its daily delivery routes, it is on track to meet its Global goal of expanding its electric vehicle (EV) fleet to 60% by 2030. This initiative also aligns with Singapore's broader sustainability goals under the "Energy Reset" pillar of the Singapore Green Plan 2030, which aims to promote the adoption of EVs.

To further enhance its last-mile delivery, DHL Express has partnered with PICK Network, a nationwide parcel locker network by the Infocomm Media Development Authority of Singapore. By consolidating deliveries at a single service point, DHL Express reduces both the on-road time of its vehicles and overall emissions. Additionally, route optimisation software helps DHL Express couriers plan more efficient routes, leveraging data analytics to ensure timely deliveries with minimal environmental impact.

SUSTAINABLE AVIATION FUEL (SAF) AND GREEN AVIATION

A major portion of DHL's carbon emissions, approximately 70%, stems from aviation activities. In response, DHL has introduced Sustainable Aviation Fuel (SAF) as a pivotal element of its sustainability strategy. In 2023, DHL launched the GoGreen Plus initiative, allowing customers to minimise the carbon emissions associated with their shipments. This initiative focusses on "insetting," a strategy that reduces emissions directly within the supply chain, specifically downstream transportation and distribution (Scope 3 emissions). With strategic partnerships and investments in SAF, DHL is paving the way for greener aviation.

CUSTOMER ENGAGEMENT AND EDUCATION

DHL actively involves its customers in reducing carbon emissions across their value chains. Through the GoGreen Plus programme, customers are equipped to lower their Scope 3 emissions. DHL's sales teams are trained to guide customers on sustainability topics, including reducing their carbon footprint through insetting versus offsetting. The company organises regular customer events and masterclasses, deepening the understanding of critical sustainability metrics such as greenhouse gas (GHG) emissions, SBTi guidelines, and carbon reporting tools. An example of this engagement was the August 2023 webinar, "Now More Than Ever: Delivering Sustainable Logistics," in Singapore which explored collaborative solutions for greener supply chains.

FLEET ELECTRIFICATION AND RENEWABLE ENERGY

DHL has significantly reduced its last-mile delivery carbon footprint by expanding its fleet of EVs. To further enhance energy efficiency, DHL has invested in solar energy and advanced building insulation techniques. By harnessing renewable energy through solar panels, DHL is not only reducing its reliance on grid power but also lowering operational costs.

TRANSPARENCY AND REPORTING

DHL promotes transparency by providing standardised carbon reporting to its customers. This information helps investors and stakeholders assess environmental performance and encourages broader accountability across the logistics sector. By offering reliable data, DHL ensures that customers are well-informed about the environmental impact of their operations.

GOVERNMENT AND INDUSTRY COLLABORATION

DHL plays a crucial role in government and industry collaborations. The company has invested heavily in renewable energy, including solar panels, electric vehicles, and Sustainable Aviation Fuel (SAF). In Singapore, DHL Express also collaborates with recycling partners to advance initiatives such as plastic sheet and damaged pallet recycling. Additionally, the company shares its expertise at major industry events, showcasing innovations and best practices in sustainable logistics. Noteworthy examples include DHL Express Singapore's Supply Chain Committee Event with EuroCham on Decarbonising the Supply Chain (April 2024) and Sustainability in Logistics with SCCCI (March 2024).

CHALLENGES AND INNOVATIVE SOLUTIONS

Over the past three years, DHL has tackled several key challenges through innovative solutions in Singapore:

Challenge #1: Fossil Fuel Dependency in Transportation

- Solution: Fleet Electrification
- Impact: Deployment of 100 electric vehicles by its Express business and development of charging infrastructure has led to an annual reduction of 323 tonnes of CO_2 emissions, significantly decreasing reliance on fossil fuels.

Challenge #2: High Energy Consumption in Buildings

- Solution: Carbon-Neutral Buildings

- Impact: DHL's solar panel installations at its Express HQ and South Asia Hub generate 968 MWh of renewable energy annually. Solar films further reduce energy usage by maintaining a stable indoor temperature.

Challenge #3: High Aviation Emissions

- Solution: Sustainable Aviation Fuel
- Impact: DHL's partnerships with bp, Neste, and World Energy ensure a supply of over 1.4 billion liters of SAF through 2026, resulting in CO_2 savings equivalent to the annual emissions of approximately 700,000 passenger cars.

FUTURE OUTLOOK

DHL continues to explore opportunities in alternative fuels such as biofuels, hydrogen, and natural gas, as well as the deployment of fully electric cargo planes like the Alice from Eviation. The company is also leveraging advanced technologies, including AI-driven route optimisation software and IoT-enabled sensors in warehouses, to further enhance operational efficiency and reduce waste. As DHL pioneers sustainable solutions in logistics, its ongoing efforts will serve as a model for the industry in the years to come.

CASE STUDY: ROBERT BOSCH (SEA)

PIONEERING SUSTAINABILITY ACROSS GLOBAL OPERATIONS

Bosch creates technology that is "Invented for life." Bosch's solutions aim to fascinate, improve quality of life, and help conserve natural resources. For Bosch, sustainability is a non-negotiable part of doing business. This balance is maintained by integrating sustainability into all aspects of business operations, from the design of products to the sourcing of materials and the implementation of energy-efficient manufacturing processes.

Aiming for ecological, economical, and socially sustainable operations, Bosch puts focus on six dimensions of sustainability management: climate action, health, water, circular economy, human rights and diversity. Each of these dimensions is specified and continually enhanced by reference with clearly defined, medium-term targets.

Scopes 1, 2, and 3 are used in accordance with the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard. For further details about the Bosch Group's carbon neutrality (scope 1 & 2), refer to the Bosch Sustainability Report 2023 "Environment | Climate action" section.

DRIVING CARBON NEUTRALITY AND GREEN INNOVATION IN GLOBAL OPERATIONS

Bosch with its more than 400 locations worldwide has become carbon neutral overall (scope 1 & 2) by improving energy efficiency, generating our own energy from renewable sources (new clean power), purchasing electricity from renewable sources (green electricity), and – as the last resort – using carbon credits to offset residual CO_2 emissions. In 2023, residual emissions of some 581,000 metric tonnes of CO_2 were offset by carbon credits.

BOSCH MOBILITY ELECTRONICS MANUFACTURING PLANT

One example is the Bosch Mobility Electronics Manufacturing Plant in Penang. A key initiative focussing on renewable energy is the installation of one of Malaysia's largest factory rooftop solar panel systems in 2020. This can generate 4,500 MWh annually, significantly reducing the plant's carbon emissions. To top it off, this investment in renewable energy solutions was completed during the pandemic period in 2020, it was the largest rooftop solar panel systems at that time. In 2022, Bosch has further enhanced the plant's CO_2 neutrality programme by purchasing green energy and as a result are able to reduce their carbon credit compensation from 80% in 2021 to approximately 1% by 2023.

Additionally, the plant emphasises on energy and resource efficiency through energy audits and the adoption of green purchasing practices, such as using Forest Stewardship Council (FSC)-certified paper and energy-efficient equipment. In terms of waste management, the plant has eliminated personal waste

bins and only maintains centralised bins for general waste and recycle bins. No plastic bags are provided, and disposable utensils and cups are highly discouraged by imposing a fee of usage.

SUSTAINABILITY THROUGH COLLABORATION AND INNOVATION

The Bosch Mobility Electronics Manufacturing Plant in Penang's achievements in sustainability are a result of strong partnerships with local authorities, utility providers, and other stakeholders.

THE PENANG GREEN OFFICE AWARD

Additionally, the plant was honoured with the Penang Green Office Award, which recognises the plant's leadership in environmental practices. This award was made possible through the collective efforts of Bosch associates, local stakeholders, and governmental support, reflecting the power of collaboration in driving sustainability.

Moreover, the plant was one of Malaysia's largest rooftop solar panel installations in 2020, featuring 7,500 solar panels that generate 4,500 MWh of energy annually. This achievement, which was the largest system in Penang under the Net Energy Metering (NEM) scheme at that time, was facilitated by the support of utility providers, highlighting the critical role these stakeholders play in advancing renewable energy projects. Other than renewable energy, Bosch also purchases green electricity from TNB that is aligned with the company's green energy goals.

1 : EDGAR/JRC. (September 5, 2024). Global fossil carbon dioxide emissions from 1970 to 2023, by sector (in million metric tons of carbon dioxide) [Graph]. In Statista. Retrieved September 24, 2024, from https://www.statista.com/statistics/276480/world-carbon-dioxide-emissions-by-sector/

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LEAD AUTHORS

Vivek Vaidya, Associate Partner, Frost & Sullivan
Christopher Ong, Managing Director, DHL Express
Fiona Ho, Assistant Manager, Corporate Communications, Bosch Singapore
Chan Yee En, Head of Corporate Communications and Brand Management, Robert Bosch (SEA), Pte Ltd Malaysia
Continental Automotive Singapore

REVIEW & EDITORIAL SUPPORT

Nele Cornelis, Executive Director, EuroCham Singapore
Tanya Sahni, Advocacy and Programmes Manager, EuroCham Singapore

SUSTAINOVATIVE ENERGY EFFICIENCY

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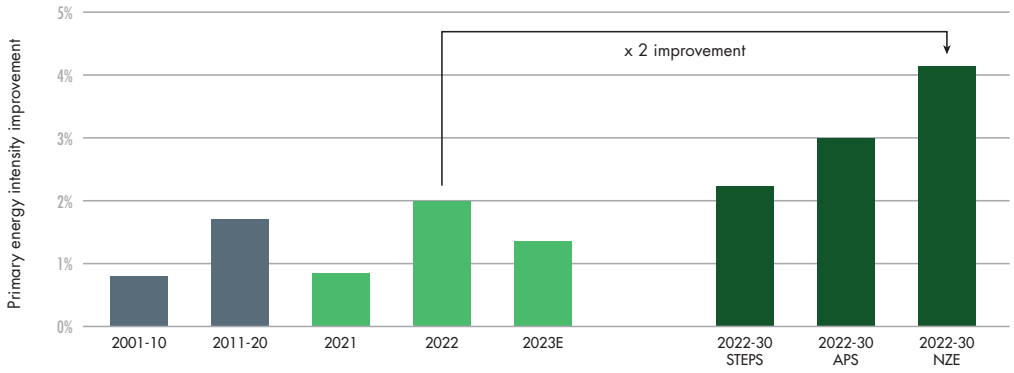
CONTENTS

1.INTRODUCTION

1.1 OVERVIEW OF ENERGY EFFICIENCY

In 2024, energy efficiency is a critical lever for driving clean energy transitions and ensuring global energy security. Despite notable gains in 2022, where global energy intensity dropped by around 2%, the rate of improvement slowed to 1.3% in 2023 and is projected to decelerate further in 2024. Energy intensity, which measures the primary energy required for economic output (GDP), remains a key indicator for tracking advancements in energy efficiency (International Energy Agency (IEA), 2023).

Figure 1: Annual primary energy intensity improvement, 2001-2022, 2023E, and by scenario, 2022-2030



Source: IEA Energy Efficiency 2023 Note: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario; and NZE = Net Zero Emissions by 2050 Scenario. As an indicative range, a GDP growth of 3% with currently expected energy demand growth between 2% and 1% would yield energy intensity improvement of between 1% and 2%, respectively.

Although global progress in energy efficiency has slowed this year (World Economic Forum, 2024), the ongoing energy crisis has catalysed the transition toward cleaner energy, enhancing efficiency in many markets. **Policies and technologies often take time to yield tangible results, but recent regulatory efforts—especially in Europe—are beginning to bear fruit. Government measures, designed in response to rising energy costs, are accelerating efficiency gains.**

While the energy crisis has imposed substantial challenges on households and led to economic losses for businesses reliant on natural gas, it has also **triggered a vital shift in energy efficiency trends**. The adoption of advanced technologies that utilise electricity more efficiently, rather than relying on direct fossil fuel combustion, is driving substantial progress in efficiency. Additionally, the record deployment of solar energy is further accelerating the decline in fossil fuel dependence in many markets, highlighting a transformative shift towards more sustainable energy solutions.

Energy efficiency has emerged as a critical strategic imperative for both sustainability and competitive advantage. In the face of escalating environmental concerns and resource constraints, companies that **prioritise energy efficiency** not only contribute to global sustainability goals but also **position themselves advantageously in the market**. By adopting energy-efficient technologies and practices, companies can significantly reduce operational costs, mitigate environmental impact, and enhance their resilience against fluctuating energy prices (McKinsey & Company, 2010). This proactive approach not only aligns with regulatory and consumer expectations but also fosters innovation, drives long-term profitability, and strengthens companies' positions in resource-conscious markets.

2. CURRENT STATE OF ENERGY EFFICIENCY

2.1 REGULATORY FRAMEWORK

Singapore and the European Union (EU) have adopted distinct approaches to promote energy efficiency, shaped by their respective challenges and geographical factors, yet both aim for significant reductions in energy consumption.

Singapore has adopted a **holistic government-wide approach**, focussing on sectors such as industry, households, public services, buildings, and transportation. Through the efforts of agencies such as the National Environment Agency (NEA) and the Building and Construction Authority (BCA), Singapore promotes energy efficiency via legislation, financial incentives, and educational campaigns. For example, Singapore offers energy efficiency grants for industrial sectors, rebates for energy-efficient appliances in households, and promotes green buildings through the Green Mark Scheme. The Land Transport Authority (LTA) is pushing for more electric vehicles (EVs) and improving public transportation to reduce carbon emissions. Singapore's measures **emphasise sectoral collaboration** and **public-private partnerships** to ensure energy efficiency is integrated across its densely urban environment (National Environment Agency, n.d.). Businesses must align with the regulations by establishing energy management roles, developing comprehensive plans, and implementing energy management systems. Proactively adopting smart technologies and energy-efficient equipment helps businesses meet stringent requirements and reduce their environmental footprint, driving long-term growth.

In contrast, the EU takes a more **aggressive**, **legislative-driven approach**. The EU Energy Efficiency Directive targets an 11.7% reduction in final energy consumption by 2030 (compared to 2020 levels). The EU sets annual energy-saving targets, which increase incrementally (from 0.8% to 1.9% by 2028), and member states are required to meet these targets through national contributions. Should the collective contributions fall short, the EU will apply an "ambition gap" mechanism. The EU's framework also mandates specific policies like the reno-

vation of 3% of public buildings annually and energy audits or management systems for businesses. The focus **on vulnerable populations** and social housing is a distinct feature, ensuring that energy-saving measures reach those most in need. Additionally, the EU emphasises the modernisation of heating and cooling systems, especially in district heating, and the creation of data centres monitored through an EU-level database (European Commissions, 2023).

While both regions demonstrate a strong commitment to transitioning toward a low-carbon economy, their approaches differ:

Scope: While Singapore focusses heavily on sectoral measures, targeting specific industries like construction, transport, and public services, the EU has a broader legislative approach, with legally binding national and sector-specific targets.

Energy-saving targets: The EU enforces its more ambitious energy-saving targets through stringent legal frameworks, whereas Singapore relies on incentives and voluntary compliance.

Public Sector Focus: The EU mandates more stringent regulations for the public sector (e.g., the 3% renovation obligation for public buildings), whereas Singapore's focus is more on encouraging energy efficiency through public-private collaboration.

Social Impact: The EU prioritises vulnerable populations and social housing, aiming to make energy efficiency equitable. Singapore's measures are more focussed on the economic benefits of efficiency rather than specific social sectors.

2.2 MARKET ANALYSIS

Energy efficiency has emerged as a critical focus for businesses and governments due to its significant role in addressing a range of interconnected global challenges. Its impact extends from **broad socio-economic considerations to the strategic interests of individual companies**. In today's rapidly evolving landscape, driven by technological disruptions and shifting customer expectations, companies are increasingly compelled - whether by choice or regulatory pressure - to enhance their energy efficiency.

GEOPOLITICAL CONFLICTS

Geopolitical conflicts have a profound impact on energy resources and security. While Russia's invasion of Ukraine in February 2022 did not originate the current energy supply crisis, it significantly exacerbated existing issues and drew global attention to vulnerabilities within the energy sector. The invasion prompted EU leaders of the 27 member states to critically reassess their energy dependencies and security strategies (European Council, 2022). In response to the conflict, average electricity prices surged by up to 12%, and gas prices rose by 32% in the EU over a five-month period, largely due to the embargo on Russian crude oil and gas (Yanatma, 2023). This sudden and substantial increase in energy costs forced many European governments to implement measures such as price caps and bill controls to mitigate the impact on consumers. However, the **volatility in energy prices underscored deeper systemic issues, revealing the fragility of existing supply chains and the urgent need for strategic shifts**. In the short term, reducing energy consumption has been adopted as a necessary measure to cope with supply constraints. In the long term, the crisis has accelerated the push for diversifying energy sources, enhancing energy security, and reducing reliance on any single supplier, particularly in volatile geopolitical climates.

ARTIFICIAL INTELLIGENCE (AI)

Artificial Intelligence (AI) stands to be a pivotal topic in 2024, as researchers and enterprises strive to determine the most practical ways to integrate this technological leap into everyday life. The adoption of artificial intelligence in the energy market is projected to grow significantly, with a compound annual growth rate (CAGR) of **18.55% in Europe** and **25.6% in the Asia Pacific** region from 2019 to 2024 (Alves, 2023). The focus is increasingly on maximising the performance of more compact AI models, an effort that has been significantly advanced by the development of model-agnostic techniques. These advancements are revolutionising the way energy is managed and optimised across various sectors, offering advanced capabilities to analyse, predict, and control energy consumption patterns. As AI technology advances, its role in driving energy efficiency will become increasingly crucial, offering new opportunities for innovation and cost savings.

CORPORATE SOCIAL RESPONSIBILITY (CSR)

Corporate Social Responsibility (CSR) has transformed the way business performance is evaluated, with energy efficiency emerging as a critical component. It signals a company's commitment to minimising environmental impact and supporting global sustainability efforts. Prioritising energy efficiency not only ensures compliance with regulations but also **enhances brand reputation and attracts investors focussed on ESG** (Environmental, Social, and Governance) criteria. In Michael Porter's strategy framework, companies gain a competitive edge either by minimising costs or through differentiation. The choices a company makes about its energy sourcing and consumption can have a significant impact on its cost structure. And how it manages the environmental and climate impacts of its energy use - particularly carbon emissions - has become an increasingly vital differentiator for consumers, investors, and corporate clients. **Energy efficiency is a cornerstone of sustainable development**, offering a means to curtail energy consumption, lower greenhouse gas emissions, and enhance economic productivity. With global energy demand expected to rise due to factors like population growth and industrialisation, improving

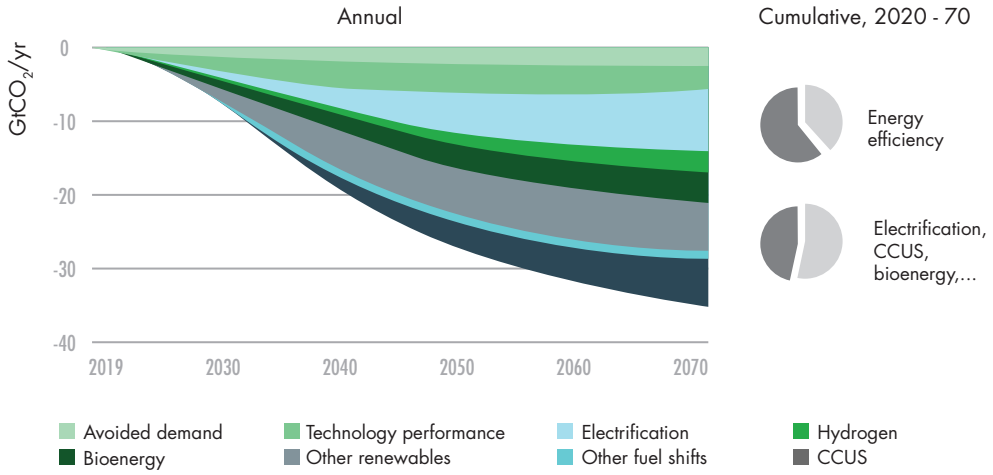
energy efficiency is imperative. Companies that proactively address energy efficiency are better positioned to meet evolving market expectations and secure long-term success.

3.TECHNOLOGICAL INNOVATIONS DRIVING ENERGY EFFICIENCY

3.1 EMERGING TECHNOLOGIES

Following the advice of the Committee on Climate Change in 2019, which emphasised decarbonisation strategies like resource and energy efficiency, electrification, hydrogen economy development, and CCUS (Business, Energy and Industrial Strategy Committee, 2019), we have seen substantial advancements in technological innovation. Strategic investments and supportive national policies have been crucial in driving this transition, transforming energy supply in end-use sectors toward more sustainable and less energy-intensive products and practices.

Figure 2: Global energy sector CO_2 emissions reductions by measure in the Sustainable Development Scenario relative to the Stated Policies Scenario, 2019-70



Source: IEA Energy Technology Perspectives 2020 Note: Notes: CCUS = carbon capture, utilisation and storage. See IEA (2020a) and the ETP model documentation for the definition of each abatement measure. Hydrogen includes low-carbon hydrogen and hydrogen-derived fuels such as ammonia.

IMMEDIATE AND LOCALISED CONTROL

Decentralised energy management systems play a pivotal role in improving energy efficiency by **enabling localised generation, storage, and distribution of energy**. Unlike traditional centralised systems that depend on large power plants and long-distance transmission, decentralised systems leverage a mix of energy sources, including renewable options like solar and wind, to operate at a local level. This local generation approach helps minimise transmission losses and optimises the use of energy resources. Investment in smart grid technologies and digital infrastructure has seen a significant increase. For instance, grid-related investment in digital technologies has grown by over 50% since 2015, with expectations to reach 19% of total grid investment in 2023 (Ernst & Young UK, 2024). The European Union's action plan for digitalising the energy system, launched in 2022, aims to promote connectivity and interoperability while fostering coordinated investments in smart grid technologies.

Microgrids, a key component of decentralised energy management, offer resilient and efficient energy supplies tailored to specific demands. They ensure effective utilisation of renewable energy, reducing reliance on fossil fuels and minimising waste. Integrated with energy storage solutions like battery systems, microgrids can store excess energy generated during peak production for use during high-demand periods, further enhancing overall energy efficiency.

PROACTIVE AND INTEGRATIVE APPROACHES

Artificial Intelligence (AI) and Machine Learning (ML) are revolutionising how organisations manage their assets and optimise operations, serving as powerful tools for optimising energy usage. AI plays a critical role in optimising Heating, Ventilation, and Air Conditioning (HVAC) systems in buildings, dynamically adjusting based on occupancy levels and environmental conditions. This application alone could reduce energy use by 8-19% by 2050, and when combined with energy policies and low-carbon power generation, could result in a

40% reduction in energy consumption and a 90% decrease in carbon emissions compared to business-as-usual scenarios (Ding, Ke, Levine & Zhou, 2024).

Smart grids are crucial for improving system-wide efficiency, offering real-time data and analytics to reduce transmission losses, minimise peak consumption, and facilitate the integration of renewable energy sources. The global adoption of smart power metres, which exceeded 1 billion units in 2022 - a tenfold increase since 2010 - is projected to reach 13 billion connected devices by 2023 (International Energy Agency, 2024). This capability aligns supply with demand more effectively, enhancing reliability and reducing energy waste. AI also helps to **scale up the adoption of the best available technologies by reducing operational and labor costs, enabling broader penetration of efficient technologies**. Moreover, AI optimises design, manufacturing, and operations across the entire business lifecycle, leading to further cost savings and efficiency improvements. These capabilities highlight AI's pivotal role in advancing energy efficiency and supporting the transition to a sustainable energy future.

LAST RESORT

Carbon capture, utilisation, and storage (CCUS) is often regarded as a **last-resort solution** in the transition to net-zero emissions, particularly for sectors where direct emission reduction is complex or expensive. According to the IEA report, CCUS is initially focussed on retrofitting existing fossil fuel-based power and industrial plants to capture CO_2 before it reaches the atmosphere, addressing emissions that are otherwise unavoidable. These industries, if left unaddressed, could contribute an estimated 600 billion tonnes of CO_2 over the next 50 years (International Energy Agency (IEA), 2020).

However, CCUS's role becomes more prominent as more **cost-effective abatement measures**, like renewable energy integration and energy efficiency improvements, are exhausted. The focus then shifts toward integrating advanced technologies such as bioenergy with carbon capture and storage (BECCS) and direct air capture (DAC). BECCS provides a dual benefit by using biomass for energy production while simultaneously capturing the carbon released, creating a net-negative emission effect. DAC offers a means to remove CO_2 directly from the atmosphere, which is essential for achieving net-zero targets, particularly in scenarios where other decarbonisation technologies fail to fully materialise or progress more slowly than expected.

These technologies provide a **critical hedge against the uncertainties of the energy transition**, ensuring that there is a viable pathway for reducing and eventually neutralising carbon emissions even in the hardest-to-abate sectors.

4.INDUSTRY-SPECIFIC ENERGY EFFICIENCY STRATEGIES

4.1 MANUFACTURING SECTORS

Case Study: Technological Innovations Enhancing Energy Efficiency in Manufacturing

Siemens Energy has made significant advancements in energy-efficient solutions for **heavy industries**.

Through its innovative deployment of the **Advanced Turbine Efficiency Package (ATEP)**, it has revolutionised energy efficiency in heavy industries. The ATEP, deployed at PacificLight Power's 800MW power plant in Singapore, represents a breakthrough in reducing fuel consumption and carbon emissions by 60,000 tonnes annually, equivalent to taking 9,300 cars off the road annually. This innovation was supported by the **Genco Energy Efficiency Grant** from Singapore's Energy Market Authority, exemplifying the importance of leveraging on government incentives to drive energy efficiency. Coupled with the ATEP, waste heat recovery systems capture excess heat from industrial processes, further reducing energy demand and improving operational efficiency in industries such as steel, cement, and chemicals.

Siemens Energy's broader solutions include **Electric Arc Furnaces (EAFs)** and **integrated energy management systems** for industries like steel, chemical and cement, replacing traditional fossil fuel methods with cleaner, more efficient alternatives. Their real-time energy management systems help industries track and optimise energy use, while digital tools like IoT and AI-based analytics enable predictive maintenance and process optimisation, further improving efficiency. Through innovations such as the **CertaLink Energy Certification**, Siemens also uses blockchain technology to verify sustainable energy use along the value chain. By linking physical assets, such as renewable energy sources or sustainable production methods, with a digital decentralised infrastructure, Siemens can provide a tamper-proof record of energy use. This allows companies to accurately track and certify the environmental impact of their energy consumption and production processes.

4.2 HEALTHCARE SECTORS

Case Study: Technological Innovations Enhancing Energy Efficiency in Healthcare Devices

Healthcare devices are another critical area where energy efficiency can generate significant sustainability benefits as energy consumption is a critical factor in determining the overall environmental impact of medical devices. Through innovative technologies and design improve-

ments, significant advancements have been made in reducing energy consumption, ultimately lowering carbon footprints and operating costs for healthcare facilities. The following examples illustrate how energy efficiency is being integrated into cutting-edge medical devices, driving both environmental and economic benefits.

1. Philips Incisive CT Scanner: This model demonstrates remarkable energy efficiency, consuming 18.3% less energy compared to a leading competitor's similar product. This improvement translates to potential energy savings of 5,350 kWh annually, significantly **reducing both operating costs and carbon emissions** over the device's lifecycle.
2. Philips EPIQ Elite Ultrasound System: Through an innovative system redesign, this ultrasound device has achieved a 37% reduction in energy consumption compared to its predecessor. This leap in efficiency reflects the **impact of continuous technological refinement** on reducing operational energy demands.
3. Philips Radiography 7300 C X-ray System: By leveraging advances in system optimisation, this X-ray system consumes 39% less energy than earlier models, offering potential savings of 1,300 kWh per year. Such innovations contribute to a lower environmental impact **while ensuring top-tier performance**.

These device-specific innovations exemplify how healthcare manufacturers can adopt energy efficiency strategies tailored to the industry's unique demands. By prioritising energy-conscious product design, the healthcare sector can mitigate its environmental impact, reduce operational costs, and contribute to global sustainability efforts.

5. CHALLENGES AND OPPORTUNITIES

5.1 KEY CHALLENGES

LACK OF AWARENESS AND UNDERSTANDING

The pursuit of energy efficiency faces significant challenges in the current economic and regulatory climate. One of the foremost barriers is the **widespread lack of awareness and understanding** among consumers, businesses, and policymakers regarding the importance and implementation of energy efficiency measures. This knowledge gap results in a low demand for energy-efficient products and services, leading to missed opportunities for reducing energy consumption and emissions. In the manufacturing sector, operational barriers such as a lack of transparency in energy use make it difficult to identify and manage the most energy-intensive processes due to the absence of precise monitoring mechanisms.

ECONOMIC DOWNTURN

Furthermore, the recent **economic downturn** has tightened budgets across industries, making it more challenging to invest in new technologies. The **high initial cost** of implementing advanced technologies like AI, ML, or carbon capture and storage further complicates this issue. The World Economic Forum estimates that transitioning to net-zero emissions will require an investment of $3.5 trillion annually through 2030 (McKinsey Global Institute, 2022), pairing industry needs with advanced technologies require significant upfront investment, and the limited availability of financing options, particularly in developing countries, exacerbates the challenge.

MARKET INERTIA AND PERCEIVED RISKS

Market inertia and **perceived risks** associated with adopting new technologies present significant barriers, particularly in sectors such as construction and manufacturing. These industries often favor conventional methods due to uncertainties surrounding the performance and economic viability of innovative energy solutions. As heavy emitters, their lack of clear decarbonisation strategies exacerbates investor skepticism, with concerns over stranded assets and potential credit risks, including loan defaults. Without demonstrating a clear pathway toward sustainability, carbon-intensive sectors risk losing out on financing opportunities, particularly as investors increasingly prioritise ESG-linked investments. This resistance to change is further intensified by challenges in accessing capital, especially during economic downturns when investments in energy-efficient technologies are perceived as risky or non-essential, despite their considerable long-term benefits.

EVOLVING REGULATORY LANDSCAPE

Navigating the **evolving regulatory landscape** adds another layer of complexity. While governments are increasingly advocating for stricter energy efficiency standards, businesses often find themselves navigating a complex web of regulations and compliance requirements, which can be difficult to manage without specialised expertise. The revised EU Energy Efficiency Directive mandates that member states collectively ensure an additional 11.7% reduction in energy consumption by 2030 compared to previous levels (European Commission, 2023). However, scepticism about the profitability of ESG initiatives has led to a **reluctance to fully integrate energy-efficient practices into broader corporate strategies**. Research from South Pole reveals that nearly half of 1,400 surveyed companies admitted it's easier to remain silent on green goals when confronted with heightened regulation, industry demands, and increased scrutiny (South Pole, 2023). This hesitancy is further compounded by the fact that decarbonisation goals often lack transparent and actionable plans for achievement.

Consequently, energy efficiency is frequently perceived as an added cost rather than a strategic opportunity for innovation and long-term value creation.

5.2 OPPORTUNITIES FOR GROWTH

Amid the challenges, there are substantial opportunities for growth in energy efficiency, particularly for businesses willing to embrace innovation and strategic investment. Across various sectors, advancements in energy-efficient technologies and government-backed initiatives are **opening doors for transformative improvements in energy usage and sustainability.**

MARKET COMPETITION DRIVES BUSINESS TO CONTRIBUTE

The integration of advanced technologies, such as **artificial intelligence (AI), machine learning (ML), and smart grid systems**, presents significant opportunities for businesses to optimise energy usage and reduce costs. AI-driven solutions are transforming energy management, allowing for real-time monitoring, predictive maintenance, and data-driven optimisation of energy consumption across industrial and commercial sectors. By investing in such solutions, businesses can reduce operational costs and carbon footprints while future-proofing their operations against energy price volatility.

Additionally, the growing market for **energy-efficient appliances, building technologies, and retrofitting** presents another high-impact investment opportunity. The global push for energy-efficient buildings, as part of the decarbonisation strategy, offers substantial growth for companies involved in developing and deploying smart lighting, advanced HVAC systems, and energy-efficient materials.

REGULATIONS AS THE DRIVING FORCE BEHIND THE IMPLEMENTATION

The energy-efficiency solutions and services market is rapidly expanding, driven by the global push for decarbonisation. In the European Union, the **Energy Efficiency Directive** is a cornerstone of this effort, compelling member states to implement concrete measures such as mandatory energy audits for large companies, energy-efficient building renovations, and industry-specific energy standards. These regulations are reinforced by the ambitious goals of the **EU Green Deal**, which seeks to make Europe the first climate-neutral continent by 2050. Through financial incentives and grants, businesses are encouraged to invest in energy-efficient technologies, demonstrating how regulatory frameworks actively drive corporate action toward sustainability.

Similarly, in Singapore, the **Energy Conservation Act** mandates that large energy users develop comprehensive energy efficiency plans. This legislation aligns with global efforts to transition to decentralised and renewable energy systems. The Act compels businesses to adopt energy-efficient practices, while government-backed incentives, such as the **Energy Efficiency Fund**, provide financial support to reduce energy consumption. These regulations not only push companies to proactively manage their energy use but also offer tangible benefits, showing that regulatory frameworks are the primary force behind energy efficiency advancements, ensuring that businesses align with national and global sustainability goals.

PUBLIC-PRIVATE PARTNERSHIPS (PPPS) IN SCALING ENERGY EFFICIENCY INITIATIVES

Public-private partnerships (PPPs) are instrumental in scaling up energy efficiency initiatives, especially in large infrastructure projects. By pooling resources, expertise, and innovation from both public and private sectors, PPPs accelerate the adoption of cutting-edge energy-efficient technologies. In the European Union, initiatives like the **Digitalisation Action Plan** foster collaboration between governments and private entities, driving energy efficiency across industries. Similarly, Singapore's **Energy Efficiency Fund** provides grants covering up to **50% of qualifying costs** for projects, including energy-efficient equipment installations and energy audits. These programmes are particularly beneficial for **small and medium-sized enterprises (SMEs)**, which often face financial barriers when adopting new technologies.

PPPs are also effective in unlocking crucial **financing mechanisms** such as **green bonds**, **subsidies**, and **tax credits**. The **EU Green Deal** aims to mobilise **€1 trillion** over the next decade, supporting energy-efficient infrastructure through private sector investment. Likewise, Singapore's **Sustainable Bond Grant Scheme** encourages companies to issue green bonds, providing access to lower-cost capital for energy efficiency projects. Tools like **energy performance contracts (EPCs)**, often sponsored by public institutions, further reduce the financial burden on businesses. These collaborations, as seen in **Copenhagen** and **Singapore**, successfully integrate energy-efficient technologies into urban infrastructure like buildings and transportation, reducing emissions and fostering sustainability.

6. THE ROLE OF CORPORATE LEADERSHIP IN ENERGY EFFICIENCY

6.1 IMPORTANCE OF CORPORATE STRATEGY

Incorporating energy efficiency into the core of corporate strategy is not merely a matter of operational optimisation; **it is a bold commitment to a sustainable and prosperous future**.

Integrating energy efficiency into a company's overarching vision is a powerful catalyst for driving long-term value creation. It signifies a dedication to resilience, innovation, and a future where business success is synonymous with environmental stewardship. Companies that recognise the intrinsic link between energy efficiency and environmental indicators are positioned to lead the charge in the global sustainability movement. By reducing greenhouse gas emissions, lowering energy consumption, and enhancing their environmental footprint, they demonstrate a profound responsibility to the planet and to society.

6.2 SIEMENS ENERGY'S CORPORATE STRATEGY: A PATH TOWARD ENERGY EFFICIENCY AND CLIMATE NEUTRALITY

Siemens Energy places sustainability at the centre of its corporate strategy, with a commitment to leading the global transition toward a more sustainable and energy-efficient future. As part of its Sustainability Programme, energy efficiency is a core pillar in achieving Siemens Energy's goal of becoming an industry leader in sustainable energy systems.

Through its Climate Neutral Programme, Siemens Energy is targeting climate neutrality in its own operations by 2030, aiming to reduce scope 1 and 2 greenhouse gas emissions by 46% by 2025, compared to a 2019 baseline. In fiscal year 2023, Siemens Energy achieved a 15% reduction in primary energy consumption, primarily through optimised gas turbine testing, energy efficiency measures, and facility consolidation. The company's comprehensive approach addresses the entire value chain, positioning it at the forefront of the energy transition.

1. Expanding production capacity with alternative source of energy: Siemens Energy's **distributed ammonia cracking technology** is set to revolutionise the green hydrogen supply chain by lowering the cost of delivered hydrogen for key applications, such as hydrogen refueling stations, off-grid power solutions, and industrial use. Additionally, Siemens Energy is developing a **prototype system** in the UK to crack ammonia and purify hydrogen to **Proton Exchange Membrane (PEM) fuel cell quality**, leveraging existing infrastructure to accelerate the adoption of hydrogen as a key energy source.
2. Enhancing fuel efficiency for its partners: Siemens Energy supported a paper and packaging producer in enhancing plant efficiency through a comprehensive **energy solution**. This included the electrification of a new paper-machine production line and the installation of a state-of-the-art power plant featuring the latest-generation gas turbines. By replacing older, less efficient models, Siemens Energy's new gas turbines deliver additional power on-site while meeting stringent NOx emission standards, significantly boosting energy efficiency and reducing the plant's environmental impact.
3. Establishing itself as the leading provider of carbon-reducing solutions for the industrial sector: Siemens Energy is establishing itself as a leader in carbon-reducing technologies for heavy industries by providing advanced electrification and automation solutions, including **Electric Arc Furnaces (EAFs), Integrated Drive Systems (IDS)**, and large **heat pumps** for district heating networks. These systems optimise energy use, recover waste heat, and reduce emissions, while the **Sidrive IQ platform** enhances operational efficiency through predictive maintenance. By integrating these innovations, Siemens Energy supports industries in reducing carbon footprints and achieving global sustainability targets.

6.3 PHILIPS' CORPORATE STRATEGY: LEADERSHIP IN ENERGY EFFICIENCY THROUGH SUSTAINABILITY

As a global leader in healthcare technology, Philips demonstrates the critical role that corporate leadership plays in driving energy efficiency through a commitment to sustainability. Their approach, **grounded in long-term goals and innovative solutions**, serves as a model for how corporations can integrate energy efficiency at multiple levels—across operations, product design, supply chains, and customer engagement.

COMMITMENT TO SUSTAINABILITY

Philips has positioned sustainability as a core element of its overall strategy. In 2020, the company reached a significant milestone by becoming carbon neutral in its operations and transitioning to 100% renewable electricity. This achievement aligns with the United Nations Sustainable Development Goals (SDGs), particularly SDG 13 (Climate Action). However, Philips' focus on sustainability extends beyond compliance—**it is embedded within the company's strategy**, reflecting its dedication to SDG 3 (Good Health and Well-being), SDG 12 (Responsible Consumption and Production), and SDG 17 (Partnerships for the Goals).

IMPLEMENTATION STRATEGY

Philips employs a multi-faceted approach to reducing its carbon footprint, targeting operations, products, suppliers, and customers:

1. Energy Efficiency in Operations: Philips upgraded its global facilities with better insulation, energy management systems, and **efficient equipment**. It also installed solar panels at several sites and, where on-site generation wasn't possible, entered Power Purchase Agreements (PPAs) and used Renewable Energy Certificates (RECs) to secure renewable electricity.
2. Energy-Efficient Products: Recognising that 80% of a product's carbon footprint comes from its design, Philips embraces EcoDesign principles. Products like the MR with SmartSpeed, DXR (Digital X-ray), ultrasound systems, and cath labs are optimised for energy efficiency, significantly **reducing energy use in healthcare settings**.
3. Supplier Collaboration: Philips works with its supply chain, where emissions are 7 times higher than its own operations. By 2025, 42% of suppliers will have committed to science-based CO_2 reduction targets.
4. Customer Partnerships: Philips supports customers by offering EcoDesigned products and helping them optimise workflows to reduce energy consumption and waste, further contributing to scope 3 emissions reductions through circular product design.

Through these strategic actions, **Philips exemplifies how corporate leadership can integrate energy efficiency into every facet of its operations**, driving meaningful progress toward a sustainable future. This commitment underscores the importance of a holistic approach to energy management, proving that corporate responsibility is essential for achieving both environmental and business goals.

7. RECOMMENDATIONS

7.1 POLICY RECOMMENDATIONS

At a national level, strengthening **energy security must go hand in hand with meeting climate goals** and UNFCCC commitments. To achieve a secure and decarbonised future, policymakers need to focus on **creating short, medium, and long-term strategies that foster the energy transition**.

Strengthening energy security while maintaining climate commitments requires not only national strategies but also robust international cooperation. The inaugural 2024 EU-Singapore Dialogue on Global Gateway exemplifies this, bringing together stakeholders to explore green and sustainable investments in Southeast Asia (Delegation of the European Union to Singapore, 2024). By enhancing regulatory frameworks through partnerships like the EU-Singapore agreement, both regions can leverage shared advancements in energy technology and policy. Aligning standards on energy-efficient technologies, carbon pricing, and innovation ensures a unified strategy that supports the global energy transition. Additionally, joint efforts to diversify critical mineral supply chains can mitigate geopolitical risks. This collaboration fosters new market opportunities while bolstering long-term energy security and decarbonisation goals for both the EU and Singapore (Lang, Berns, & Porsborg-Smit, 2022).

8. CONCLUSION

8.1 SUMMARY OF KEY POINTS

Energy efficiency is a pivotal driver for advancing both sustainability and competitive advantage, particularly in the context of increasing regulatory demands and technological advancements. Companies that integrate energy-efficient technologies, such as AI-driven smart grids and decentralised energy management systems, stand to gain substantial cost savings while significantly reducing their carbon footprints. Regulatory frameworks like the EU Energy Efficiency Directive and Singapore's Energy Conservation Act provide essential support, driving both corporate responsibility and innovation. The role of public-private partnerships (PPPs), alongside financial tools like green bonds and energy performance contracts, further reinforces the path to large-scale energy efficiency adoption. Leaders such as Siemens and Philips exemplify how prioritising energy efficiency aligns with long-term profitability, market leadership, and environmental stewardship.

8.2 CALL TO ACTION

The time for decisive action is now. Industry leaders must integrate energy efficiency as a central component of their corporate strategy, not only to meet stringent regulatory standards but to safeguard against future disruptions in the energy landscape. By adopting cutting-edge energy management systems, smart technologies, and optimising operations, businesses can achieve lasting cost reductions, improve their ESG performance, and bolster their resilience. The path forward lies in leveraging public-private partnerships, accessing innovative financing tools, and embracing sustainability as a driver of growth. Corporate leaders must seize this opportunity to position themselves as pioneers in the global transition to a cleaner, more efficient energy future.

9. ACKNOWLEDGEMENTS

LEAD AUTHORS

Victoria Kanagavelan, Senior Consultant, ESG Risk, Data Protection & Compliance, Singapore, Sia Partners
Vincent Leung, Senior Consultant, ESG Risk, Data Protection & Compliance, Hong Kong, Sia Partners
Nai Zhi Yun, Managing Director, Risk, Data Protection & Compliance, Singapore, Sia Partners
David Hollander, Partner, Financial Markets & Private Banking, Singapore, Sia Partners

CONTRIBUTORS

Huub van den Brok,Head of Strategic Business and Sustainability, Philips APAC, Singapore
Yvonne Cheng, Regional Sustainability Lead for Asia Pacific at Siemens Energy, Singapore

REVIEW & EDITORIAL SUPPORT

Nele Cornelis, Executive Director, EuroCham Singapore
Tanya Sahni, Advocacy and Programmes Manager, EuroCham Singapore

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CONTENTS

INTRODUCTION

In writing this report, our aim is to inspire and encourage more to make every dollar invested in Asia deliver a positive, measurable impact. As such, this report not only uncovers some of the significant opportunities and unique challenges to drive impact in Asia, but also extends the scope of existing research by providing tangible, real life examples from practitioners on the ground. Insights in this report are informed by stories across Asia, which includes China, India, and the Southeast Asian countries.[1]

The starting point in designing this report was the recognition that it is necessary to widen the focus of attention beyond just increasing the volume of available impact capital. Of course, impact-oriented financing is needed. However, it is just as important to bring in other change agents, such as impact-oriented companies and entrepreneurs who are creating positive change in their communities. Hence, to truly understand how impact is being delivered in Asia, we sought to speak with the key drivers of impact, from impact investors and ventures to mainstream investors and businesses. Understanding the perspectives and practices by this wide range of corporate actors is critical to drive impact at scale. The results of these candid conversations are at the heart of this report which, combined with our extensive research, has enabled us to derive valuable insights on impact integration across Asia.

This report, jointly developed by the Centre for Impact Investing and Practices (CIIP), Accenture, and Singapore Management University (SMU), aims to raise awareness of the great work for impact which is already underway, and to convene further discussions on how we can collectively deliver even more impact in Asia, for Asia.

In this report, we provide an overview of the insights we have learnt from the field, introduce several case studies on the impact journeys of regional players, and propose ideas on how we can move the impact ecosystem forward.

EXECUTIVE SUMMARY

Impact is about the simultaneous pursuit of two objectives: profit and social and/or environmental good. The defining features of impact practice, be it in investing or in running a company, is an articulated motive and intent to generate positive social and/or environmental impact alongside a targeted financial return.

1 Regarding the scope of Asia: 1) Insights in this report are derived from interviews with organisations operating in China, India, and Southeast Asia specifically; 2) Statistics and data on Asia cited in this report, unless otherwise stated, cover the regions of Southeast Asia, South Asia, and East Asia as classified by United Nations.

Both investors and companies are needed to drive impact – investors as active stewards provide guidance and expertise as well as much needed financial capital; companies as active agents to develop and implement business strategies that deliver measurable impact to the communities they serve.

Delivering impact at scale requires systematic measurement of outcomes and effective integration of impact considerations into management and governance systems. This is vital for ensuring accountability and sustained commitment impact through various phases of investor engagement or a company's life-cycle, and is especially important for navigating through periods of rapid organisational growth and strategic change.

The impact landscape spans a spectrum of approaches and strategies, pursued by a variety of players operating at different stages of their respective impact journeys. Impact-oriented practitioners range from mainstream investors and companies pursuing opportunities in Environmental, Social, and Governance (ESG) areas, to specialist impact investors and companies dedicated to contributing to the world's Sustainable Development Goals (SDGs).

The market for impact is large and growing. In Asia, there is both immense opportunity and need for impact action, from empowering the hundreds of millions of micro, small, and medium-sized enterprises (MSMEs) and smallholder farmers in the region, to developing a roadmap for a just climate transition and providing goods and services to a growing population of first-time consumers.

Asia offers a unique opportunity to deliver impact at scale. New technology and digitally enabled business models are capable of expanding the reach of previously unaffordable products and services to a large population with rising purchasing power and heightening social and environmental awareness. The relatively young population also represents a fast-growing pool of socially and environmentally conscious entrepreneurial talent. These positive dynamics, together with the region's underlying cultural values, create conditions highly conducive for driving impact in Asia.

To unlock Asia's impact potential, it is critical to collect Asia-specific data on both social and environmental issues to improve our baseline understanding of impact needs, expected outcomes, and potential opportunities across the region. Further, the sharing and dissemination of more Asian success stories in impact will inspire broader action.

A successful impact market requires a consolidated ecosystem of diverse stakeholders, supported by a favourable regulatory environment. This involves fostering impact-aligned organisations, enhancing impact proficiencies with standards and tools, upskilling talent, building robust data infrastructure for information sharing, and improving access to capital through innovative financial solutions.

The time to act is now, and every organisation has a role. Regardless of type, size, or sector, organisations can and should do more. Purposeful and strategic thinking about impact, embedding it into governance and decision-making, and measuring both positive and negative impact are essential steps.

IMPACT INVESTMENTS

Profit with Purpose for Social and Environmental Change

The defining feature of impact practice, be it in investing or in running a company, is an articulated motive and intent to generate positive social and/or environmental impact alongside a targeted financial return. Impact goals are typically set with reference to recognised impact standards and implemented through continuous measurement and systematic management.

The rising frequency of adverse climate events and the prevailing social inequalities laid bare by the COVID-19 pandemic have generated widespread debate and introspection within the institutional investor and business communities about their broader responsibilities and role in society, beyond the singular pursuit of profit. As consumers seek to better align their values with consumption habits, and regulators move towards mandatory ESG disclosures, investors and businesses alike understand the need to respond. Leaders are recognising that they must now move beyond the hygiene factor of assessing ESG as a risk management and compliance tool, and look to purposefully embed positive social and environmental impact into their core investment processes and business practices. Frameworks such as the International Finance Corporation's (IFC's) Operating Principles for Impact Management (OPIM) are important for investors looking to embed impact considerations throughout the investment lifecycle.

Before going further, it is important to recognise that although impact investing has existed for some years, it is still too often misunderstood and confused with philanthropy. Impact investments are "made into companies, organisations, and funds with the intention to generate social and environmental Impact alongside a financial return."[2] It is the simultaneous pursuit of positive social and environmental change

2 GIIN (2017). 2017 Annual Impact Investor Survey

and financial return that sets impact investing apart from philanthropy. Nevertheless, there is a longstanding misconception that impact investing involves a trade-off in financial returns in order to achieve positive social and environmental outcomes. In fact, financial returns and social or environmental goals are equally vital components of the dedicated impact investors' strategy. The Global Impact Investing Network's (GIIN's) Annual Impact Investor survey provides evidence for this. About 70% of respondents to the 2020 survey indicated that they seek risk-adjusted, market-rate returns, and ~90% indicated that they expect financial performance to meet or exceed targets.[3] While this is encouraging, it is not clear that this belief is prevalent beyond the core group of impact investors. Our discussions with a range of investors and companies suggest that it is important to continue to reiterate and reinforce stories that show it is possible to generate positive impact alongside market-rate returns.

Companies also have an important role to play by integrating impact practices in their business strategy and operations. To be credible, as with impact investing, companies must have a stated, built-in intentionality to deliver positive change alongside profit, using globally recognised decision frameworks such as the UNDP's SDG Impact Standards. Investors can then allocate capital to such companies based on targeted impact outcomes as well as expected financial returns.

KEY IMPACT ACTORS

Both investors and companies are indispensable for delivering impact at scale.

The fast-evolving impact ecosystem is a vibrant community with a diverse set of practitioners of various kinds. There are two key groups of actors: impact-oriented investors (see Figure 1a) and impact-oriented companies (see Figure 1b), both of which are indispensable in scaling impact:

- **Impact-oriented investors:** investors, including institutional and individual investors, professional fund and wealth managers, who allocate financial capital to businesses with the intent to generate positive impact alongside financial returns
- **Impact-oriented companies:** companies, including purpose-led large corporates or mission-driven start-ups who embed impact intent in their business strategy and operations, and deploy resources to deliver targeted impact outcomes alongside financial performance

Beyond investors and companies, there is a range of critical ecosystem actors, from standard setters (e.g., UNDP SDG Impact, IFC, the GIIN) and networks (e.g., Asian Venture Philanthropy Network (AVPN)) to third party assurers, measurement, and service providers (e.g., Tidelines, Y Analytics, Bridgespan). As we will explore in the later section of this report, all stakeholders are required, individually and collectively, in order to develop a robust impact market.

SPECTRUM OF IMPACT

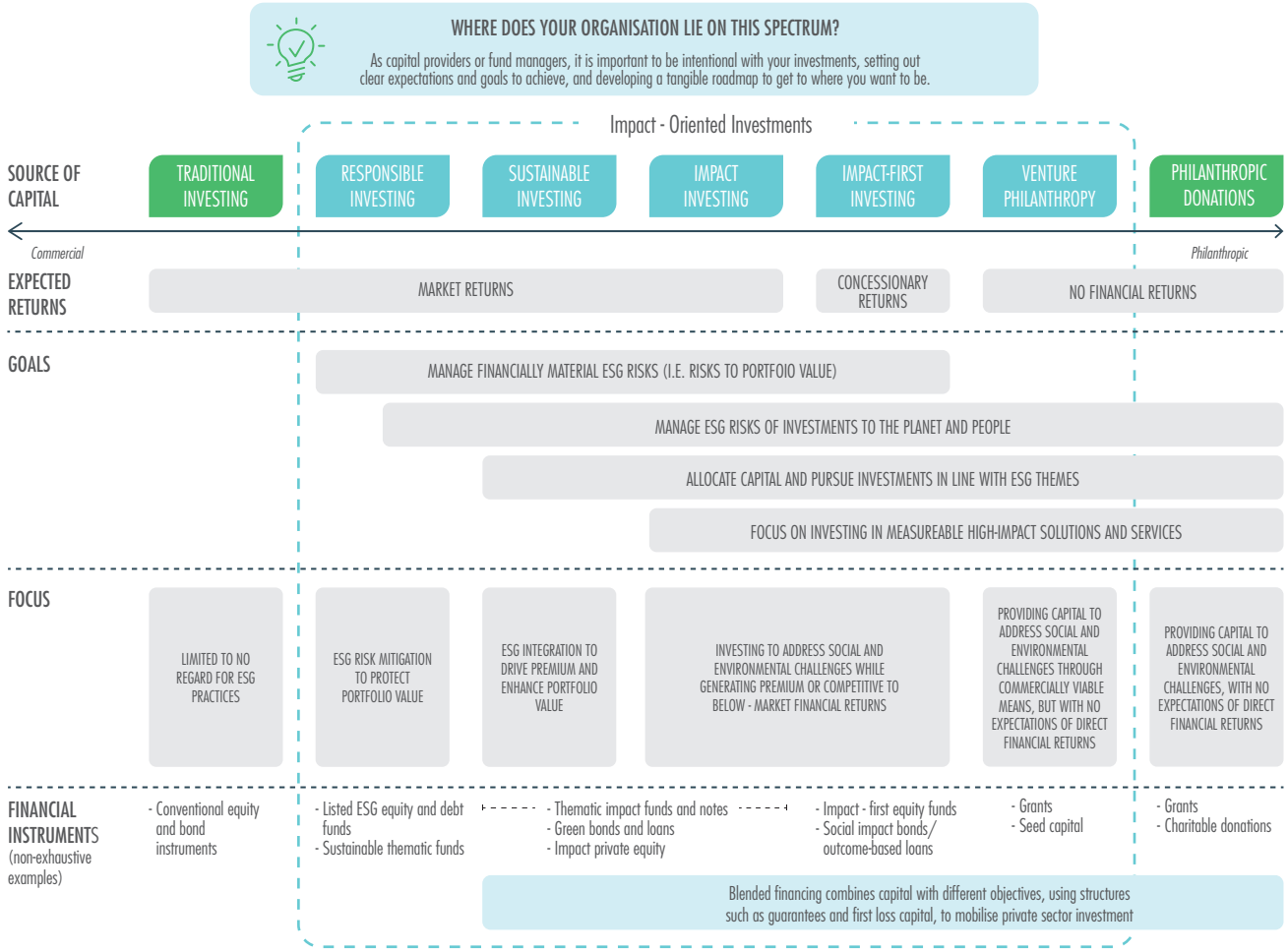
The impact landscape spans a spectrum of approaches and strategies pursued by a variety of players operating at different stages of their respective impact journeys.

From an investor's perspective, impact-oriented investments cover a broad range of strategies, varying from responsible investing to venture philanthropy. Today, ESG factors set the baseline and the minimum threshold for responsible businesses to avoid harm and are integrated into a growing majority of mainstream investment decision-making. For example, Dragon Capital, a long-term and responsible public equities and fixed income investor in Vietnam, incorporates a range of strategies in their investments, from negative screening as a baseline, to ESG integration and corporate engagement as best practice. For Dragon Capital, ESG is critical for risk management.

It seeks to optimise risk-adjusted performance by integrating ESG factors throughout the investment process and across its actively managed funds. "One of the biggest challenges to ESG practices in Vietnam today is the lack of awareness from local businesses. Further, the availability, reliability, and accessibility of ESG metrics and information remain key challenges for many investors," says Vinh Pham Nguyen, Corporate Development Director of Dragon Capital. Dragon Capital, a signatory to the UN Principles for Responsible Investment (PRI) since 2013, has been a keen and long-term advocate for the promotion of ESG awareness and adoption in Vietnam.

3 GIIN (2020). 2020 Annual Impact Investor Survey

Figure 1a: Spectrum of Impact - Oriented Investments



Source: Adapted by CIIP, SMU, and Accenture, based on the UNDP, Credit Suisse, Bridges Fund Management, The Impact Investing Institute, and PwC

Impact investors go beyond ESG. They are intentional with their capital and seek to finance solutions to social or environmental challenges via the entrepreneurs and businesses that they back. For example, ABC Impact commits 100% of its investment activities to positive impact creation. All of its portfolio companies are working to address the world's most pressing challenges, such as climate change, resource scarcity, and deepening inequality. ABC Impact also expects compelling financial returns from their investments.

While impact investing does not equate to a sacrifice in profit and often generates well above market rate returns, it is true that impact oriented investments bring a range of expected returns, from market rates to concessionary returns. In some cases, such as venture philanthropy, investors may seek no financial return at all, but do evaluate the promise of commercial viability of their investments as an important criterion.

The complex social and environmental problems of our time sometimes require complex solutions. Hence, some impact-oriented investors make use of blended finance solutions to facilitate the path to commercial viability for companies trying to address challenging societal or environmental problems. Investments using blended finance allows impact-oriented practitioners from across the spectrum with different levels of risk appetite and impact objectives to invest alongside each other. Blended financing instruments can increase capital availability by de-risking investments (e.g., through first-loss guarantees) or further enhancing impact (e.g., through results-based funding).

Transaction highlight: Stegra (previously H2 Green Steel)

ING acted as Pathfinder* on the €4.2 billion project financing for Stegra (previously H2 Green Steel). In addition to raising €4.2billion in debt, the project also raised €2.1bn in equity and €250m in grants, exemplifying the enormous amounts of capital that the steel industry needs to raise to decarbonise. In its role, ING was responsible for coordinating the documentation process amongst more than 20 banks, two ECAs and one supra-national institution.

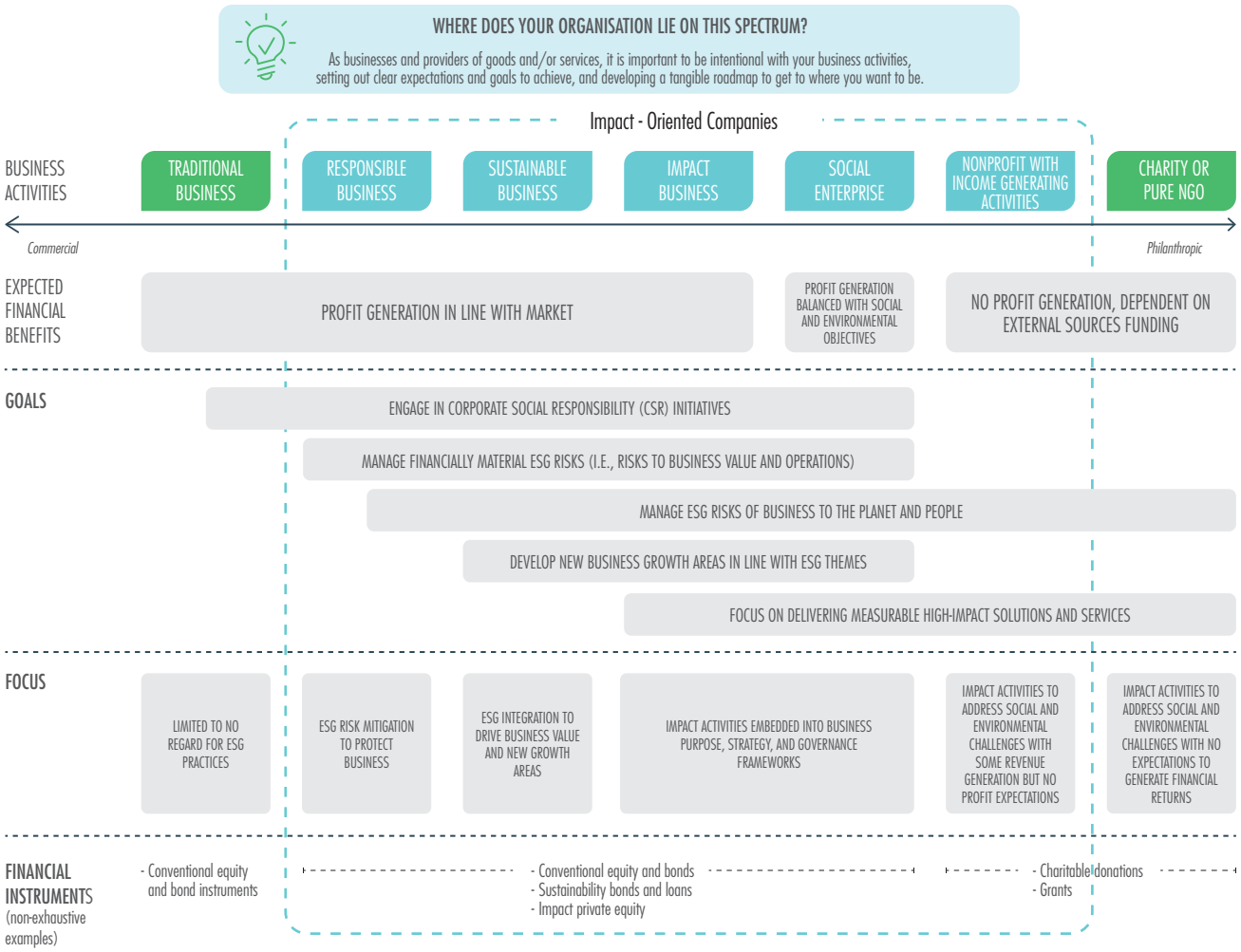
The project will use direct reduction technology utilising hydrogen, which is expected to lead to an up to 95% reduction in the carbon footprint of the produced steel compared to the prevailing steel-making method using coal-based blast furnaces. This ground-breaking and large-scale green steel plant, based in northern Sweden (with good access to renewable electricity, high-quality iron ore, and a specialised and innovative local steel industry), is planning to start production during 2026.

** A Pathfinder is a financial institution that plays a leading role in the structuring of a complex financing*

Similar to the case of investors, impact-oriented companies adopt a range of approaches and strategies to impact (Figure 1b). Indeed, impact orientation – albeit to different degrees – is increasingly adopted by established businesses. These strategies range from managing ESG risks to the business and practising corporate social responsibility (CSR) to pursuing new ESG opportunities, e.g., renewable energy, circular business models.

A growing breed of entrepreneurs is building businesses with impact at its core, applying market forces to solve social and environmental problems, from agri-tech platforms improving farmer livelihoods and fintech players disrupting the micro-credit lending industry, to remote carbon monitoring solutions.

Figure 1b: Spectrum of Impact - Oriented Companies



Source: Adapted by CIIP, SMU, and Accenture, based on the UNDP and Brown University

ATTRIBUTES OF SUCCESSFUL IMPACT INVESTING AND PRACTICES

To succeed in impact investing and practices, we need to get four key attributes right – impact intent, impact measurement, impact accountability, and commercial viability.

There are many types of principles, standards and frameworks, which have been adopted by impact investors and companies, with some developing their own proprietary systems to track outcomes. While the specifics of these adopted frameworks will vary, successful impact practitioners – whether investors or companies - have four essential attributes in common: (1) they are driven by clear ex-ante impact intent; (2) they demand the setting of measurable impact standards and objectives, which are then measured and managed; (3) they integrate impact across all management processes and systems of accountability; and (4) they are committed to commercial viability.

Drawing on the GIIN's core characteristics of impact investing[4] and IFC's OPIM[5], we summarise the four essential attributes of successful impact inclusion in Figure 2.

Figure 2: Four Essential Attributes of Impact Investing Practice

KEY ATTRIBUTES	AN IMPACT INVESTOR/ COMPANY MUST...	BEING AN IMPACT INVESTOR/ COMPANY IS NOT...
Define impact intent	✓ Have clear ex-ante intent to have, and improve, impact outcomes.	✗ To have ex-post justification of what impact has been created due to the investment
Set measurable impact standards & goals	✓ Define targets in line with one's impact vision and strategy	✗ To have only a vision or aspiration for impact
	✓ Continuously measure impact with a clear and comparable set of metrics (i.e., to safeguard impact as the business evolves)	✗ To declare intention without monitoring the actual impact created
Integrate impact into management processes & systems of accountability	✓ Establish governance and processes to hold internal stakeholders to account	✗ To have unclear roles and responsibilities
	✓ Optimise impact outcomes on an ongoing basis	✗ To be inconsistent in delivering on and maximising impact outcomes
Commit to commercial viability	✓ Ensure impact generation in a commercially viable and sustainable way	✗ To necessarily sacrifice commercial viability in the pursuit of impact

Source: Adapted based on the GIIN's Core Characteristics of Impact Investing and IFC's OPIM

GLOBAL IMPACT LANDSCAPE

Globally, the market for impact is large and growing. Yet, more is needed – post-COVID-19, financing the SDGs faces a gap of US$4 trillion annually.

Of the many underlying factors generating momentum for impact practices, we see two major forces accelerating growth, namely a heightened awareness of impact issues due to the COVID-19 pandemic and the rise of ESG practices and considerations.

The COVID-19 pandemic has markedly increased the awareness of social inequality in many places, including issues such as the widening wealth gap and the lack of access to basic healthcare services or essential educational resources. These stark realities have sharpened the focus of consumers and other stakeholders to ask for businesses to do more than deliver profit. According to Accenture's survey on market sentiment, 64% of global consumers are attracted to company brands that actively communicate their purpose[6], and 61% of consumers are buying more environmentally friendly, sustainable or ethical products with 89% likely to continue post-pandemic[7].

The ESG wave has spurred companies into getting serious about purpose and profit. Reflecting the evolution from shareholder value to stakeholder value, research generally suggests that ESG investing and practice can help companies mitigate risks, enhance their performance, and even serve as a source of "alpha" in market value and investment return[8].

While ESG reporting and compliance is important, a more intentional, accountable, and substantial approach is needed to deliver positive impact at scale. The global SDG financing gap is US$4 trillion annually, up from US$2.5 trillion pre-COVID-19[9]. This represents considerable potential and need that can be addressed by impact investing and practices. Between 2019 and 2020, the global assets under management (AUM) of impact investing funds increased from ~US$500 billion to ~US$630 billion, at an annual growth rate of

4 GIIN (n.d.). Core Characteristics of Impact Investing
5 OPIM (n.d.). The 9 Principles
6 Accenture (2018). From me to we: The rise of the purpose-led brand
7 Accenture (2020). COVID-19: New habits are here to stay for retail consumers
8 See Giese, Nagy and Lee (2020). Deconstructing ESG Ratings Performance; Giese, Lee, Melas, Nagy and Nishikawa (2019). Foundations of ESG Investing: How ESG Affects Equity Valuation, Risk, and Performance; MSCI (2018). How Markets Price ESG: Have Changes in ESG Scores Affected Stock Prices?; Verheyden, Eccles and Feiner (2016). ESG for All? The Impact of ESG Screening on Return, Risk and Diversification
9 UNCTAD (2023). SDG Investment Trends Monitor Issue 4

~26%[10]. The IFC further estimated that, in 2020, an additional US$1.6 trillion of investment assets were intended for impact but did not have systems in place to measure impact.

ASIA'S IMPACT LANDSCAPE

Asia stands out — demographically, developmentally, and in terms of sheer diversity—presenting tremendous opportunities for the private sector to address social and environmental issues through commercially viable solutions.

Asia's scale and development profile presents considerable and unprecedented opportunity. On basic demographics, Asia's population of ~4.3 billion comprises 55% of the world's total population[11], and 980 million youth (aged 15-29) call Asia their home[12]. Three of the four largest countries by population are in Asia, i.e., China, India, and Indonesia.

Much of Asia's large population is still in need of essential services, a gap that the private sector is well poised to fill. According to World Bank data, 20 out of the 26 economies in Southeast Asia, South Asia and East Asia are in the low-income to upper middle-income range. Across lower-middle- and low-income economies in Asia, there are 1.1 doctors per 1,000 population, and this rises slightly higher to 1.3 doctors per 1,000 population – when upper-middle income economies in Asia are taken into account. This is in stark contrast compared to OECD's average of 3.4[13].

Asia also has the fastest-growing middle-class globally. The middle-class population in Asia is estimated to grow from 2 billion in 2020 to 3.5 billion in 2030[14], at ~7%+ CAGR, driven in large part by China and India. Within the decade, two out of three members of the global middle class will come from Asia. Building sustainable systems to provide services and products to Asia's emerging consumer class while protecting the region's environmental resources represents a significant challenge and opportunity for both the private and public sectors.

It must also be noted that many sectors in Asia are still at an early stage of development. This represents great potential for industrialisation and digitisation of these sectors and for investors and businesses to scale stakeholder value alongside shareholder value. As UNDP SDG Impact has observed, the COVID-19 pandemic has exacerbated the development challenges in Asia that is home to almost two-thirds of the global population. The ever-changing 'new normal' has formed a powerful push factor for many people to adopt digital technology to access basic services, leading to the acceleration of digitisation and the growing need to enhance digital literacy. Local MSMEs have been challenged by the disruption of global supply chains, increasing the demand for financial capital and more efficient and effective supply chain management support.

INSIGHTS FROM PRACTITIONERS IN ASIA

Between January and April 2022, we conducted 28 interviews with investors and companies in Southeast Asia, India, and China to understand their perspectives on impact and where they are on the impact journey. In this section, we summarise the key learnings and insights from our rich discussions, which cover the broad topics of impact motivation, strategy, measurement, accountability, and success.

INVESTORS' PERSPECTIVE

Investors agree that strong motivation and clear intention is critical.

Motivation and intentionality in pursuing impact matters. From our interviews, the motivation of the individual investors, fund managers and investees was something that came out consistently as a critical factor in impact. Ex-ante motivation and intent is the cornerstone of impact practice and drives many investors. It guides them to make decisions by adopting rigorous processes to assess the intent and authenticity of potential investees. For example, Omidyar Network India believes that "the intention to create impact is an important question and starting point", as shared by its partner Varad Pande.

10 IFC (2021). Investing for Impact: The Global Impact Investing Market 2020 (Note: the figures include both privately managed funds investing in public markets, private equity (PE), venture capital (VC), real assets, real estate, infrastructure, or private debt and publicly managed investment by Development Financial Institutions (DFIs) and national/regional development banks)
11 Worldometers (2022). Asia Population
12 United Nations (2019). World Population Prospects 2019
13 OECD (2020). Health at a Glance: Asia/Pacific 2020 : Measuring Progress Towards Universal Health Coverage (Doctors and Nurses) (Note: Asia scope, based on latest year available, covers: Bangladesh (2018), Brunei Darussalam (2017), Cambodia (2014), China (2017), Hong Kong, China SAR (2018), India (2018), Indonesia (2018), Japan (2016), North Korea (2017), South Korea (2017), Lao PDR (2017), Macau, China SAR (2017), Malaysia (2015), Mongolia (2016), Myanmar (2018), Nepal (2018), Pakistan (2018), Philippines (2017), Singapore (2016), Sri Lanka (2018), Thailand (2018), and Vietnam (2016))
14 Brookings Institution (2017). The Unprecedented Expansion of The Global Middle Class (Note: Data covers Asia and Pacific, including Australia and New Zealand, and excludes Iran, North Korea, Singapore)

Investors are specifically looking for companies where impact creation is embedded in the core business model and whose founders are able to clearly articulate their impact intention. They also attach emphasis and efforts to seek alignment in intentionality with both prospective investees and LPs, as they have found that a shared pursuit of impact serves as a solid foundation to maximise impact through joint efforts. In addition, a clear and compelling common purpose among internal stakeholders is a powerful agent for change, which also drives stronger long-term financial returns and reduces risk.

"Our partners are authentically interested, motivated and passionate about harnessing the power of the capital markets to make a positive impact on the lives of emerging consumers and their communities", as shared by LeapFrog Investments' partner, Fernanda Lima.

Investors can deliver impact through different strategies and approaches. Active stewardship is the cornerstone for all investors interviewed.

Many investors shared that, despite challenges, they have been successfully translating their impact intents into actions, from identifying and assessing investment opportunities to measuring and managing impact outcomes, both positive and negative. Impact investors define their investment strategy in various manners, from using a sectoral, market-led approach to focussing on a specific social or environmental issue.

For example, **ABC Impact** identified their five investment themes based on the UN SDGs and pursued market opportunities within these themes.

LeapFrog Investments employs a sector-specific approach, focussing on financial inclusion and healthcare, to enable them to go deeper in their impact and value creation discussions. For example, the healthcare team includes several doctors, who are able to draw on first-hand experiences in the healthcare industry to develop strategies that are practical and nuanced and which drive both financial and social returns.

By contrast, **Omidyar Network India** is sector agnostic, which enables them to see the intersections across sectors. They employ a geographical focus to their investment strategy, with an approach that is shaped by a deep understanding of the nuances of a common culture, values, and identity of the population it serves, often referred to as the Next Half Billion, representing the 500 million Indians who have come online for the first time via their mobile phones between 2017 and 2022.

Oppenheimer Generations Asia (OppGen Asia) does not have a specific sectoral focus or top-down thematic approach, but does carefully select the right investment partners to ensure a shared commitment to impact and engaged capital. Their principal, Jonathan Oppenheimer, defines engaged capital as "a partnership between financial investors and company managers, with a shared long-term horizon and a focus on maximising sustainable value". Engaged capital investment requires patience, tolerance of risk, and scale.

No matter the strategic approach, impact investors need to adopt a framework for impact assessment. In partnership with Bridgespan Social Impact, TPG's The Rise Fund and Y Analytics, TPG's dedicated impact assessment and ESG capability, developed a research-based approach to assign monetary value to impact, based on metrics that help estimate the economic value of the social and environmental impact of the investment.

Ehong Capital, an impact investor in China has adapted and applied Impact Management Project's (IMP's) 5-dimension framework for impact evaluation, and the GIIN's IRIS+ to identify key outcomes and metrics to measure.

Similarly, **ABC Impact** employs a systematic and evidence-based approach to IMM, from leveraging the UN SDGs as a basis for goal setting and IMP's 5-dimension framework for impact evaluation, to developing a scoring system that defines the minimal impact threshold for their investments.

Several players have developed proprietary IMM frameworks. For example, **LeapFrog Investments** has pioneered its own proprietary measurement tool - Financial, Impact, Innovation and Risk Management (FIIRM) Framework - that embeds key indicators of impact together with financial and operational performance and governance indices and is benchmarked to international best practices such as the Global Impact Investment Rating System (GIIRS), IRIS+, and PRI. Lok Capital has also evolved its proprietary measurement framework to include considerations on gender equality and emission reductions through its investees.

East Ventures, a mainstream venture capital (VC) fund that is not typically recognised as an impact investor, adopts a consumer-led and digital-first approach. While they do not identify as an impact investor, they look for digital solutions that solve specific pain points in the local society and industry. East Ventures employs a practical approach to impact, by supporting investees in building product market fit to solve sizable societal problems. The fund focusses on developing the core business of their investees before assessing and measuring its impact contribution. East Ventures does not apply an impact framework to its ventures at the early stages, focussing rather on ensuring the company has the necessary "muscles" to be commercially viable and financially sustainable. As the business becomes stronger and sustainable, they then support them in developing a more deliberate and focussed impact strategy. East Ventures recognises they can do more in impact as a large mainstream VC, for example, they are starting to measure their portfolio's impact and to monitor non-financial

metrics, though not yet across their entire portfolio. They recently became Indonesia's first venture capital firm to sign the UN Principles for Responsible Investment (PRI)[15].

Notwithstanding the difference in approaches, all investors interviewed pursue financial returns in their impact investments. According to a study by IFC, private-equity impact investments deliver at par or beyond market level (generally 15% above the S&P 500 index)[16]. Interviews conducted as part of this report have also shown that a double bottom line is possible.

For example, **Ehong Capital** invested in Qiangying Duck Farm Group (2012-2018) and achieved 3x exit multiple. It also created 8,000 jobs (60% for women) in low-income communities, and lifted 3,000+ smallholder farmers households out of poverty.

Further, beyond capital, active stewardship is also indispensable to support companies to develop its business and scale impact. As OppGen Asia explains, "Capital needs to be engaged, for example by helping ventures make sound decisions to invest in productive assets in the pursuit of long-term value."

All investors we interviewed agree. For example, Lok Capital provides its portfolio companies with not only financial capital, but also strategic guidance on product development and expansion. They have recently started discussions with one of its investees in microfinance, Veritas Finance, to identify a borrower income measurement and monitoring system.

In recent years, there has been a growing number and diversity of investors participating in impact investing. The market has expanded to include mainstream investors in both private (e.g., TPG's The Rise Fund, Bain Capital, KKR[17]) and public equity (e.g., BlackRock), as well as established financial institutions such as Goldman Sachs and JP Morgan[18].

Despite the positive momentum, there still remain some key gaps in impact capital. Critically, more patient capital is needed, at the start of a company's journey and to safeguard a company's impact mission amidst efforts to scale. Most investors interviewed found timeframe a challenge in impact investing. For example, impact investors such as Lok Capital (investment horizon of ~10 years) and Ehong Capital (investment horizon of 7-8 years) have generally demonstrated more patience than traditional investors. They both think that a longer time frame is needed to enhance impact outcomes alongside financial returns in local markets (e.g., 15-18 years in India, and 9-10 years in China). This observation is also reflected in a GIIN study[19]: practitioners generally shared that a more flexible time horizon would allow them to optimise impact outcomes and financial returns as well as responsible exits from the portfolios; however, most of them face pressures to return capital within a fixed timeline.

Sharing successful stories of impact investments can inspire and crowd in more capital.

Many investors observe that there are emerging pools of ESG capital, mainly driven by the growing awareness and demand from consumers as well as a supportive regulatory environment. For example, Anarghya Vardhana, Partner at Maveron observed, "There are emerging pools of ESG capital driven by the pursuit of valuation premium and increasing emphasis attached to purpose among companies, driven by the demand of consumers." However, investors generally agreed that to drive more investments into solutions that contribute to solving social and environmental challenges, more evidence and success stories in Asia is needed. These stories act as a vehicle to illustrate impact creation, so as to increase confidence and secure buy-in from investors. This will help mobilise more capital towards impact.

Maya Chorengel, co-managing Partner at TPG's The Rise Fund reinforced that, "success stories are needed to accelerate the adoption of impact across the ecosystem". Dondi Hananto, Partner at Patamar Capital also observed that LPs in impact-driven funds are not only driven by impact metrics, but also by the "theory of change" driving their investments and the firm's demonstrated commitment to helping entrepreneurs maximise the impact of their companies. Further, LeapFrog Investments believes in leading by example and demonstrates institutional capacity in impact as a means of encouraging more mainstream capital into the sector.

Success stories can also inspire more local players to develop impact solutions. An early demonstration of the power of impact stories is the successful IPO of SKS Finance, dedicated to empowering unbanked customers with inclusive microfinance in India[20], which has catalysed the emergence of the microfinance industry in India and encouraged new players to enter the market.

15 East Ventures (2022). East Ventures becomes Indonesia's first venture capital firm to sign UN Principles for Responsible Investment
16 IFC (2020). How a mandate for impact in emerging markets helped the IFC outperform the S&P 500
17 Private Equity News (2021). What you need to know about Bain's $800m Impact Fund
18 British Private Equity & Venture Capital Association (BVCA) (n.d.). Impact investment in private equity and venture capital
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COMPANIES' PERSPECTIVE

All business leaders interviewed in Asia agree that a well-defined impact strategy, which clearly demonstrates intent and sets clear goals is needed. However, developing and articulating an impact strategy is an evolutionary process.

Fundamentally, impact should be embedded, not "bolted-on". It should be regarded at the most strategic level as a lever to drive enterprise value creation and as such should be a priority for C-suite leaders. With stakeholders increasingly demanding purposeful and responsible businesses, impact integration has become a license to operate – whether a start-up, a growth business, or an established incumbent. To ensure impact is complementary and not antagonistic to core business objectives, it should be embedded into "business-as-usual" – from strategy through to operating model – and not thought of in siloes, as it has been traditionally, for example as a separate Corporate Social Responsibility initiative. SwipeRx, a community-driven commerce model that improves the quality, availability, and affordability of medicines for its pharmacy members, sees no trade-off between their business and impact outcomes. "At SwipeRx, business and impact are inextricably linked, the more we scale our business, the more we improve public health", says Farouk Meralli, CEO of SwipeRx. Tanah Sullivan, Head of Sustainability at GoTo, describes a similar ethos at the digital platform company, "Creating value for stakeholders is central to how we operate and grow as a company."

It is never too late to start, nor is any action too small to make a difference. Developing and articulating a business' impact intent is an evolutionary process. It could take several iterations before a company develops clarity about the full scope of their impact strategy and how best to establish impact delivery as part of the core business model.

Early-stage ventures can start with a focussed impact goal and expand their scope as they grow. For example, Nikel, a fintech company based in Singapore, began with lowering the cost of capital for underserved sectors. It has continued to maximise the reach of their impact by partnering with regional leading banks to develop credit scoring models that can enable established players to address needs of the underserved as well.

Large corporates can make an outsized impact by investing to transform their own supply chains and operations. For example, Dole Sunshine Company has partnered with Ananas Anam to work closely with farming communities in the Philippines to reduce food waste and improve livelihoods of farmers. Through this initiative, leftover pineapple leaves on farms will be repurposed into ethical, sustainable, animal-free leather by Ananas Anam, creating a new revenue stream for the farmers. "In Asia, the acceleration of impact evolution is driven by 'survival instinct,' and the opportunities presented, e.g., increasing consumer demand on good nutrition," says Pier Luigi, Worldwide Food & Beverages business, Dole Sunshine Company.

Many large corporations also strive to future proof their business by building new engines of growth that are focussed on developing sustainable development solutions. For example, Olam Group has a robust corporate venture portfolio that includes Jiva, an end-to-end digital platform that is focussed on empowering smallholder farmers, e.g., increasing access to financing and markets and improving sustainable practices.

Established frameworks and benchmarks are helpful as starting points to translate motivation into articulated goals. However, impact strategy and implementation require contextualisation based on the needs of specific countries and sectors.

Many interviewees found that a useful starting point on their impact journey was to take reference from and align with well-established principles, standards, decision frameworks, and metrics. Many companies have also started looking beyond ESG reporting and are evolving their impact strategy in line with their contributions to the UN SDGs.

For example, in line with its core business in agrifood, Japfa Ltd has aligned its sustainability strategy to SDG 2: to end hunger, with improved food nutrition and sustainable supply chains. With this as its guiding principle, Japfa Ltd launched the first sustainability-linked bond in the global agri-food industry aimed at improving water circularity through wastewater recycling, to help reduce water withdrawal and conserve clean water.

Similarly, Olam Group maps its impact outcomes (e.g., prosperous farmers, thriving communities) and 10 priority areas (e.g., safe and decent work, nutrition and health) against the UN SDGs.

ING aims to play an active role in developing and refining climate standards, measurement methodologies and frameworks. To that end, it worked with the 2° Investing Initiative (2DII) to develop the Paris Agreement Capital Transition Assessment (PACTA) for Banks methodology. They have also collaborated with RMI's Center for Climate Aligned Finance (CCAF) to help develop methodologies that can be used by financial institutions and sector participants alike to benchmark their own alignment with net-zero goals. These include the Poseidon Principles for the shipping sector, the Sustainable STEEL Principles for the steel sector, and the Sustainable Aluminium Financing Framework. ING believes that standardising the way progress towards net-zero targets is measured allows for greater comparison between companies within the same industry and within financial institutions' portfolios.

As emphasised by UNDP SDG Impact in our conversations with them, for businesses to successfully embed impact in the Asian market, they must tailor their impact goals to the needs of those who experience such impacts, and to their own unique operational strengths and strategy.

Clear impact metrics and an established mechanism for reporting are needed to measure and manage the business' impact, both positive and negative.

Impact measurement and management (IMM) is needed to avoid mission drift from initial intent, and to ensure impact mission is safeguarded over time. As a business evolves, and more investors join to support its growth, there is a risk that a business loses sight of its initial motivation and intent which will potentially limit sustained impact generation. Hence, IMM should be established alongside businesses' existing financial metrics to ensure the pursuit of impact and financial outcomes go hand in hand. As a starting point, many companies have found the ESG framework useful as a recognised set of metrics to measure and report on.

While ESG provides a baseline framework to start with, current adoption by industry is mostly focussed on compliance and risk mitigation. Impact management needs to go further – to embed considerations of impact outcomes, both positive and negative, into key management decision-making processes and governance.

Both ESG and impact management require greater standardisation of data, quantification of impact, and an expanded view of materiality reporting – from focussing on financially material metrics to considering double materiality. We need to improve the availability, quality, and interoperability of data to enable companies, financial institutions, and investors to assess progress towards sustainable development goals and measure the impact of their operations and investments.

Impact accountability extends beyond positive impact generation to understanding and managing negative impacts as well. For example, Aruna recognises that their business of connecting fishermen directly to the market inherently disrupts the middlemen in the fishing supply chain. To address this, Aruna actively engages and employs the middlemen, for example as their quality control partners. Japfa Ltd has conducted lifecycle assessments (LCA), both social and environmental, to better understand the impact of their business across all stages of a product's life. Results from the LCA are used to guide their sustainability strategy and initiatives, for example, improving water and waste management.

Comparability of impact outcomes is critical to allow companies to learn from one another, benchmark themselves against best-in-class and to be recognised by all stakeholders, including consumers, employees and the capital markets.

Across our interviews, it is clear that it is critical to establish consistency and comparability of impact metrics across different measurement frameworks and methodologies so that all stakeholders can clearly understand the impact a business is having, so that they can make strategic decisions and capital allocations accordingly. This is not always easy for new entrants, and the ecosystem in Asia needs to provide stronger support for on-ramping companies who want to move toward impact but need support in establishing their frameworks and systems.

Making impact outcomes comparable and communicable to all stakeholders holds significant commercial value to companies. The growing maturity in reporting and comparability of environmental metrics (e.g., carbon emissions) today has shown us the potential upside for businesses to be held accountable, notwithstanding issues of greenwashing.

BUILDING BLOCKS TO SCALE UP IMPACT

Our discussions with investors and companies have provided a valuable peek into a flourishing impact ecosystem in Asia. However, it is also clear from our conversations that key gaps remain, and more is needed to unlock the full potential of impact in the region.

Much that is needed is leadership and action by all organisations, investors and businesses alike. We have summarised some of the key ingredients required for organisations to be effective agents of impact below.

ORGANISATION SUCCESS FACTORS

Investors

- Start with an intent for impact at the fund level, which can be operationalised in various ways, e.g., investing to serve the bottom of the pyramid or to develop environmentally sustainable solutions
- Build on intent to develop a rigorous impact measurement and management (IMM) system, guided by internationally recognised frameworks that are adapted to local culture and nuances
- Be active stewards – impact-oriented investors provide much more than financial capital, in the form of human capital, expertise, and

leadership at the ventures' capitalisation table
- Invest in data and research to measure and manage impact at both the portfolio and investee levels

Companies

- Identify "sweet spots" of impact areas with a strong business case, and align the core business model with impact creation to minimise trade-off considerations
- Leverage digital technology to bring down costs and scale both business and impact
- Start with what is in your control, e.g., supporting MSMEs suppliers and / or small-holder famers across the business' supply chain
- Continuously measure impact, e.g., studies to understand end-customer needs and outcomes, lifecycle assessments for cradle-to-grave or cradle-to-cradle analysis of impacts across all stages of a product's life
- Set guardrails to avoid "mission drift" and losing sight of the impact mission, especially through business growth and organisational changes

All Organisations

Safeguarding the impact mission

- Pursue impact that is in line with internal motivations, tied to the core organisational mission
- Articulate a clear impact strategy, from goal setting to target expectations, including setting management KPIs

Measurement as the first step of management

- Drive rigorous data collection and establish strong impact management systems to ensure accountability of impact, both positive and negative

Aligned operating model

- Cultivate talent with impact skills and capabilities, both through new hires and upskilling of existing staff
- Establish an operating model and governance structure that aligns top-down impact mission and strategy with bottoms up buy-in and action to ensure delivery

DEVELOPING THE IMPACT ECOSYSTEM

Based on our discussions and the needs highlighted by market participants, we believe a fully developed impact ecosystem is critical to create impact at scale in Asia. Achieving this will require individual and collective efforts from a broad range of stakeholders, including investors, companies, researchers, networks, service providers, and regulators. Each group of stakeholders has a clear role to play, as elaborated below.

As described throughout this report, investors (from capital providers to fund managers) and companies (from large corporates to new ventures) are the core drivers and executors of impact. Investors can improve capital flows while providing active stewardship to support investments to scale and move along their impact journey. Meanwhile, companies can align their business models to create positive impact (e.g., circular supply chains, digital platforms) and set up their organisational structure and operating model to effectively execute impact (e.g., strong governance and clear links between impact outcomes with KPIs).

The research sector, both industry and academic, plays an important role in defining the baseline understanding of impact outcomes and needs across key sectors in Asia. Given the general paucity in impact data, especially in Asia, more research is required to shine a light on the impact needs and opportunities in the region, e.g., sector and subsector indices on impact outcomes, market sizes for impact opportunities. For example, Circulate Capital acknowledged the importance of partnering with experts from non-profits such as Ocean Conservancy and The Circulate Initiative, with research institutes such as A*STAR and with academics for primary research on environmental issues such as plastic pollution or the climate impact of plastic recycling to better guide their investment and impact strategy. ABC Impact and Ehong Capital, amongst other funds, also invest in collecting primary data to validate their initial impact theses, formed based on international frameworks, with on-the-ground data that reflect local realities.

Educational and training institutes will be critical to develop a strong talent pool with high quality impact skills and capabilities. Institutions of higher learning including universities will play an important role in cultivating a new generation of impact agents. The development and

integration of impact modules and courses into curricula will help instil awareness, shape intentionality, and develop the proficiency in impact language among future generations of capital providers, fund managers, business founders and leaders. For current generations already in the workforce, institutions which deliver professional education and upskilling programmes in partnership with industry practitioners and networks will be important. In addition, mentorship at the earlier stages of a business' lifecycle is key to embed impact at the core. At this stage, programmes like accelerators and incubators are critical in supporting the formulation of intent and impact strategy alongside business fundamentals for early to growth stage businesses.

Service providers (e.g., data and measurement providers, strategic advisors) are needed to build up impact proficiency in the market. For example, data platforms and analytics dashboards would provide more visibility and a better understanding of impact outcomes, to enable more informed decisions when balancing different impact considerations.

Recommendations on potential deals for investment based on real-time data collection and analytics would be useful to facilitate matching between investors and companies. Independent associations and agencies, such as UNDP SDG Impact, are important in defining and promoting impact standards. Ecosystem players look to these impartial bodies to establish guiding principles for goalsetting and comparable impact metrics and taxonomies for reporting and benchmarking.

Networking bodies, such as the AVPN, are critical to convene ecosystem players to generate much needed discourse on impact and promote successful impact stories. For example, Asia-based forums, roundtables, and conferences can bring together impact agents to facilitate the exchange of ideas and mobilise collective action in the region.

Finally, a favourable regulatory climate will be necessary to spur the growth of impact investing and practices. We have already seen instances where supportive policies and regulations have accelerated development of sustainability practices and social enterprises in countries in Asia. Going forward, we anticipate that supportive regulations will play a significant role, as the impact market matures and develops further.

KEY ACTIONS FOR IMPACT ORGANISATIONS: PRELIMINARY RECOMMENDATIONS

It is clear that significant activity in the impact space is already underway in Asia. Through our conversations, a few key takeaways have emerged:

1. Asia presents tremendous opportunities to achieve impact at scale, due to its unique characteristics.
2. Social and environmental impact can be pursued simultaneously without sacrificing financial returns, enabled by increasing digitalisation.
3. Systematic and continuous measurement is critical to make impact more visible and accountable
4. More patient, diverse, and innovative forms of capital are needed to further scale impact.
5. While there are clear signs of promise, there is much more to do. A robust impact ecosystem will be key to building strong market fundamentals, while active leadership by all organisations is needed to make impact the norm, not the exception

Based on findings from this report, we have developed a preliminary set of core recommendations that all players, no matter which type or at which stage, can mobilise towards as we move along this journey of impact together.

1. Start now – do not let perfect be the enemy of good. While impact related problems may seem large, and the space continues to evolve with changing standards and expectations, it is more important to do something than to do nothing at all. It is better to make mistakes along the way and adapt your course of action than be plagued by inaction.
2. Be rigorous in your approach. There is a wealth of resources that provide guidance on how to integrate impact into the organisation in a rigorous manner at all levels. Look out also for case studies that can serve as inspiration and learnings for the development of your own impact intent and strategy.
3. Think about impact strategically. Investors and businesses who are serious about impact embed it at all levels of their organisation: at the core fund or business strategy and across all decision-making and management processes and systems of accountability.
4. Begin to measure impact, both positive and negative. Only what is measured can be managed. It is critical for all organisations to take ownership of their own impact measurement through primary data collection, while collaborating with others and championing for better standardisation and harmonisation of metrics and taxonomies to establish better infrastructure at the ecosystem level.

This is the time for collective action among investors, companies, research institutions, philanthropic organisations, NGOs, governments, and the community. Achieving our vision for a sustainable future is not a zero-sum game. To succeed, all types of capital and practitioners have to come together to build a robust impact ecosystem in Asia, for Asia.

About the Centre for Impact Investing and Practices (CIIP)

The Centre for Impact Investing and Practices (CIIP) strives to enlarge the impact ecosystem in Asia and beyond, by bringing together stakeholders, engendering interactions, and establishing a common language for positive outcomes in impact investing.

Their mission is to advance impact investing knowledge, communities, and practices, so as to encourage and enable effective deployment of private capital by investors, companies, and philanthropists, towards positive impact outcomes for the environment and well-being of communities in Asia and around the world.

Based in Singapore, CIIP is a non-profit centre established and supported by Temasek Trust, a steward of philanthropic assets, gifts, and endowments. Temasek and ABC Impact are CIIP's strategic partners.

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List of Participants (In Alphabetical Order)

INVESTORS

ABC Impact
Circulate Capital
Dragon Capital
East Ventures
Ehong Capital
Ishk Tolaram Foundation
LeapFrog Investments
Lok Capital
TPG's The Rise Fund
Maveron
Omidyar Network India
Oppenheimer Generations Asia
Patamar Capital

COMPANIES

Aruna
AIA
Bandhan Bank
Dole Sunshine Company
GoTo
Grab
ING Bank N.V. Singapore Branch
IngCare
Japfa Ltd
Kim Dental
SwipeRx
Nikel
Olam Group
RWDC Industries
Veritas Finance

LEAD AUTHORS

Centre for Impact Investing and Practices
Singapore Management University
Accenture

REVIEW & EDITORIAL SUPPORT

EuroCham Singapore

WWF SINGAPORE AND EUROCHAM'S PARTNERSHIP IN ACTION

In November 2023, the European Chamber of Commerce (EuroCham) and the World Wide Fund for Nature Singapore (WWF-Singapore) reinforced their mutual commitment to sustainability and nature conservation by signing a Memorandum of Understanding (MOU) at EuroCham's prestigious Sustainability Award Gala. This partnership underscores their shared dedication to environmental stewardship and collaborative efforts to pave the way for a sustainable future.

WWF EARTH HOUR SUMMIT 2024

EuroCham was honoured to serve as a strategic partner for the WWF Earth Hour Summit 2024.

Held at the Marina Bay Sands, EuroCham's patron, Ms. Iwona Piorko, Ambassador of the European Union Delegation to Singapore, joined Singapore's Minister for Sustainability and the Environment, Ms. Grace Fu, in a high-profile panel discussion titled "Corporate Ambition in Asia: Enhancing Bottom Lines Through Environmental Action."

Moderated by Vivek Kumar, CEO of WWF-Singapore, the discussion addressed pressing environmental issues, emphasising the need for international cooperation and policy alignment to navigate the global challenges. The panel also explored how to adapt corporate climate strategies to Asia's biodiversity-rich context and identified practical methods for accelerating climate action.

EuroCham member Mr. Christopher Ong, Managing Director of DHL Express also contributed to another insightful panel, *"Collaborating Across Supply Chains: Strategies for Emission Reduction."*

Moderated by Stephanie Lim, Head of Market Transformation at WWF-Singapore, along with panel members from Agoda and Marina Bay Sands, the discussion explored the complexities of how companies can forge meaningful partnerships with both upstream and downstream stakeholders to address carbon emissions. It highlighted the active engagement and thought leadership of EuroCham's members in advancing sustainability.

COLLABORATION WITH WWF-SINGAPORE ON THE PANEL DISCUSSION "THE BIODIVERSITY PULSE" FOR SOUTHEAST ASIA

Another highlight of EuroCham and WWF-Singapore's partnership was the panel discussion titled "The Biodiversity Pulse" for Southeast Asia, featuring Mr Akshat Garg, Assistant Vice President of Asia Sustainable Finance at WWF-Singapore.

Akshat made a notable contribution to the discussion, joining esteemed panellists Ms Evelien Hooijman (ING Bank), Prof Hao Liang (SMU), and Ms Nikki Kemp (Singapore Green Finance Centre). He provided valuable perspectives on biodiversity conservation, covering the latest research, ongoing initiatives, and the vital funding required to support nature conservation. Additionally, Mr Garg highlighted the role of innovative technologies and solutions in deepening our understanding and enhancing the protection of biodiversity.

The collaboration between EuroCham and WWF-Singapore through these events demonstrates their commitment to advancing sustainable development within businesses, fostering thought leadership, and driving towards a net-zero and nature-positive future.

EUROPEAN EXCELLENCE IN SUSTAINABILITY

EuroCham SINGAPORE

AIRBUS

Pioneering Sustainable Aerospace for a Safe and United World

With over 134,000 employees, Airbus is the largest aeronautics and space company in Europe and a 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 focussed on high-value services. The Airbus Singapore Campus is the regional hub for its commercial aircraft, defence, space and helicopter businesses.

THREE PILLARS FOR SUSTAINABILITY

Sustainability is at the heart of Airbus' purpose and is fully integrated into its corporate strategy. This company-wide approach is driven by three 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.

AN OVERVIEW OF AIRBUS' ENVIRONMENTAL RESPONSIBILITY

Airbus's sustainability strategy works to reduce CO_2 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 CO_2 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 deliver the world's first hydrogen-powered 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 focussing on core innovation pillars to drive sustainability. On average, more than 2 billion euros per year 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-focussed, intelligent and digital. The Industry 4.0 initiative pushes Airbus towards a full digital transformation across its entire product lifecycle.

A SUSTAINABLE SUPPLY CHAIN

A company's environmental and social impact is intricately linked to its supply chain. Airbus focusses 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.

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 frame work 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.

AIRBUS

AIRBUS SINGAPORE PTE LTD
12 Seletar Aerospace Link | Singapore 797553
W: www.airbus.com
T: +65 6543 0977

ACT GROUP

Comprehensive Support for Every Step of the Decarbonisation Journey

With seven global offices and 15 years of expertise, ACT has empowered thousands of clients to decarbonise with their comprehensive decarbonisation and environmental solutions, tailored to their clients' unique needs. ACT has more than 200 products and cutting-edge digital solutions that focus on enabling organisations to meet complex environmental regulations and achieve their climate goals, no matter how ambitious. ACT is a CDP Gold Accredited Solutions Provider, a member of the Singapore Carbon Market Alliance (SCMA), and is represented on the board of the International Emissions Trading Association (IETA).

PARTNERING TO ACHIEVE DECARBONISATION GOALS

ACT supports the global energy transition by providing the tools to take climate action – from emissions measurement to reduction and disclosure – and supporting clients no matter where they are on their decarbonisation journey, and regardless of their size, sector, or location. ACT ensures businesses have everything they need to decarbonise and mitigate emissions, offering clients the ability to buy renewable energy and carbon credits globally, as well as project development services that improve energy efficiency and mitigate emissions. This, combined with cutting-edge digital solutions that enable clients to calculate, manage, and disclose their emissions, makes ACT the ideal decarbonisation partner for businesses to reduce emissions across scopes. ACT also has the knowledge and market expertise to support clients in meeting complex environmental regulations set by regional, national, and international authorities.

Challenging Scope 3 and supply chain emissions are reduced efficiently with ACT's Supply Chain Decarbonisation Programme, a comprehensive solution that streamlines the process of calculating, managing, and reducing emissions across an entire supply chain. By integrating global renewable energy procurement, precise emissions data management, and seamless supplier engagement, the programme empowers businesses to achieve impactful and measurable decarbonisation results that can be auto-reported major disclosure frameworks, like CDP.

Through these activities, ACT helped industries source 169 terawatt hours (TWh) of renewable and alternative energy, supported organisations in mitigating 8 metric tonnes of carbon dioxide-equivalent ($MtCO_2$) of emissions, and helped companies reduce 1.9 TWhc of energy – just in 2023.

HIGH-IMPACT CLIMATE PROJECTS

Improved Cookstoves in Ghana

ACT worked with Envirofit and the Klik Foundation to help the Swiss and Ghanaian governments implement next generation cookstoves in Ghana that substantially reduce carbon emissions. This project is one of the first internationally transferred mitigation outcome (ITMO) projects to be authorised under Article 6.2 of the Paris Agreement, which allows countries to collaborate on their Nationally Determined Contributions (NDCs) for reducing global emissions.

In Ghana, many rural areas are often bypassed by Improved Cookstoves (ICS) initiatives. With the country's explicit commitment to generating clean cooking solutions as part of its NDCs targets, this gap must be addressed. Through ACT's multilateral partnerships, the greenhouse gas mitigation project is expected to create 180,000 improved cookstoves. This will benefit 750,000 Ghanaians by reducing household smoke and toxic emissions by 80% and cutting cooking fuel costs by 60%.

Addressing Deforestation in Colombia

Large areas of the Colombian Amazon have been transformed from native grasslands and/or gallery forest into low-productivity pasturelands for cattle or agricultural activities, leading to land degradation and soil erosion. ACT's Amazonia Nativa Project is set to plant an area of up to 20,000 hectares with a mix of native species consisting of hardwood trees and acai palms, which will establish alternative, sustainable business models with local communities. This project design will lead to a flow of

funds to the local community from carbon monetisation, combined with income generation from açaí berries and – in the long run – from selective hardwood harvesting. Additionally, there are long-term positive environmental benefits to growing a vibrant forest cover, including increasing capacity for carbon sequestration and reducing erosion.

By completing the pilot phase, the following impact can be achieved over the lifetime of this project: 600,000 trees planted, 250,000 tCO_2 removed from the atmosphere, 25,000 cubic metres of sustainably harvested timber produced and 250 tonnes of acai berries harvested.

INVESTING IN A COMPREHENSIVE SINGAPORE OFFICE

In Singapore, ACT is capitalising on the strategic location of its Asia-Pacific headquarters in the city-state. While ACT has offices in Tokyo and Shanghai to serve the needs of those markets, Singapore as its APAC hub is the centre of impact for the wider APAC region. To support this goal, ACT is investing heavily in research and knowledge-building while ramping up its capabilities in legal management, corporate sustainability, and project development to build a comprehensive and capable Singapore office. It is building the infrastructure to deal with jurisdictions and complexities beyond Southeast Asia and deliver solutions to all APAC partners.

ACT serves local companies and regional operations for many organisations that also set their headquarters in Singapore. The ambition is to boost and support the sustainability ecosystem and enable companies in the capacity-building stage to take climate action and set them up for success as they engage with compliance markets in the future.

Empowering Through Knowledge Sharing

Through the efforts of ACT's APAC Managing Director, Federico Di Credico, the group supports the work being done by the Climate Action Data (CAD) Trust to develop a secure digital infrastructure to connect registries and provide public access to information. This initiative will enhance carbon credit transparency, prevent double counting, and improve market integrity. This decentralised system will simplify and improve compliance reporting, transactions, and benchmarking for public and private sectors.

Different ACT teams come together to deliver workshops and knowledge sharing, both internally and externally. The group's Research & Development (R&D), Climate Project Development, and Sustainability teams facilitate monthly training sessions for ACT employees across the Singapore, Shanghai, and Tokyo offices to develop internal sustainability awareness and knowledge.

These teams also conduct free external workshops to companies and universities in Singapore and Southeast Asia to drive climate action, develop new climate leaders and support capacity-building in the region. These include conducting trainings in collaboration with the UN Global Compact Network as part of the LowCarbonSG programme to help upskill their members in carbon management, where participants learn how to manage their carbon emissions through practical decarbonisation solutions. ACT also works closely with leading universities in Singapore as well as the region to design curriculums and deliver seminars aimed at educating students and working professionals on carbon and renewable energy markets.

Finally, ACT also regularly contributes to roundtables, seminars, as well as closed-door discussions that help to shape the industry's understanding on upcoming regulations, decarbonisation tools and trends to ensure corporates in the region are equipped with the right knowledge and tools to act on their environmental ambitions.

The ACT commitment to sustainability in Singapore is both robust and dynamic, and they actively foster community engagement to educate future leaders, paving the way for a more sustainable and informed future.

ACT

ACT GROUP
108 Robinson Road | #03-01 | Singapore 068900
W: www.actcommodities.com
T: +65 6990 9220

ASIA PACIFIC BREWERIES

Brew a Better World

Asia Pacific Breweries Singapore (APBS), the leading brewery in Singapore, is renowned for its high-quality beers and innovative brewing techniques. Founded in 1931, APBS produces iconic brands such as Tiger Beer, Heineken, and ABC Stout. With a commitment to sustainability and excellence, APBS has established itself as a key player in the beverage industry, serving both local and international markets with a diverse portfolio of premium products.

Asia Pacific Breweries (APBS) is a proud member of The HEINEKEN Company, one of the world's leading brewers. As part of HEINEKEN, APBS benefits from a global network and extensive resources, allowing it to uphold high standards in brewing excellence and sustainability. This affiliation empowers APBS to implement innovative practices and contribute significantly to HEINEKEN's mission of brewing a better world.

OVER 90 YEARS OF PURPOSE-DRIVEN LEADERSHIP GROUNDED BY PEOPLE, PLANET AND PROSPERITY

APBS is strongly guided by its corporate purpose – "We brew the Joy of True Togetherness to Inspire a Better World". The company believes it has a role in brewing conditions for deep, meaningful connections to happen.

Underpinning the corporate purpose are a set of values that represent what APBS stands for; Passion for consumers and customers, Courage to dream and pioneer, Care for people and the planet and Enjoyment of life; these values have grounded the company for the past 93 years, and form the foundation for its future success.

APBS understands that it can only thrive if its people, the environment, and the communities around it are thriving. This is why the company is dedicated to making a positive impact in the community and prioritises its 'Brew a Better World' sustainability strategy, actively supporting the UN Sustainable Development Goals.

BREW A BETTER WORLD STRATEGY

The HEINEKEN Company is the first global brewer to have its long-term net-zero and FLAG (Forest, Land, and Agriculture) targets approved by the Science Based Targets initiative (SBTi). It is also the first global brewer to commit to achieving net zero across its entire value chain by 2040, a full decade ahead of the Paris Agreement's timeline.

To meet these ambitious sustainability goals, APBS has developed its own comprehensive sustainability strategy in close collaboration with both external and internal stakeholders. This strategy is set to meet the targets defined by HEINEKEN's "Brew a Better World: Raise the Bar 2030" initiative which is straightforward enough to fit on the back of a coaster.

In-House Capability: Brew a Better World (BABW) Academy

APBS' focus on sustainability is substantiated by the resources invested by HEINEKEN to build in-house capability. The Brew a Better World (BABW) Academy offers curated e-learning courses to facilitate better understanding of sustainability, be it environmental or social. The global sustainability team organises monthly webinars to share best practices among breweries, employees are meaningfully involved and engaged in the company's sustainability strategy through educational activities, online content engagement and volunteer events such as a company-wide sustainability-themed scavenger hunt, staff volunteering session with Zero Waste Singapores and a beach clean-up for Earth Day 2023.

BREWING SUSTAINABILITY: RECYCLING, PACKAGING, AND GREEN VALUE CHAIN

Green Value Chain: From Seed to Sip

Sustainability is embedded from the planting of a barley seed to the moment a glass of cool beer is served at the bar. Beer, one of the world's oldest beverages, begins with all-natural ingredients – malt, yeast, hops, and water – sourced sustainably at a global level.

The HEINEKEN Company has a Low Carbon Farming programme, working with suppliers, cooperatives, and farmers in various countries. A dedicated team collaborates directly with farmers to test new farming

practices and measure their carbon reduction over 3 to 5 years. This allows all participating farmers to measure and track yearly carbon reductions.

In Singapore, APBS demonstrates its commitment by brewing with solar energy. Over 8,000 solar panels installed on brewery roofs contribute to 20% of the power mix. Additionally, the onsite rainwater harvesting system and water reuse treatment plant help reduce water intake.

Reducing emissions from refrigeration is also a high priority, as beer is best served cold. The company provides its trade partners and suppliers with energy-efficient green fridges to halve the carbon emissions generated by refrigeration.

Sustainable and Circular Packaging

APBS also has a robust circularity approach for sustainable packaging. When a consumer enjoys beer in a hotel, restaurant, or hawker centre, the packaging is 100% reusable – every keg, bottle, and crate is returned to be cleaned and reused.

In the 1980s, long before sustainability became a buzzword, the brewery invested in a reverse logistics system to collect used glass bottles and beer kegs from the marketplace for cleaning and reuse.

All steel kegs are 100% reusable and have lifetimes of over 10 years. When they reach their end of life, the kegs are recycled as scrap metal instead of being discarded.

Each glass bottle reaches customers through reusable crates, and after the beer is consumed, the empty bottles are returned.

At the brewery, the returnable glass bottles undergo strict quality checks before being refilled with freshly brewed beer and sent back to the marketplace. This results in more than 27 million glass bottles, or approximately 88% of the company's used bottles, being reused and recycled each year.

The brewery's sustainable packaging efforts also extend to its logistics and transportation operations. In 2018, APBS reduced the thickness of its aluminium cans, saving over 25,000 kg of packaging waste and lowering emissions from transportation.

Repurposed Food Waste

The brewery also adopts a circular approach to its main food waste: spent grains. All spent grains are fully repurposed as animal feed, diverting about 20,000 tonnes of grains from landfills annually. At the same time, APBS is exploring innovative ways to upcycle spent grains. A recent example is WellSpent Barrakku, a novel snack created from upcycled grains by the chefs at At-Sunrice GlobalChef Academy. This snack was featured as part of APBS's Tiger Brewery Tour: Sustainability Edition, in partnership with the National Environment Agency's Go Green 2023 campaign.

Let's Recycle Together

Recognising its role in Singapore's Zero Waste journey, APBS collaborated with Zero Waste Singapore (ZWSG) and Lion's Befrienders in 2023 to launch a recycling programme under ZWSG's Let's Recycle Together movement. This initiative aimed to engage Singapore's growing senior citizen demographic, enriching their active ageing journey by encouraging them to contribute to the circular economy and help reduce landfill waste.

CHAMPIONS OF SUSTAINABILITY IN SINGAPORE

In recognition of ongoing sustainability efforts, APBS was awarded the Eco-Office certification in 2022 by the Singapore Environment Council (SEC), a United Nations Environment Programme (UNEP)-recognised organisation. An external audit assessed the company's management of energy, water, resources, and waste, the interior office environment, corporate sustainability strategy implementation, and sustainable practices of employees like switching off equipment when not in use, recycling waste, and monitoring energy usage.

APB SINGAPORE

ASIA PACIFIC BREWERIES (SINGAPORE) PTE LTD
459 Jalan Ahmad Ibrahim I Singapore 639934
W: www.apbsingapore.com.sg
T: +65 6276 3488

BASF

Creating Chemistry for a Sustainable Future

BASF creates chemistry for a sustainable future by combining economic success with environmental protection and social responsibility. Present in Singapore since 1978, BASF operates four production facilities as well as its Human Nutrition Application Lab Asia Pacific. In 2023, BASF posted sales of approximately €300 million to customers in Singapore and had 520 employees by year-end.

As a co-founder of the U.N. Global Compact, BASF continually contributes to the implementation of the United Nations' Agenda 2030. BASF's products, solutions, and technologies help achieve the U.N. Sustainable Development Goals (SDGs).

KEY SUSTAINABILITY TOPICS INTEGRATED IN THE ORGANISATIONAL AND MANAGEMENT STRUCTURES

By conducting a comprehensive materiality analysis, updated in 2023, BASF identified key sustainability topics significant to the company, its stakeholders, and the broader context in which it operates. These relevant topics at the group level are based on the three dimensions of materiality: environment, social, and governance. Under these dimensions, the topics include climate and energy, circularity and resource efficiency, waste, emissions to air, soil, and water, biodiversity, process safety, occupational health and safety, product stewardship, responsibility along the value chain, and business ethics.

Together with decentrally organised specialists, the BASF units Corporate Strategy & Sustainability and Corporate Finance are responsible for integrating sustainability into decision-making processes and for steering and reporting on sustainability topics. The Net Zero Accelerator unit plays a key role in achieving climate protection targets by accelerating and implementing projects related to low-emission production technologies, circular economy, and renewable energy. In addition to the central structures, every region, country organisation, and business unit has a dedicated team or person responsible for sustainability topics.

STEERING THE PRODUCT PORTFOLIO TOWARDS SUSTAINABILITY

BASF has developed an array of processes, tools, and systems to realistically and transparently convey the sustainability contribution of its products. The Sustainable Solution Steering (TripleS) method, updated in 2022, enables the steering of BASF's product portfolio by categorising products into five segments that consider sustainability-related aspects: Pioneer, Contributor, Standard, Monitored, and Challenged. Products in the Pioneer and Contributor segments make a positive sustainability contribution in the value chain and are summarised under the term Sustainable-Future Solutions. By 2030, more than 50% of BASF's sales relevant to TripleS are expected to be attributable to Sustainable-Future Solutions.

trinamiX's Plastic Identification Tool

trinamiX, a subsidiary of BASF, has developed an innovative handheld tool that uses near-infrared light to instantly identify more than 30 different types of plastic. Combining robust hardware with intelligent data analysis and an intuitive app, trinamiX's Mobile NIR Spectroscopy Solution allows users to easily sort plastic waste on the spot. At the push of a button, the handy tool delivers information about the identified sample to the user's mobile device. This helps sort plastics into clean material streams, enabling higher prices from plastic waste aggregators and recyclers.

In Singapore, the trinamiX NIR technology is already fully commercialised. In June 2023, trinamiX premiered the next-generation handheld NIR spectrometer at LASER World of PHOTONICS 2023.

COMMITMENT TO SINGAPORE'S GREEN PLAN 2030

BASF is committed to the Singapore Green Plan 2030, with goals to reduce absolute CO_2 emissions by 25% by 2030 and achieve net zero emissions by 2050 at all production sites. Key strategies include energy conservation, water efficiency, and evaluating renewable energy sources like solar power. BASF is also upgrading equipment and reviewing packaging and logistics to enhance sustainability.

The new BASF Singapore head office aims for Green Mark Certification, further supporting the SG Green Plan 2030. In Singapore, BASF supports the UN SDGs through initiatives focussed on Quality Education (SDG #4) and Sustainable Cities and Communities (SDG #11). Since 1983, BASF's Kids' Lab programme has reached around 300 children annually. Additionally, BASF raises awareness about the circular economy and waste management through regular beach clean-ups and partnerships with industry associations like the Alliance to End Plastic Waste and the Singapore Chemical Industry Council (SCIC).

AWARDED FOR SUSTAINABILITY EFFORTS

BASF has been recognised for its sustainability efforts by various organisations. For the business year 2023, the international organisation CDP awarded BASF Leadership status in the categories of climate protection, water management, and forest protection, with a rating of A- in each category. In 2023, MSCI ESG Research awarded BASF an A rating, and BASF achieved Prime status (B-) in the ISS ESG rating, placing it in the top 10% of the companies assessed.

BASF
We create chemistry

BASF SOUTH EAST ASIA PTE LTD
128 Beach Road | Guoco Midtown #18-01 | Singapore 189773
W: www.basf.com
T: +65 6337 0330

BEACONSULTING

Advancing Innovation for Sustainability

BeaConsulting is a fully owned subsidiary of Bonucchi e Associati srl, a company that has been offering management consulting, market research, training, and content providing services in Italy and globally since 1993. Initially, BeaConsulting's role was to implement the projects of its Italian parent company in Singapore, focussing on supporting Italian SMEs in international marketing, export, and internationalisation. However, it quickly developed its own identity.

In addition to serving as Bonucchi e Associati's base for internationalisation projects in Singapore, BeaConsulting has developed specific expertise in consulting for startups and SMEs within the circular economy sector. This expertise is applied across all the sectors it operates in, with a particular focus on two key ecosystems: beauty & wellness and architecture & design.

The company began its involvement in ASEAN projects in 1993 and established its first team in Singapore in 2011. BeaConsulting was formally incorporated in Singapore in 2020 and operates here today with a director and two employees, generating revenues under 1 million SGD.

BeaConsulting collaborates with numerous companies, associations, and institutions to provide effective services to SMEs looking to enter international markets.

A SUSTAINABLE CORPORATE CULTURE AT BEACONSULTING

BeaConsulting prides itself on being a socially sustainable company, even at the parent company level. The organisation operates as a paperless company and all employees in both Singapore and Italy are actively involved in sustainability-related assignments, making it a core focus and shared responsibility across the company.

For instance, when a new client expands their operations in the ASEAN region to manufacture mattresses using a circular economy approach (recycling materials to create new products), BeaConsulting's team collaborates on the project. They develop and implement a sustainability roadmap specifically tailored for the hospitality industry.

Furthermore, BeaConsulting boasts a workforce that is 90% female and embraces a hybrid work policy, demonstrating a strong commitment to work-life balance principles. This dedication to sustainability and gender diversity sets them apart, fostering a progressive and inclusive workplace culture.

REPURPOSING COFFEE WASTE

BeaConsulting is active in the R&D of Coffeefrom, an innovative initiative that focusses on transforming coffee waste into sustainable products. By repurposing coffee grounds, the project aims to create eco-friendly items, reducing waste and promoting a circular economy. The first product developed under this project is a coffee cup, highlighting the practical applications of recycled coffee materials. This initiative is a collaboration between Laura Gallo, founder of Coffeefrom, and Rita Bonucchi, owner of Bonucchi e Associati and Director of BeaConsulting, showcasing their dedication to sustainability and environmental responsibility.

Coffeefrom originated from an entrepreneurial initiative by Il Giardinone, a social enterprise focussed on environmental services since 1996. Collaborating with Lavazza, Novamont, and the Polytechnic of Turin, Il Giardinone began transforming coffee grounds for mushroom cultivation, laying the foundations for this innovative brand.

Coffeefrom is a company participating in the Global Startup Programme organised by the Italian Trade Agency (ITA). This programme supports startups in expanding their business internationally.

In 2019, Coffeefrom was established with the aim of converting industrial coffee

grounds into new materials. Embracing a circular economy approach, the start-up repurposes coffee waste from the food industry into recycled and bio-based thermoplastic materials, creating innovative products and applications. The project thrives on the intentional blending of values and resources across supply chains, resulting in a virtuous industrial symbiosis that combines BeaConsulting's environmental, social, design, and industrial expertise.

Coffeefrom's social impact is operationally driven by Il Giardinone, which handles logistics and the initial processing of coffee grounds. As a "Type B Social Cooperative," Il Giardinone ensures at least 30% of its workers are from disadvantaged categories. The workforce varies seasonally but includes at least 20 fragile workers at any given time.

Having obtained food-contact certification, Coffeefrom is now ready to market its products globally. The primary focus is on expanding the model to Asia by securing funding, partners, and licensing the Coffeefrom patent. BeaConsulting supports Coffeefrom's activities in the ASEAN region, working mainly with clients in the architecture & design and beauty & wellness industries.

Additionally, BeaConsulting collaborates with Politecnico di Milano on developing new materials from spent coffee grounds, furthering their commitment to sustainability and innovation.

As part of the programme, Coffeefrom is introducing a new sustainable material made from used coffee grounds to the ASEAN region. This initiative aims to promote and implement the innovative material in the market, fostering the creation of eco-friendly products and reducing waste.

COLLABORATION ON SUSTAINABILITY INITIATIVES

Offsetting Emissions Through Treedom Forest

Through BeaConsulting's Treedom forest initiative, the company plants trees via Treedom, an online platform that enables individuals and businesses to offset their carbon emissions. By maintaining a Treedom forest, BeaConsulting aims to compensate for the carbon emissions generated by frequent flights between Italy and Singapore, thus contributing to environmental sustainability and carbon neutrality efforts. Treedom supports tree planting projects worldwide, promoting reforestation and aiding local communities. This initiative not only helps in reducing the company's carbon footprint but also aligns with their commitment to social and environmental responsibility, making a positive impact globally and fostering a greener future.

Collaborating with the Italian Chamber of Commerce, Singapore (ICCS)

BeaConsulting recently collaborated with the ICCS to organise a seminar focussed on implementing sustainability practices within the hospitality industry. This effort highlights BeaConsulting's commitment to sustainability, both internally and with clients, and underscores their dedication to partnering with external organisations to promote and educate on sustainable practices.

BeaConsulting

BEACONSULTING PTE LTD
111 Middle Road | National Design Centre #03-01 | Singapore 188969
W: www.bonucchi.com
T: +65 8617 2330

BNP PARIBAS

A Leader in Financing the Sustainable Transition

In Asia Pacific, BNP Paribas is one of the best-positioned international financial institutions with an uninterrupted presence since 1860. Currently with over 20,000 employees and a presence in 13 markets, BNP Paribas provides corporates, institutional and private investors with product and service solutions tailored to their specific needs.

It has key positions in its three main activities: Domestic Markets and International Financial Services, whose retail-banking networks and financial services are covered by Retail Banking & Services, and Corporate & Institutional Banking, which serves two client franchises: corporate clients and institutional investors.

Asia Pacific is a key strategic region for BNP Paribas and it continues to develop its franchise in the region. In Southeast Asia, BNP Paribas has core banking licenses in Indonesia, Malaysia, Singapore, Thailand and Vietnam. Singapore has been the Bank's hub for Southeast Asia since 1968.

FINANCIAL SERVICES ALIGNED WITH SUSTAINABILITY GOALS

BNP Paribas has a comprehensive sustainability strategy with clear and focussed priorities. The CSR strategy aligns with the 17 United Nations Sustainable Development Goals and aims to support clients in transitioning to a carbon-neutral economy. This strategy is part of BNP Paribas' GTS 2025 strategic plan, which integrates growth, technology, and sustainability. BNP Paribas adheres to the Principles for Responsible Banking (PRB) and Principles for Responsible Investment (PRI), ensuring that its financial activities align with sustainability goals.

An ESG Assessment tool is used to evaluate the ESG performance of clients as part of the credit process. This tool helps BNP Paribas understand clients' compliance with sectoral policies and the maturity of their ESG strategies.

A Low-Carbon Transition Group (LCTG) was formed in 2021, which includes over 200 specialised bankers focussed on supporting corporate clients in their decarbonisation efforts.

BNP Paribas decided to gradually align its loan portfolio with the objectives of the Paris Agreement. In 2021, the Group committed to setting intermediary alignment targets for the most carbon-intensive sectors. To date, it has published targets for six sectors - Oil and Gas, Power generation, Automotive, Steel, Aluminium and Cement. In 2024, the Group is setting portfolio alignment targets for three additional sectors: Aviation, Shipping, and Commercial Real Estate, while also disclosing its approach to the Residential Real Estate and Agriculture sectors.

FOSTERING A CULTURE OF SUSTAINABILITY

Launched at the end of 2022, BNP Paribas Sustainability Academy provides training to employees on sustainable finance topics. By the end of 2023, more than 86,000 employees had participated in at least one training session, fostering a culture of sustainability within the organisation. BNP Paribas Mobility also launched the "Mobility4you" platform, integrating carbon footprint assessments and promoting soft mobility.

FINANCING SUSTAINABLE PROJECTS

The bank has developed a wide range of sustainable finance products (including sustainable bonds, positive impact loans, sustainability-linked loans (SLL), and sustainability-linked bonds (SLB) to support clients' transition to a low-carbon economy and promote sustainable development. In 2023, BNP Paribas issued a €750 million sustainability-linked bond for Heidelberg Materials, tied to specific CO_2 reduction targets. Another example is the $1 billion loan to ReNew Power in India to finance a portfolio of wind and solar projects.

The group has been instrumental in financing projects like the Baltic Power offshore wind farm in Poland and AESC's gigafactory in France.

Through the Ecological Transition Capital investment line, the bank has invested in companies like CarbonWorks and Protix, and in funds like Shift4Good, aiming to accelerate the development of technologies that reduce carbon emissions and promote sustainability.

BNP Paribas has supported projects that promote the circular economy and sustainable mobility. It financed La Fonte Ardennaise's foundry sand regeneration project, reducing CO_2 emissions and saving natural resources. It supported Northvolt's gigafactory expansion in Europe to produce sustainable batteries.

In 2023, it led the world with USD 62.5 billion in ESG loans and bonds. The company's commitment to financing low-carbon energy projects resulted in a credit exposure of EUR 32 billion to low-carbon energy production by September 2023, with a target of reaching EUR 40 billion by 2028.

RESPONSIBLE BUSINESS PRACTICES ACROSS VALUE CHAINS

BNP Paribas has developed a Sustainable Sourcing Charter that outlines commitments for both the Group and its suppliers. This initiative is reinforced by the Group's achievement of the "Responsible Supplier Relations

and Procurement" label, awarded by French public authorities. Furthermore, the Group incorporates ESG (Environmental, Social, and Governance) considerations into its procurement processes by using ESG questionnaire templates to assess potential risks when entering into relationships with suppliers and subcontractors.

BNP Paribas also actively promotes diversity in its procurement practices. The Group collaborates with suppliers who employ vulnerable and disabled individuals, demonstrating its commitment to inclusive purchasing. By 2025, BNP Paribas aims to increase its inclusive purchases in France by 30%, further enhancing its social responsibility.

Moreover, the Group's dedication to sustainability extends to its participation in the Ambition4Circularity platform. This platform unites the commitments of member companies of the Association française des entreprises privées (AFEP) to advance the principles of a circular economy, highlighting BNP Paribas' broader commitment to sustainable and responsible business practices.

PARTNERSHIPS AND COLLABORATIONS

BNP Paribas Asset Management is a founding member of Nature Action 100, launched during the Montreal COP 15 on biodiversity. This initiative is the first global investor engagement effort aimed at encouraging key companies to take urgent and necessary measures to protect and restore nature and ecosystems.

The Group actively contributes to the Hydrogen Council, which comprises nearly 150 international companies committed to low-carbon hydrogen as a crucial resource for the decarbonising industry.

BNP Paribas is also part of the Low-Carbon Building Initiative (LCBI), which gathers major European real estate players to adopt common practices and standards for measuring the carbon footprint of buildings throughout their lifecycle and aims to reduce it by half.

On top of that, BNP Paribas has been involved in the initial design work and the development of the Taskforce on Nature-related Financial Disclosures (TNFD) framework. The final recommendations were published in 2023, providing a common language for better analysis, management, and communication of nature-related dependencies, impacts, risks, and opportunities.

In 2024, BNP Paribas partnered with Mistral AI to develop advanced data-driven solutions for sustainability, enhancing capabilities in customer support, sales, and IT. This collaboration enables BNP Paribas to improve its sustainability metrics tracking, to manage better and improve its environmental impact, and to better support the transition of its clients.

NOTEWORTHY SOCIAL AND ENVIRONMENTAL INITIATIVES

BNP Paribas subsidiary Nickel offers banking services to individuals who may not have access to traditional banking. In 2023, Nickel reached nearly 3.7 million accounts, with a significant portion of these account holders having lower incomes or being unemployed.

In addition to these banking services, BNP Paribas has made significant strides in supporting entrepreneurs through its partnership with Adie. Since 1993, this partnership has enabled the support of nearly 40,000 entrepreneurs, providing over 47,000 microloans. This initiative is particularly focussed on underrepresented groups, including those without diplomas, young people under 30, and women.

Moreover, BNP Paribas is committed to impact entrepreneurship through its "Act For Impact" initiative, which supports businesses focussed on critical themes such as the circular economy, healthcare, child protection, professional integration, and equal opportunities.

ALIGNED WITH SG GREEN PLAN ROADMAP

BNP Paribas supports the broader implementation of Singapore's sustainability objectives. It collaborates with various stakeholders, including government agencies, private sector partners, and non-governmental organisations, to drive sustainability initiatives that are consistent with the SG Green Plan. This collaboration helps ensure that the bank's activities are in line with national sustainability priorities and contribute to the overall goals of the SG Green Plan.

> BNP Paribas has received "Best Bank for Sustainable Finance" by Euromoney for three consecutive years. The bank has also been recognised in the Forest500 ranking by the NGO Global Canopy for its commitments to combat deforestation.

BNP PARIBAS
The bank for a changing world

BNP PARIBAS, SINGAPORE BRANCH
20 Collyer Quay | #01-01 I Singapore 049319
W: www.bnpparibas.com.sg
T: +65 6210 1288

BSI

BSI's Journey to Net Zero: Shaping a Sustainable Future

BSI is a trusted Royal Charter brand that helps organisations worldwide to make excellence a habit through standards creation, system certification, supplier verification and training activities. As the world's most experienced Standards Body and founding member of ISO, BSI leads the way in originating many of the world's most recognised standards, including ISO 9001 Quality Management, ISO 14001 Environmental Management, ISO 22301 Business Continuity Management, ISO/IEC 27001 Information Security etc.

BSI's business model demands that we view all actions through the lens of societal progress, making sustainability our guiding principle. BSI aim's to empower collaborative efforts towards achieving sustainability goals and creating a positive impact.

BSI'S PATH TO NET ZERO: STRATEGIC ACTIONS AND GLOBAL LEADERSHIP

BSI's sustainability strategy is firmly aligned with its organisational purpose and commercial goals. Through a comprehensive materiality assessment, BSI identifies key risks and opportunities, shaping its strategic priorities.

Publicly committed to achieving net zero emissions by 2030, BSI aims to reduce its Scope 1 and 2 emissions by 90% and Scope 3 emissions by 42%, in line with the Paris Agreement. To support its clients' net zero journeys, BSI offers Net Zero Pathway solutions, integrating ISO IWA42:2022 and ISO 14064-1.

Putting strategy into action, BSI led the 'Our 2050 World' network to launch The Net Zero Guidelines (ISO IWA42:2022) at COP27. These guidelines are designed to help governments and organisations accelerate action and limit global warming to 1.5 degrees Celsius, providing a practical, end-to-end framework for organisations at any stage of their net zero journey.

Global Consistency

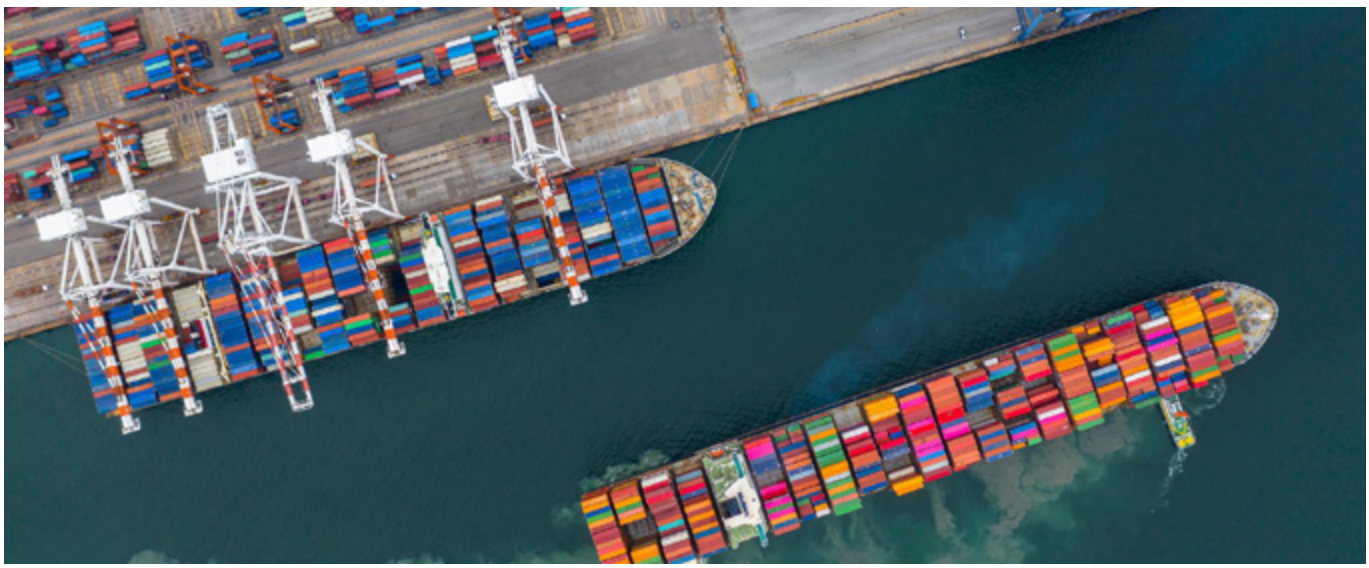
Sustainability is a collective commitment that transcends divisions, markets, regions, and teams. In 2022, BSI achieved global certification for Environmental Management Systems (ISO 14001) and Occupational Health and Safety Management (ISO 45001), fostering global alignment, effective impact management, and risk reduction. This certification process empowered an engaged team of internal advocates, facilitating sustainable development initiatives and supporting our journey towards net zero goals.

Actively working to achieve GHG reduction targets ahead of schedule, BSI has maintained carbon neutrality since 2020 by investing in high-quality carbon credits. Through its Carbon Offsetting Policy, developed with guidance from PAS 2060, ISO

14068 draft, and the Oxford Carbon Offset Principles, transparency and accountability is ensured. Credits labeled with the Integrity Council for the Voluntary Carbon Market (ICVCM) Core Carbon Principles (CCP) Assessment Framework to further enhance sustainability efforts have been prioritised going forward.

Quality Data

At BSI, achieving goals hinges on the foundation of quality data. BSI has streamlined its reporting systems, transitioning from spreadsheets to the Connect Climate platform, enhancing data accuracy, transparency, and consistency. This shift not only reduces time spent on data analysis but also



provides teams with a clearer view of our progress against yearly targets.

Furthermore, adherence to standards such as the Guidance for Quantification and Reporting of GHG Emissions and Removals (ISO 14064-1) ensures that our measurement and reporting processes meet the highest global standards, instilling confidence in both internal and external stakeholders.

EMPOWERING TEAMS FOR SUSTAINABLE SUCCESS

BSI prioritises empowering teams through training workshops and support to accurately report GHG-related activities, including invoices, expenses, and travel planning, thereby capturing richer and more precise data.

Employee engagement is at the core, fostering the development of better tools and data that feed into custom implementation plans, successfully embedding sustainability into BSI's projects and processes.

Beyond data-focussed training, BSI is transforming its communication approach with a redesigned training curriculum targeting confidence gaps, an interactive Sustainability Intranet Hub, and monthly live TeamsCasts. These initiatives foster engagement on crucial sustainability topics among colleagues, empowering every team member to contribute meaningfully to BSI's sustainability journey.

The Carbon Allowance Model

Reducing its carbon footprint requires a holistic approach, with sustainability becoming a shared responsibility embedded in every decision-making process. To achieve this, BSI has implemented a Carbon Allowance Model, allocating carbon budgets to each division and function, and linking these targets to leadership incentives and bonus remuneration. This approach ensures accountability and drives comprehensive pathways toward carbon reduction goals.

INTEGRATING GREEN PRACTICES ACROSS BSI

By fostering deep collaboration with supply chain leads, BSI has integrated sustainability into procurement processes, risk assessments, and facilities planning. The company is actively implementing energy management systems and promoting responsible travel decisions through practical tools and guidelines. This commitment has already yielded significant results, such as a 20% reduction in carbon impact from relocating a recent meeting. Through collective efforts and continuous improvement, BSI is paving the way for a more sustainable future.

In 2020, electric vehicles were added to the company's car leasing scheme in the UK, piloting the programme for broader rollout as charging grids expand. By 2022, 40% of BSI's UK fleet was either electric or hybrid. In 2023, the order book shows a rapid increase, with 99% of new orders being electric or hybrid vehicles.

THE COMMITMENT TO A SUSTAINABLE FUTURE

With 2030 fast approaching, urgent action is essential to accelerate progress towards a safer, sustainable future for generations to come. BSI is committed to driving positive change by assisting organisations and society in their journey towards sustainability. Through strategic initiatives focussed on culture, communication, and engagement, BSI works tirelessly to achieve its carbon targets while remaining mindful of broader environmental and societal impacts.

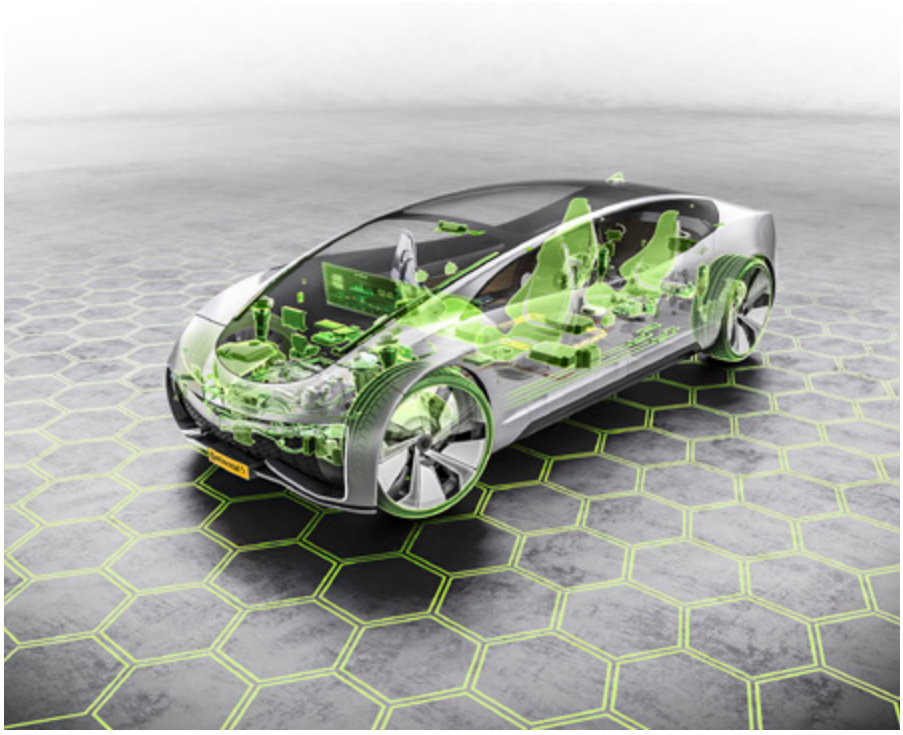
> Susan Taylor Martin, CEO of BSI, emphasises the urgency of its commitment: "Why are we taking such a bold step towards net zero? Because we can. And we must."

BSI GROUP SINGAPORE PTE LTD
77 Robinson Road | #28-03 | Singapore 068896
W: www.bsigroup.com
T: +65 6270 0777

CONTINENTAL AUTOMOTIVE

Future Business is Sustainable Business

Continental develops pioneering technologies and services for sustainable and connected mobility of people and their goods. With sustainability as the key driver of innovation, the company has its sight on ambitious targets to achieve by 2050 at the latest, together with partners along the value chain. At the Singapore R&D hub, engineers are teaming up with researchers to find new solutions, such as increasing circularity in automotive electronics and optimising the electromobility ecosystem.



Carbon neutrality, emission-free mobility and industry, a circular economy and responsible value chains are the main levers of transformation to a more sustainable planet. Continental has thus set itself one ambition: to achieve 100 percent in each area by 2050 at the latest, and together with the company's partners throughout the value chain.

While some associate climate protection with sacrifice, Continental sees it through a different lens. The transformation of the economy towards carbon neutrality is, above all, a tremendous opportunity – for the planet and also for the business of the company. Sustainability is anchored in the foundation of Continental's values and is vital to the vision of "creating value for a better tomorrow".

FOUR AMBITIONS

Carbon Neutrality

Continental aims to become carbon neutral across the entire group by 2040. Concrete steps are being taken, such as switching all energy purchased to green energy since 2020 and making use of new technologies to reduce emissions in production processes.

However, most of the emissions generated in the value chain – equating to around 99 percent – are generated outside of production. Raw material procurement, use of the product and recycling at the end of its life cycle will have to be transformed in a sustainable way and Continental is committed to working closely with customers, suppliers and other partners.

Emissions-Free Mobility and Industry

Continental provides a range of customer-focussed products and services, which supports societies and businesses from different industries in the transformation to an emission-free future. These solutions can be used to support emission-free rail transport, bicycles and even resistance-optimised tires.

One notable area is in e-mobility, and Continental's innovations can help to reduce the weight of electric vehicles (EVs), enabling lower raw material consumption and ultimately lessening the power requirements. With up to 65 percent renewable, recycled and mass balance certified materials, the Ultra Contact NXT from Continental combines a remarkably high share of sustainable materials with maximum safety and performance. At the same time, all dimensions carry the highest possible rating in the EU tire label ("A") in rolling resistance, wet braking and exterior noise.

Circular Economy

By 2050, Continental aims to fully close its product and resource cycles together with its partners in the value chain – and make circular economy a reality. This entails implementing circularity in product design, business models, material use and material procurement. In the tire business, for example, Continental is pioneering innovative methods for recycling rubber from end-of-life tires and is working on the further development of pyrolysis — a process that converts end-of-life tires into raw materials. By 2050 at the latest, all tires are to be made of sustainable materials. There is still a long way to go until then. But step by step, it is already becoming apparent which raw materials will find their way into tire construction in the future. These include waste products from agriculture – such as the ash from rice

husks, rubber from dandelions, as well as recycled rubber or PET bottles.

Over at Continental's industrial business, the focus is on replacing conventional materials with recycled and bio-based ones. For example, the artificial leather skai VyP Coffee is made from coffee grounds reused to produce breathable upholstery fabrics. In addition, Continental has developed concepts to increase the proportion of sustainable materials in existing products, such as air springs, and to reduce the CO_2 footprint. Sustainable natural rubber, bio-based oils and plasticisers are being used, as well as recycled steel bead wires instead of conventional raw materials.

Responsible Value Chain

Respect for human and environmental rights is an integral component of all business activities at Continental. Continental prioritises social and environmental responsibility throughout its entire value chain - from the sourcing of raw materials to the production process and finally to the customer, with the ultimate goal of creating a positive impact on society. To achieve a 100 percent responsible value chain – together with its business partners and by 2050 at the latest – Continental has established a comprehensive management system for ensuring due diligence, to detect risks related to its commitments within its supply chain and in its own operations.

SUSTAINABILITY IN SINGAPORE

With over 35 years of engineering history, Continental Singapore is one of Continental's largest R&D hubs in Asia and serves a range of regional and global customers, across a wide portfolio of hardware and software products. Engineers are also working in advanced fields such as high-performance computers, AI, and cybersecurity, that will further the development of the future generation of software-defined vehicles, which will be smarter, safer and more sustainable.

Innovation Through Collaboration

To bring about innovative solutions which can transform the mobility ecosystem, Continental Singapore collaborates closely with other industry players and research institutions.

One area is in improving the circularity of automotive electronics and here Continental has partnered with the French Alternative Energies and Atomic Energy Commission (CEA) and Nanyang Technological University, Singapore (NTU Singapore).

At the Singapore-CEA Alliance for Research in Circular Economy (SCARCE) – a research centre set up by CEA and NTU Singapore – different methods to improve the circularity of Printed-Circuit Boards (PCBs) are being explored, such as eco-designs to facilitate used PCB disassembly and automated sorting of components with intelligent solutions such as machine learning.

Engineers in Singapore also work closely with NTU researchers at the Continental-NTU Corporate Lab to create smart and sustainable mobility solutions. One area is in the intelligent management of Electric Vehicle (EV) fleets, which can optimise charging schedules and locations to mitigate battery degradation, and reduce the demand placed on the electricity grid during peak hours.

Environmental Stewardship

Continental Singapore participates in the annual Earth Hour programme, with additional activities such as sustainability talks and a pledge event, where employees commit to protecting the environment in their own personal ways. Employees also take part in a yearly beach clean-up, to support a clean marine environment and protect the ocean's biodiversity.

Green Business

The Singapore office at Boon Keng Road is certified RE100, with 100 percent energy coming from renewable sources. Additionally, photovoltaic panels installed on the rooftops of the office building also supply an additional source of clean energy. The company's goal is to achieve a two percent reduction in energy consumption year-on-year, and this has been achieved through various ways, including switching to LED lighting, and right-sizing the office space to match hybrid work environment.

Employees from various departments and business areas have also undergone training to use the Green Compass assessment tool, to better understand the company's current level of environmental sustainability and develop future strategies for green transformation.

TURN CHANGE INTO OPPORTUNITY

In this era of transformation for the mobility industry, sustainability is to be embraced and is key to future business for Continental. To make its sustainability ambition a reality and bring about lasting impact in the industry, Continental seeks to work closely with all stakeholders - employees, shareholders, stockholders, customers, partners, and suppliers.

"In the words of Dr. Ariane Reinhart, Continental Executive Board member for Human Relations and Sustainability: "As we navigate the complexities of the automotive industry, we are not only shaping our own future but also influencing the course of an entire sector. Together – with ambition, viability, compliance and passion – we are embarking on a journey that goes beyond profit margins; it is a commitment to building a legacy of sustainability," she said in a letter in Continental's Integrated Sustainability Report 2023."

CONTINENTAL AUTOMOTIVE SINGAPORE PTE LTD
80 Boon Keng Road | Singapore 339780
W: www.continental.com
T: +65 6580 0000

DELIVERY HERO

Pioneering Sustainable Deliveries

foodpanda is a leading on-demand delivery platform in Asia dedicated to bringing consumers a wide array of food and groceries. Powered by technology and operational excellence, foodpanda has also pioneered the growth of quick-commerce across the region with its network of retail partners and pandamart cloud stores. foodpanda operates in more than 400 cities across 11 markets in Asia. foodpanda is the Asia Pacific subsidiary of Delivery Hero.

COMMITMENT TO SUSTAINABILITY

foodpanda's commitment to sustainability is organised around three key approaches:

1. Sustainable Platform: foodpanda leverages its app to work with merchant partners, delivery partners, and consumers to promote conscious choices.

2. Sustainable Operations: foodpanda integrates sustainability considerations into its daily operations to enhance efficiency and sustainability.

3. Sustainable Societies & Ecosystems: foodpanda collaborates with partners to enhance the sustainability of the food delivery ecosystem and the well-being of local communities.

Adopting a local-led approach to driving change across their 11 markets in the Asia Pacific region, foodpanda's sustainability focus is clearly outlined with quantifiable metrics, aligned with their parent company's climate action strategy to reduce greenhouse gas emissions in their value chain. They focus on areas like vehicle decarbonisation, alternative materials, consumer choices, food waste reduction, and alleviating food insecurity. In addition, their in-house initiatives foster a culture of environmental responsibility. The Eco Heroes employee group leads sustainability efforts and organises the annual Sustainability Week for Earth Day, encouraging sustainable lifestyles among employees.

foodpanda's commitment extends to its office spaces. Its regional headquarters in Singapore is in a LEED Platinum and Green Mark Platinum building, powered by 100% renewable energy and featuring energy-efficient LED lighting. The office uses recycled coffee ground cups (Huskee cups) and provides reusable containers for employee takeaways.

CREATING TANGIBLE IMPACT THROUGH SUSTAINABILITY INITIATIVES

foodpanda's sustainability efforts have led to significant social and environmental impacts.

Vehicle Decarbonisation

foodpanda actively encourages its delivery partners to adopt greener modes of transport. By expanding electric vehicle (EV) partnerships in multiple markets, foodpanda enables its delivery partners to access EVs at affordable prices. In Hong Kong, foodpanda has partnered with e-motorbike supplier Niu-HK and China CITIC Bank, allowing delivery partners to purchase selected Niu e-motorbike models with interest-free instalment plans using a China CITIC Bank card. In Singapore, foodpanda partnered with Gogoro and Cycle & Carriage to trial Gogoro electric Smartscooters with swappable batteries under a pilot scheme by the Land Transport Authority (LTA). This pilot provided valuable insights into distance anxiety, battery swapping infrastructure, energy savings, and carbon emissions, informing LTA's policies for realising Singapore's Electric Vehicle vision, a critical component of the Singapore Green Plan 2030.

Through its initiatives, one in five foodpanda delivery partners now use zero-emission delivery modes, such as bicycles and electric vehicles. In Singapore, foodpanda's delivery partners participating in the electric motorbike pilot with Gogoro and Cycle & Carriage saved 10,000 kg of carbon dioxide emissions in the first four months of the pilot.

Packaging Circularity and Single-Use Plastic Reduction

Since 2017, foodpanda has been nudging consumers to reduce the use of disposable cutlery through the default cutlery opt-out toggle on its app. This ensures consumers receive cutlery only when they specifically request for it, and has significantly influenced consumer behaviour over time. In 2017, only 20% of Singapore orders were delivered without disposable cutlery; this figure increased by close to 4 times by 2023. foodpanda also saw a significant increase across APAC: between 2022 and 2023, no cutlery orders increased by over 75%. Through its default cutlery opt-out toggle, foodpanda enabled its restaurant partners and consumers to avoid over 2,400 tonnes of plastic waste in 2023.

In addition, foodpanda has introduced programmes to encourage the use of reusable containers for food delivery and self-pick up in selected markets. In 2023, over 8,000 users participated in its closed-loop Reusable Container Programme in Hong Kong and Taiwan. As a result, foodpanda saved close to 19,000 disposable plastic containers.

At foodpanda's own online grocery stores (called "pandamarts"), it has been tracking the proportion and volume of bags used for packing customers' orders that are of lower environmental impact. In Singapore, foodpanda has fully switched to using 75% recycled plastic bags for pandamart deliveries in Singapore, saving over 70,000 kg of virgin plastic annually. Elsewhere in Pakistan, pandamart orders are being delivered in non-woven cloth bags which has helped to reduce over 90,000 tonnes of CO_2 emissions.

Food Waste Reduction

foodpanda has been monitoring food surplus at our pandamarts regularly to improve its inventory management. In 2023, food surplus equivalent to over 100,000 meals was diverted and donated to local communities in Hong Kong, Malaysia, Philippines and Singapore. Starting in 2024, foodpanda Pakistan has also started donating its pandamart surplus to benefit its local communities in need.

Alleviating Food Insecurity

Through an in-app meal donation feature available to customers after order placement, foodpanda has facilitated more than 300,000 customer meal donations in 2023 to local food banks and the World Food Programme in Malaysia, Hong Kong, Philippines and Singapore.

SUSTAINABILITY INITIATIVES IN ASEAN

foodpanda has been proactively advancing vehicle decarbonisation by expanding electric vehicle (EV) partnerships across five ASEAN markets, which enable its delivery patterns to have access to electric motorbikes at affordable prices. These partnerships also include regulatory sandboxes, which help inform policies and regulations that pave the way for large scale adoption of electric vehicles.

In addition, foodpanda has also initiated programmes to address food insecurity. In the Philippines, foodpanda actively contributes to the wider community through the pandaSHAREs programme since 2021. This programme facilitates donation drives, provides meals to medical frontliners, and sends relief goods to disaster-stricken communities in collaboration with organisations such as the Philippine Disaster Resilience Foundation.

In Singapore, foodpanda launched the Pau-Pau Breakfast Club in 2023, aimed at tackling food insecurity and promoting healthier eating habits. The initiative involved donating healthy and nutritious items and providing opportunities for communities to learn how to prepare simple and nutritious meals.

FOODPANDA'S INITIATIVES ALIGNED WITH THE SINGAPORE GREEN PLAN

foodpanda's sustainability initiatives are aligned with the Singapore Green Plan. Its initiative to advance vehicle decarbonisation as the food delivery platform to pilot the use of electric motorbikes with swappable batteries is aligned with the Energy Reset pillar of the Singapore Green Plan, which envisions all vehicles to run on cleaner energy by 2040.

In addition, its initiatives in Singapore to fully switch to using 75% recycled plastic bags for pandamart deliveries, and to divert surplus edible food from its pandamarts to local communities are also aligned with the Sustainable Living pillar, which aims to reduce waste and enhance circularity in waste materials.

foodpanda

DELIVERY HERO SINGAPORE PTE LTD (FOODPANDA)
63 Robinson Rd | #11-01 Afro Asia | Singapore 068894
T: www.foodpanda.com

DHL EXPRESS

Pioneering Sustainability in Logistics

DHL Express, a division of the world-renowned DHL Group, stands as the global leader in logistics, boasting about 600,000 shipping professionals and operating in more than 220 countries and territories.

Established in 1972, DHL Express Singapore is a crucial part of this extensive network, featuring four service centres, one regional hub, and a fleet of more than 330 vehicles dedicated to providing exceptional door-to-door delivery services. With its unwavering commitment to efficiency and reliability, DHL Express Singapore continues to set the standard for logistics excellence in the region.

COMPREHENSIVE SUSTAINABILITY STRATEGY

DHL Express's slogan "Excellence. Simply Delivered." emphasises their commitment to high-quality service while integrating sustainability into their operations. DHL has set ambitious goals, such as achieving net-zero emissions by 2050 and investing significantly in climate-neutral solutions, including electric vehicles and sustainable aviation fuels

Also, DHL Express Singapore has established comprehensive Key Performance Indicators (KPIs) to drive its sustainability strategy, with a strong focus on both environmental and social pillars.

Among its environmental targets, the company aims to achieve its group's targets which includes the use of 30 percent blending of Sustainable Aviation Fuels by 2030 and the electrification of 60% percent of its last-mile delivery vehicles. Additionally, from 2021 onwards, DHL Group is committed to implementing carbon-neutral designs for all new buildings.

In terms of social responsibility, the DHL Group prioritises safety with the goal of reducing the Lost Time Injury Frequency Rate (LTIFR) to below 3.1 by 2025. The company is also dedicated to enhancing gender diversity, aiming to increase the representation of women in management positions to 30 percent by 2025. Furthermore, DHL focusses on attracting and retaining top talent, striving to maintain a consistent score of over 80 percent for Employee Engagement in the annual Employee Opinion Survey (EOS).

While these DHL Group ESG KPIs appear ambitious, DHL Express Singapore's commitment to fostering a sustainable and inclusive working environment has enabled it to be well on its way to achieving its sustainability targets, while exceeding the social targets already in 2023.

COMMITMENT TO ELECTRIC VEHICLES AND OPTIMISING ROAD PLANNING

As an express delivery business, transportation significantly contributes to emissions. Therefore, the company has prioritised converting its fleet to electric vehicles (EVs).

In 2023, DHL Express Singapore achieved its target of converting 29 percent of its courier fleet to EVs, reaching a total of 100 EVs by the end of the year. The company aims to further increase its EV fleet to 68 percent by 2025 and achieve 100 percent by 2030, surpassing the global target of 60 percent.

Innovative Road Solutions: DISCO, ODIN and WISE

The operations team utilises various internally developed applications to optimise resource allocation and route planning. These include the DISCO application that ensures that the right number of vehicles are deployed to manage daily shipment volumes efficiently and the ODIN which assists couriers in planning the most efficient routes for their daily pickups and deliveries, enhancing time and fuel efficiency. Additionally, the WISE application allows the Operations team to monitor live traffic conditions, avoiding unnecessary delays caused by traffic jams. These business applications have been successfully deployed globally, showcasing DHL's commitment to operational efficiency and sustainability.

GoGreen Specialist Certification

DHL Express Singapore has achieved a significant milestone by certifying 85 percent of its employees as GoGreen Specialists to date. This certification involves comprehensive training on sustainability practices, environmental awareness, and implementing green initiatives for employees.

DHL Express Singapore has ambitious plans to further this achievement, aiming to certify all its employees in the future. This high certification rate underscores the company's

commitment to embedding sustainability into its corporate culture and ensuring that all employees are equipped with the knowledge and skills to contribute to the company's environmental goals.

OFFERING SUSTAINABLE AVIATION FUEL: GOGREEN PLUS

At DHL Express, 90 percent of emissions come from aviation and it recognises that this needs to change. DHL Group's new Sustainable Aviation Fuel (SAF) offering, GoGreen Plus, allows customers to reduce the carbon emissions associated with their shipments through the use of SAF through "insetting". This allows customers to reduce their Scope 3 emissions, i.e. the indirect greenhouse gas emissions that occur in a company's value chain, including downstream transportation and distribution.

BP and Neste are committed to supply DHL Express with more than 800 million litres of SAF until 2026 and a recent deal with World Energy will provide the company with approximately 668 million litres of SAF via SAF certificates over a seven-year period until 2030.

Customers can opt for GoGreen Plus through DHL's online shipping platform, MyDHL+, by selecting the service as an optional add-on. This flexibility allows businesses to tailor the carbon reduction level they aim to achieve for each shipment, promoting more sustainable logistics operations globally.

COLLABORATION WITH RECYCLING PARTNERS

As a proponent of the Circular Economy Model, DHL Express Singapore collaborates with our Green Partners to run two recycling programmes, ensuring resources are utilised to their fullest potential.

Plastic Sheet Recycling

One of DHL's suppliers collects used plastic sheets. These sheets are converted into recycled plastic resin pellets. The pellets are then sent to factories to produce new plastic film products, known as PCR (Post-Consumer Recycled) products.

Damaged Pallet Recycling

Recycled wooden pallets are utilised in two main ways - A 'Free Sawdust Program' where sawdust from the pallets is used to clean oil spills or is compressed into biomass pellets, which can be burned to create biomass energy. DHL has also partnered with a sustainable brand to upcycle wooden materials which are then used in workshops and sustainable events to create new products or art.

Through these partnerships, DHL has reduced waste disposal cost by S$2,500 per month and more importantly redirected 12 tonnes of waste away from landfill monthly.

IN LINE WITH SINGAPORE'S GREEN PLAN

DHL Express Singapore's vision to achieve 100 percent electric vehicles by 2030 aligns with the "Energy Reset" pillar of the Singapore Green Plan 2030, complementing government efforts to promote the switch to electric vehicles.

Its GoGreen Plus service, which utilises Sustainable Aviation Fuel (SAF) in its aeroplanes, supports the "Green Energy" pillar of the Singapore Green Plan. This includes a target to "increase fuel efficiency and carbon neutral growth," with SAF currently being the primary method for directly reducing carbon emissions in aviation.

In addition, DHL Express Singapore promotes sustainability education for employees by contributing to the "City in Nature" pillar. Tree planting is part of DHL's Specialist electives.

By implementing greener habits at work, DHL Express Singapore supports the "Sustainable Living" pillar, encouraging employees to adopt green practices both at work and at home.

Singapore is a pioneer within the DHL Express network in terms of greening its operations. Besides having one of the largest commercial EV fleets in the Asia-Pacific, it is also the first Asian country to introduce GoGreen Plus and consistently collaborates across borders to enhance operations throughout its global network.

DHL EXPRESS (S) PTE LTD
DHL Air Express Centre | 1 Tai Seng Drive | Singapore 535215
W: www.dhl.com

DIAGEO

Celebrating Life, Every Day, Everywhere

Diageo is a global leader in beverage alcohol, with an outstanding collection of brands across spirits and beer categories. These brands include Johnnie Walker, Singleton, Smirnoff, Captain Morgan, Baileys, Don Julio, Tanqueray, and Guinness. Diageo is a global company whose products are sold in more than 180 countries around the world. The company is listed on both the London Stock Exchange (DGE) and the New York Stock Exchange (DEO).

DIAGEO'S SOCIETY 2030: SPIRIT OF PROGRESS

'Society 2030: Spirit of Progress' is Diageo's 10-year ESG action plan to help create a more inclusive and sustainable world. It builds upon Diageo's long-standing commitment to social and environmental responsibility, addressing key issues such as climate change, water stewardship, responsible drinking, diversity and inclusion, and community development. 'Society 2030: Spirit of Progress' has three priorities: to promote positive drinking, champion inclusion and diversity, and pioneer grain-to-glass sustainability, underpinned by a focus on doing business the right way. Aligned to the United Nations' Sustainable Development Goals, Diageo's ambitious targets will lead the business over the next decade and deliver a positive impact on society and the environment.

PROMOTING POSITIVE DRINKING

Diageo has set ambitious targets to reduce harmful drinking and ensure that alcohol is enjoyed responsibly. By 2030, the company aims to reach over one billion people with messages of moderation and responsible drinking. This will be achieved through a combination of education, advocacy, and collaboration with partners across the industry and beyond.

Diageo's approach includes the development of low and no-alcohol products to provide consumers with more choices. For instance, the company has expanded its portfolio with products like Gordon's 0.0%, a non-alcoholic gin, and Guinness 0.0%, a non-alcoholic version of its iconic stout. These innovations cater to the growing demand for non-alcoholic alternatives and help promote moderation.

In addition, Diageo supports numerous programmes and initiatives aimed at reducing harmful drinking behaviours. This includes partnerships with organisations such as the International Alliance for Responsible Drinking (IARD) and local community groups to implement educational campaigns and interventions that address issues like underage drinking and drunk driving.

In Singapore, Diageo partnered with K-Pop celebrity Suho of EXO to create an original song and music video titled 'Enjoy the Flow, Savour Every Moment' that emphasises the importance of savouring each moment and enjoying alcohol in moderation, encouraging viewers to sip slow, and savour every note.

The track blends familiar sounds from a bar, such as glasses clinking, with sounds of nature and flowing water to produce multiple layers of music.

The song, music video and behind-the-scenes video was shared across select Diageo social platforms as well as EXO's social channels. Through this, Diageo was able to engage with the intended audience in a manner that connects with them culturally, whilst retaining authenticity of the messaging.

This activation also directed consumers in Singapore to DRINKiQ.com, a dedicated, responsible drinking website that offers valuable information, practical advice on alcohol consumption, and a range of resources to encourage moderate drinking.

> Diageo and Grab Singapore's Innovative Anti-Drink Driving Campaign

In addition, Diageo partnered with Grab Singapore for the second year to roll out an interactive anti-drink driving campaign which allows users to "video chat" with drink drivers in a Q&A format. Titled 'Wrong Side of The Road', the campaign was launched in partnership with the United Nations Institute for Training and Research (UNITAR) and aims to educate the public on the consequences of drunk driving.

The partnership with Grab Singapore saw the campaign being rolled out to their partner-drivers through the GrabAcademy as a training module, with over 10,000 completions in 2024. Diageo remains committed to changing attitudes towards drink driving and will continue to drive the important message through our various responsible drinking programmes and initiatives.

CHAMPIONING INCLUSION AND DIVERSITY

Diageo recognises that a diverse and inclusive workplace is crucial for driving innovation and business success. The company has set ambitious goals to enhance diversity across its global operations. By 2030, Diageo aims to achieve 50% representation of women in leadership roles and to have 45% of its leadership team composed of leaders from ethnically diverse backgrounds.

To support these goals, Diageo has implemented a range of initiatives focussed on recruitment, retention, and development of diverse talent. This includes targeted pro-

grammes to support the advancement of women and underrepresented groups within the company. For example, the "Diageo Spirited Women" employee resource group network provides mentoring, coaching, and networking opportunities for women at all levels of the organisation.

Diageo also fosters an inclusive culture through training and education programmes that promote awareness and understanding of diversity issues. Moreover, Diageo's commitment to diversity extends beyond its workforce to its suppliers and partners. The company actively seeks to work with diverse suppliers and has set a target to spend 10% of its procurement budget with diverse-owned businesses by 2030.

PIONEERING GRAIN-TO-GLASS SUSTAINABILITY

Committed to Achieve Net Zero

Diageo has committed to achieving net-zero carbon emissions across its direct operations by 2030. To reach this goal, the company is investing in renewable energy, energy efficiency improvements, and innovative technologies. For instance, Diageo has implemented solar power installations at several of its facilities and is exploring the use of hydrogen fuel cells and other low-carbon technologies. Since 2008, Diageo has already halved the carbon emissions associated with its operations and continues to invest in carbon-neutral facilities. In addition to their existing four carbon-neutral distilleries in Scotland and North America, they are designing new sites in Mexico, Canada, and Ireland.

Water Stewardship with Environmental Bamboo Foundation

Water stewardship is another critical component of Diageo's sustainability agenda. The company aims to achieve a net positive water impact in its operations by 2030, meaning that it will replenish more water than it uses. To achieve this, Diageo is implementing water efficiency measures, investing in water recycling and reuse technologies, and supporting watershed restoration projects in water-stressed regions.

In Indonesia, Diageo has partnered with the Environmental Bamboo Foundation on agroforestry projects aimed at water replenishment in Bali. The programme will not only replenish more water than is used in operations but also restore 7,500 hectares of critical land, increase absorption of underground water and 19.8 kilotons of CO_2 emissions, and empower 150 farming families with a projected income increase IDR 240 million per village by the third year.

Sustainable Packaging: Diageo's Commitment to a Circular Economy

Diageo is also committed to reducing packaging, increasing the recycled content in the packaging, and promoting a circular economy. In 2022, Diageo announced a programme to phase out the use of 183 million cardboard gift boxes from its premium Scotch portfolio around the world.

Diageo also embarked on a reusable packaging collaboration with ecoSPIRITS, an innovative closed-loop distribution system that nearly eliminates packaging waste in the premium spirits supply chain. As part of this pilot programme, Diageo deployed Smirnoff Vodka and Captain Morgan Rum in ecoSPIRITS' ecoTOTE formats across restaurants and bars in Jakarta and Bali. Once the ecoTOTE has been used, it gets picked up, refilled, and then sent back to the venue to use again, saving 5 glass bottles each time, and therefore reducing the amount of carbon produced. Through this pilot, Diageo set out to reduce approximately 99% of packaging waste compared to traditional single use glass bottles, and through the success the company has seen, they are now expanding this project to 18 markets across the next two years.

DIAGEO

DIAGEO SINGAPORE PTE LTD
Ocean Financial Centre | 10 Collyer Quay #20-01/04 | Singapore 049315
W: www.diageo.com
T: +65 6994 6074

DREES & SOMMER

Building for the Future

Drees & Sommer is renowned for delivering successful buildings, high-performing real estate portfolios, and liveable cities. For over 50 years, the company has been a trusted partner to private and public clients, offering innovative solutions in consulting, planning, construction, and operation. Drees & Sommer's comprehensive expertise spans all aspects of real estate and infrastructure, including digital solutions.

The diverse team globally comprises over 73 nationalities speaking more than 50 languages. In 2022, Drees & Sommer expanded to Singapore, emphasising building for the future through sustainability consulting and ESG initiatives, having established a presence in the APAC region since 2021.

Drees & Sommer's commitment to sustainable corporate development is in line with the United Nations Sustainable Development Goals, the United Nations Global Compact principles, and the Science Based Target Initiative requirements.

Their dedication to sustainability is evident across various business domains, including ESG, sustainable construction, and blue city planning. Additionally, the acquisition of EPEA, the innovators behind the Cradle to Cradle Design Framework, further underscores the company's commitment to continuous improvement.

INTERNAL SUSTAINABILITY INITIATIVES: CARBON FOOTPRINT REDUCTION AND ECO-FRIENDLY PROJECT

Reducing CO_2 Emissions of its Operations

Beginning in 2019, Drees & Sommer's commitment to sustainability has included a thorough record of the CO_2 emissions produced by the energy used at our various locations and from our company's transportation. As a result, the company has calculated that each staff member is responsible for approximately 2.29 tonnes of CO_2 emissions annually. The majority of these emissions are generated from business travel and use of the company's vehicle fleet. The remaining portion is attributed to energy consumption in office buildings. Drees & Sommer is proud to have received support from organisations such as the Myclimate foundation to assist with the important task of accounting for its carbon footprint.

One example of this is the design and construction of Drees & Sommer's new headquarters building, OWP12, in Germany. The building is designed to generate more energy than it consumes when in operation, which is a huge step towards sustainability. The highly insulated facade construction, photovoltaic systems on the roof and on the southern facade, geothermal energy via geothermal boreholes, and green northern facade are all innovative features that contribute to the building's energy efficiency. The use of geothermal energy is particularly impressive, as it is a renewable source of energy that has minimal impact on the environment.

50 Sustainability Projects

In celebration of their 50th anniversary, Drees & Sommer has embarked on 50 sustainable, ecological, and social projects as part of their internal sustainability initiatives. These projects include urban gardening at a school in Shanghai, creating a green summer terrace for a café serving homeless people in Vienna, organising beach clean-ups in Dubai, and establishing bee colonies on their campus in Germany.

Transparency, Impact, and Global Goals

As a Beneficial Company, Drees & Sommer aims to contribute positively to the environment and community. Their sustainability report, prepared in accordance with Global Reporting Initiative (GRI) guidelines, ensures transparency and offers insights into their values and conduct. This report is intended for all stakeholders, including customers, employees, suppliers, politicians, and authorities, who are interested in understanding Drees & Sommer's commitment to sustainability.

Dress & Sommer published its first sustainability report in 2011, and in 2022 released its first GRI report. The current report builds on the previous year's GRI report and is based on the 2021 financial year. The company's sustainability goals are aligned with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda for Sustainable Development.

EMPOWERING EMPLOYEES THROUGH SUSTAINABLE TRAINING AND EXPERTISE

The company has a dedicated team focussed on sustainability. Additionally, every location globally has sustainability champions who are responsible for implementing sustainable practices internally. Furthermore, Drees & Sommer have teams that specialise in offering sustainable consulting and ESG advice to clients and all employees receive training on integrating sustainability practices into their work. The company's dedicated sustainability and ESG experts hold several workshops yearly to educate employees on how they can implement and perform sustainable services to clients.

ADVANCING SUSTAINABILITY THROUGH TECHNOLOGY AND INNOVATION

Drees and Sommer has encouraged innovation to meet its sustainability goals. One notable initiative is ESG Consulting and Management, where the company aims to enhance environmental, social, and corporate governance aspects. The Zero Carbon initiative targets carbon emission reductions across all areas, while the promotion of green hydrogen as a future energy carrier supports the expansion of renewable energies.

Their Interdisciplinary Design & Research team has crafted bespoke digital tools and methods for smart, innovative, and sustainable projects. These Interdisciplinary Design Models evaluate various metrics such as aesthetics, performance, buildability, op-

erability, wellness, design rationale, and financial viability throughout project development.

Strategic acquisitions and partnerships with sustainability innovators like EPEA have enabled the development of solutions and technologies that help clients achieve environmental and social responsibility while remaining competitive.

Drees & Sommer has also created an innovative module for technical building services, providing significant time and cost savings in design, production, and assembly phases. Additionally, they have developed a toolbox for user-friendly technology, allowing clients to track sustainability measures through smart innovations and building sites.

SINGAPORE AND APAC FOCUS

Drees & Sommer's main sustainability initiative in Singapore and the APAC region is to actively participate in innovative knowledge sharing and exchange between the German and Singaporean Green Building Councils.

As a member of the Singapore Green Building Council (SGBC), Drees & Sommer aims to develop and deliver unique, sustainable building solutions to Singapore and APAC.

Drees & Sommer's commitment to sustainability is evident in its efforts to actively participate in knowledge sharing and exchange, and its dedication to aligning its strategy with the Singapore Green Plan 2030. As a member of the SGBC, Drees & Sommer is well-positioned to develop and deliver sustainable building solutions in Singapore and the APAC region.

Drees & Sommer APAC's strategy and initiatives align with the Singapore Green Plan 2030 roadmap. The company has been supporting local planners with solutions for Electric Vehicle infrastructure, which is in line with the Green Plan's goal to encourage the adoption of electric vehicles. Additionally, Drees & Sommer APAC has made it a mission to apply sustainable practices throughout the value chain, which is highly relevant in achieving many of the SGP 2030 goals. By doing so, the company is contributing to the overall effort to create a sustainable future for Singapore.

DREES & SOMMER

DREES & SOMMER APAC PTE LTD
25 International Business Park | #01-79 German Centre | Singapore 609916
W: www.dreso.com/apac
T: +65 8339 0020

ECOCERT

Sustainable Practices in Agriculture, Cosmetics, and Textiles

ECOCERT, established in France in 1991, certifies organic and sustainable practices in agriculture, cosmetics, textiles, forestry, and hospitality. For over 30 years, the organisation has helped many businesses adopt and promote sustainability. Operating in over 130 countries with 26 offices and 2200 employees, it has played a key role in developing the organic sector. Originally a group of technicians, farmers, and consumers focussed on organic farming, ECOCERT now spans various industries, offers wide range of services with expertise from fair trade to carbon neutrality. Its Asia headquarters is located in Singapore, with a dedicated team of over 250 experts supporting organic and sustainable practices across multiple industries in the region.

PROMOTING ORGANIC PRODUCTION WITH SOCIAL RESPONSIBILITY

ECOCERT plays a pivotal role in supporting and promoting organic production in the agriculture, textile, and cosmetics industries. By working closely with brands and suppliers, the organisation ensures that organic raw materials are sourced responsibly and that supply chains are transparent and traceable. This certification process involves rigorous inspections and adherence to international standards, providing consumers with confidence in the products they purchase. The organisation not only promotes chemical-free production but also advocates for systems that respect local communities and uphold social justice. These efforts are essential for creating a better world, addressing issues like child labour, fair wages, women's empowerment, and corruption, particularly in Asia, where these challenges are still widespread.

ECOCERT'S ROLE IN ORGANIC TEXTILE AND COSMETIC INDUSTRY

The organic textile market is projected to grow at a compound annual growth rate (CAGR) of 40% by 2030, while the organic cosmetics market is expected to grow at a CAGR of 51% over the same period. ECOCERT collaborates closely with brands and suppliers in these industries to support the production and sourcing of organic raw materials and certify the traceability of their supply chains.

Organic Textiles

For nearly 30 years, ECOCERT has been a pioneer in the textile sector, promoting the use of raw materials from organic agriculture and ensuring environmentally friendly production processes. Their certifications, such as the Global Organic Textile Standard (GOTS) and the Organic Content Standard (OCS), guarantee that textiles meet stringent criteria for sustainability and traceability from raw materials to finished products.

Organic Cosmetics

ECOCERT's expertise extends to the cosmetics industry with the development of the COSMOS standard, the leading certification for organic and natural cosmetics. This standard ensures that cosmetic products contain a high percentage of organic ingredients and adhere to strict environmental and social criteria throughout the production process. ECOCERT's clients in the cosmetics sector include major international brands seeking to enhance their sustainability credentials and transparency. The organisation supports these companies by providing detailed evaluations and continuous improvement plans to meet the highest standards of sustainability and corporate social responsibility.

SOCIAL AND ENVIRONMENTAL IMPACT

ECOCERT's commitment to social responsibility extends well beyond organic certification. The organisation actively promotes fair trade practices, ensuring that workers receive fair wages and work in safe conditions. Child labour is strictly prohibited, and efforts are made to empower women in the agricultural and production sectors. By fostering ethical practices, the organisation helps create sustainable livelihoods and supports the development of local communities.

In addition, the organisation supports standards that encompass environmental sustainability, promoting biodiversity, reducing deforestation, and minimising waste

as well as water and energy consumption throughout the production process. Brands are encouraged to implement eco-friendly practices and rethink their business models to align with a more circular economy.

ECOCERT's efforts are realised through collaborations with initiatives like the Rainforest Alliance, Fair For Life, Forestry Stewardship Council, Sustainable Rice Program, 4C, and Regenerative Organic Alliance, enhancing sustainable agricultural and manufacturing practices globally. These partnerships underscore the organisation's

commitment to environmental protection, improving working conditions, and supporting fair trade.

MITIGATING SUSTAINABILITY RISKS FOR GLOBAL BRANDS AND EMPOWERING CONSUMERS

The financial and reputational risks associated with failing to meet sustainable goals are significant for global brands. Managing traceability and reducing risks in supply chains is now a top priority. Consumers will no longer tolerate failures in protecting people and the environment.

Brands that do not meet sustainability standards risk losing consumer trust and facing backlash, leading to financial losses and reputational damage. By partnering with ECOCERT, brands can mitigate these risks by ensuring their products meet the highest standards of quality, safety, and sustainability. This enhances brand credibility and aligns with the growing consumer demand for transparency and ethical practices.

ECOCERT sets high standards and provides transparent certification, empowering consumers to make informed choices that benefit their health and the environment. This approach protects consumers from misleading labelling or fraudulent claims about the organic nature of products. Consumers are willing to pay premiums for organic foods based on their confidence in these attributes. The organic label is a critical factor in their decision-making process, assuring them of the product's authenticity and adherence to rigorous standards.

ORGANIC REGULATIONS IN THE EU AND IN SINGAPORE

Organic regulations help reduce greenwashing by requiring companies to disclose detailed information about their environmental practices, sourcing, and impacts. Standardised organic regulations facilitate international trade by ensuring that organic products meet consistent criteria across different regions. On 17 January 2024, the European Parliament formally endorsed its provisional agreement with the Council on the Directive Empowering Consumers for the Green Transition through Better Protection against Unfair Practices and Better Information ("Greenwashing Directive"). The Greenwashing Directive aims to contribute to the EU's green transition by empowering consumers to make informed purchases using reliable sustainability information about products and traders. To do so, the Directive introduces specific rules on sustainability and environmental claims. Companies should keep a close eye on the transposition of this Directive, as it will have a significant impact on how they communicate about their sustainability, environmental, and social or ethical efforts.

In Singapore, while there is no national organic certification system, the country recognises organic certifications from other countries. Imported organic products must meet the certification standards of their country of origin. The Singapore Food Agency (SFA) conducts checks and investigations to ensure compliance. According to Singapore's Food Regulations, food can only be labelled as "organic" if it has passed inspection and attained certification by a recognised certifying body, which follows the minimal measures stated in the Codex Guidelines. These guidelines are developed by the Codex Alimentarius Commission (CAC), a joint body of the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) of the United Nations.

ADVANCING THE GLOBAL ORGANIC MOVEMENT THROUGH PARTNERSHIPS

ECOCERT plays a vital role in the global organic agriculture movement and is closely aligned with the International Federation of Organic Agriculture Movements (IFOAM). IFOAM promotes an economic and social production model based on four main principles: health, ecology, fairness, and care. These principles support sustainable development by promoting practices that respect ecosystems, maintain biodiversity, and responsibly manage natural resources.

Through partnerships with organisations like IFOAM, ECOCERT advances the global organic movement, encouraging sustainable agricultural practices and supporting the transition to a more sustainable and equitable world.

ECOCERT Headquarters as a Model of Sustainable Architecture

Located in the region of Toulouse in the south of France, ECOCERT's flagship eco-building exemplifies its commitment to sustainability. Constructed from natural and local materials like wood and straw, the building produces more electricity than it consumes, making it a positive energy structure. This innovative design underscores ECOCERT's dedication to environmental responsibility and serves as a model for sustainable architecture. It has been awarded the International LEED Platinum certification, recognising it as one of the most environmentally-friendly buildings.

GROUP ECOCERT
Act for a sustainable world

ECOCERT
1 North Bridge Road | #08-01 | Singapore 179094
W: www.ecocert.com
T: +65 3138 5058

ESSEC BUSINESS SCHOOL

Preparing the Next Generation of Leaders to Drive Sustainability

ESSEC Business School, established in 1907 in France, is one of Europe's leading business schools, recognised for its strong focus on international education and research. The school holds the prestigious "triple crown" accreditation from AACSB, EQUIS, and AMBA, underscoring its global reputation for excellence.

The school expanded its global presence by establishing its Asia-Pacific campus in Singapore in 2005. This campus serves as a hub for business education in Asia, offering programmes like the Global BBA, Master in Management (MiM), Global MBA, and Executive MBA. The campus attracts a diverse student body from around the world, providing them with international exposure and opportunities to engage with the dynamic business environment in the Asia-Pacific region.

ESSEC Business School has long been a pioneer in integrating sustainability into its curriculum, notably through its Asian Strategy Consulting Project (ASCP). Through this project ESSEC exemplifies how academic institutions can contribute to sustainability. By integrating real-world consulting projects into its curriculum, ESSEC provides students with the skills and experience necessary to tackle pressing environmental, social and economic challenges. The ASCP not only educates students about sustainability but also empowers them to make a difference in their future careers.

THE ASIAN STRATEGY CONSULTING PROJECT (ASCP)

Launched in 2010, the ASCP is designed to give students hands-on experience in management consulting while addressing real-world business challenges. Since 2019, the ASCP has increasingly focussed on sustainability, reflecting the growing urgency of environmental issues worldwide.

The ASCP was established as a platform for ESSEC students from the Master in Management (MiM) programme to engage with companies across the Asia-Pacific region.

Initially focussed on various business problems, the project has evolved to prioritise sustainability issues, aligning with global trends and the Paris Agreement's goals. It is a three-month programme where students are matched with multinational corporations (MNCs), startups, and public sector organisations to solve real-world business problems. Each year, the MiM students work in teams to address diverse challenges, ranging from digital business model transformation to sustainability initiatives.

Learning by Doing: The Consulting Experience

A hallmark of the ASCP is its "learning-by-doing" approach. Students undergo rigorous training that mirrors the actual consulting process. This includes an intensive one-week consultancy course on consultation and sustainability, followed by extensive desk research, fieldwork, and business analysis. Students work closely with company stakeholders, conduct interviews, and develop recommendations which are presented to a jury at the project's conclusion.

This experiential learning model not only equips students with practical skills but also instils a deep understanding of sustainability in business contexts. For example, in one of the projects, a student team worked on

an electric vehicle go-to-market strategy, providing insights that could influence the broader industry. In another project, students developed a go-to-market strategy for using green materials in the construction industry in Cambodia. Such projects demonstrate how students can drive sustainability initiatives within diverse sectors.

Impact and Future Prospects

The ASCP's focus on sustainability has far-reaching implications. By working on projects that address critical environmental issues, students learn and at the same time contribute to solutions that can benefit society at large. For example, projects on electric vehicles and sustainable fashion provide insights that companies can leverage to enhance their sustainability strategies.

The ripple effect of these projects extends beyond the immediate outcomes. As students graduate and enter the workforce, they carry with them the knowledge and experience gained through the ASCP. This diffusion of expertise can help drive broader systemic changes in how businesses approach sustainability.

Bridging the Gap Between Academia and Industry

The ASCP has received positive feedback from both students and companies for its rigorous approach and high-quality work. The programme effectively facilitates the transition from theoretical learning to practical application, offering innovative solutions and fresh perspectives through student contributions. Industry professionals have recognised the relevance and impact of the research and recommendations provided, underscoring the programme's success in bridging the gap between academia and industry.

Expanding the Scope

Looking ahead, ESSEC aims to expand the scope of the ASCP, incorporating more projects that address pressing environmental and social issues. This expansion will provide students with even more opportunities to make a positive impact and drive sustainable change across various industries and regions.

Through strong corporate partnerships, a rigorous training programme, and a focus on impactful projects, the ASCP has set a benchmark for sustainability education. As the world continues to grapple with environmental issues, initiatives like the ASCP are crucial in preparing the next generation of leaders to drive sustainable change.

ESSEC BUSINESS SCHOOL

ESSEC ASIA-PACIFIC CAMPUS
5 Nepal Park I Singapore 139408
W: www.essec.edu
T: +65 6884 9780

ELECTROLUX GROUP

Shape Living for the Better

Electrolux Group is dedicated to shaping a better future by transforming the experiences associated with taste, care, and wellbeing. Our mission is to foster more enjoyable and sustainable living practices across the globe.

As a preeminent global appliance manufacturer, we place the consumer at the core of our operations, striving to deliver exceptional experiences within three primary innovation areas:

- Taste: Elevating culinary experiences through innovative kitchen solutions that empower consumers to prepare delicious meals with ease.
- Care: Enhancing garment care to ensure clothing maintains its quality and longevity, thus promoting sustainable consumption habits.
- Wellbeing: Creating products that contribute to a healthier home environment, supporting overall wellness and quality of life.

SUSTAINABLE AS A STRATEGY

Sustainable innovation in consumer experiences is at the heart of Electrolux's long-term growth strategy. By offering solutions that make food preparation more enjoyable, extend the lifespan of garments, and enhance wellbeing at home, we are dedicated to promoting responsible consumption and improving quality of life. To achieve these aims, we prioritise increasing operational efficiency through digitalisation, automation, and modularisation—key initiatives for boosting profitability and supporting sustainable growth in a dynamic market.

Electrolux was one of the first 100 companies worldwide to set a bold climate target approved by the Science Based Targets initiative in 2018. With our Scope 1 and 2 targets, we are working towards a 97% reduction in emissions by 2030 compared to 2015 levels. Additionally, we are signatories of the UN Global Compact Business Ambition for 1.5°C and the UN Cool Coalition agreement to phase out high global warming potential gases from refrigerants.

Additionally, our "For the Better 2030" framework addresses solutions across three key pillars: better company, better solutions, and better living, while aligning with the Global Reporting Initiative (GRI) and the UN Sustainable Development Goals (SDGs).

A CULTURE OF SUSTAINABILITY

At the factory level, Electrolux has established a Green Spirit team focussed on enhancing energy and water efficiency, reducing CO_2 emissions, and an Environment, Health, and Safety (EHS) team dedicated to upholding safety and environmental standards.

Mandatory training programmes aligned with Electrolux Group policies and the code of conduct are regularly updated. Many of these training modules specifically address aspects of social sustainability, ensuring that all employees are equipped with the knowledge and skills necessary to contribute to the company's sustainability objectives.

INNOVATING FOR A SUSTAINABLE FUTURE

Electrolux is guided by three strategic drivers that permeate all facets of its business: sustainable action, the creation of enhanced experiences, and a commitment to continuous improvement. Innovation serves as a key component across these drivers and is actively encouraged by leaders throughout the organisation.

Currently, over 60% of the energy used across all Electrolux group sites comes from renewable sources. Notably, the South Australian manufacturing facility has implemented a state-of-the-art electric furnace designed to operate entirely on renewable energy. This innovative furnace reduces overall energy consumption by approximately 70%, even during the demanding enameling process, which requires temperatures exceeding 900°C.

For the past decade, Electrolux has utilised Life Cycle Assessment (LCA) tools to evaluate the environmental impact of its products. This analysis has revealed that approximately 85% of a product's environmental impact occurs during its usage phase.

One area of innovation is the steam oven, which not only facilitates healthier meal preparation but also promotes resource-efficient cooking. By allowing cooking at lower temperatures, steam ovens enhance flavor and preserve essential nutrients.

Electrolux's "Truth About Laundry" report indicates that many consumers wash clothes unnecessarily to achieve a fresh feeling.

Washing machines equipped with steam technology enable consumers to refresh garments without requiring a full wash, utilising up to 90% less water and 30% less energy compared to a complete washing cycle.

BUILDING A SUSTAINABLE SUPPLY CHAIN

Electrolux maintains a strong commitment to integrating social sustainability into its supplier evaluation process, guided by compliance with the Electrolux Group Supplier Workplace Standard.

To enhance sourcing decisions, a Responsible Sourcing scoring model has been implemented globally. This model rewards and promotes suppliers demonstrating strong sustainability performance while addressing areas for improvement among underperforming suppliers. Last year, 742 suppliers were identified as critical and prioritised within the Group's Responsible Sourcing Programme.

A critical supplier is defined as one facing elevated risks associated with their operations, such as those located in high-risk areas or those with production processes that could lead to environmental, labour, human rights violations, or health and safety incidents.

To drive environmental performance among suppliers, Electrolux actively participates in the Carbon Disclosure Project (CDP) supply chain programme. In 2023, strategic Original Equipment Manufacturers (OEMs) within the Electrolux network were included in this initiative.

Additionally, in 2023, 34% of Electrolux's annual ocean cargo was transported using more sustainable fuels, such as biofuels derived from waste cooking oil. Since 2021, the company has achieved a reduction of over 85% in climate impact from air transport by shifting to lower-impact transportation modes. Electrolux continuously monitors and evaluates its environmental performance through a logistics dashboard, which now includes metrics on the use of more sustainable fuels.

PARTNERSHIP AND COLLABORATIONS TO LEVERAGE SUSTAINABILITY

Through its collaboration with Coolrec, Electrolux has successfully developed the world's first refrigerator made from 70% recycled plastic, which has been honoured with the European Plastic Recycling Award for "Automotive, Electrical or Electronic Product of the Year 2023."

In partnership with Stena Recycling, Electrolux is working to create new recycled materials derived from Waste Electrical and Electronic Equipment (WEEE), including materials sourced from household appliances.

To further advance its cooking products, Electrolux has teamed up with Merieux NutriSciences to assess food freshness and the impact of cooking technology on food lifespan and nutrient preservation across various cooking methods.

ELECTROLUX FOOD FOUNDATION

In 2016, Electrolux established the Electrolux Food Foundation with the mission to promote sustainable food choices and support individuals in need. By 2030, the foundation aims to inspire 300,000 people to adopt more sustainable cooking practices. As part of this initiative, Electrolux launched Replate.com, an engaging educational platform designed to foster sustainable food habits, including the Food Heroes project, which offers an open-source toolkit for educating children.

The foundation, in collaboration with its partners, plans to train 3,000 individuals through the Like a Chef Programme and educate over 9,000 culinary professionals via the Feed the Planet Sustainability Education course by 2030.

Originally, Electrolux aimed to donate 3 million meals to those in need by 2030; however, this goal was achieved seven years ahead of schedule. Consequently, the company has set a revised target of 6 million meals to be donated by 2030.

PRODUCT PERFORMANCE WITH A FOCUS ON EMISSION REDUCTION

In Europe, Electrolux recently launched the new EcoLine selection, featuring energy-efficient kitchen and laundry appliances, as well as the most efficient home care products available.

In 2022, Electrolux introduced the world's first refrigerator constructed with a 70% recycled inner liner. Since 2005, the company has achieved a 43% reduction in energy used per manufactured product, and in 2023, 60% of the total energy consumption in our operations was sourced from renewable resources. Additionally, Electrolux has improved water efficiency by 48% compared to 2015. In terms of product performance, there has been a 28% reduction in CO_2 emissions associated with the use of sold products compared to 2021.

SINGAPORE & ASEAN FOCUS

Electrolux's sustainability initiative in Singapore emphasises energy-efficient appliances and circular economy practices. The company focusses on four key areas: energy efficiency, circular economy strategies, sustainable supply chains, and community engagement. Through these initiatives, Electrolux is enhancing operational sustainability and contributing to a greener future for Singapore.

Electrolux

ELECTROLUX GROUP
351 Braddell Road | #01-04 | Singapore 579713
W: www.electrolux.com.sg

FRIESLANDCAMPINA

FrieslandCampina's Commitment to Nutrition and Waste Reduction in Asia

FrieslandCampina, one of the world's largest dairy companies, has a cooperative history spanning over 150 years. The company transforms milk into a wide range of dairy products and ingredients.

Royal FrieslandCampina N.V. is wholly owned by Zuivelcoöperatie FrieslandCampina U.A., a cooperative comprising 14,634 dairy farmers from the Netherlands, Belgium, and Germany. Through this cooperative, the member dairy farmers collectively own the company.

FrieslandCampina is committed to producing net climate-neutral dairy by 2050. The company is actively working to reduce its environmental footprint across its entire value chain. Its Climate Plan outlines the 2030 climate targets, the strategies for achieving them, and the methods for measuring and monitoring progress.

A SUSTAINABILITY FRAMEWORK BUILT AROUND NUTRITION, PEOPLE, AND PLANET

For FrieslandCampina Asia, sustainability ambitions focus on three key areas: Access to Nutrition, Nourishing Generations Without Waste, and Food Security through Local Milk Sourcing. These areas align with ESG goals, offering opportunities to make a tangible impact in local markets while creating value for the business.

Everything FrieslandCampina does is guided by its purpose: Nourishing by nature. The company is dedicated to providing better nutrition for the world and ensuring a good livelihood for farmers, both now and for generations to come. FrieslandCampina contributes to nutritious and affordable food for everyone, from young children to the elderly. By enhancing the availability and affordability of high-quality milk-based ingredients, the company positively impacts people's lives.

Delivering excellent nutrition must go hand-in-hand with taking the best possible care of the planet. As such, sustainability remains a top priority, with a focus on Environmental, Social, and Governance (ESG) aspects. This commitment not only grants FrieslandCampina its license to operate but also serves as a driving force for value creation.

FrieslandCampina's sustainability framework is built around three pillars: Nutrition, People, and Planet, each with clear goals and action plans.

Under 'Nutrition', FrieslandCampina continuously improves its products and makes them more accessible, ensuring that not a drop of milk is wasted in its supply chain. For 'People', the company supports the development of resilient local food chains and ensures that everyone involved in the value chain enjoys fair and inclusive working standards. Regarding the 'Planet', FrieslandCampina focusses on reducing its carbon footprint and enhancing its environmental impact by adopting circular packaging.

Access to Affordable Nutrition

In Asia, populations are growing, and societies are becoming increasingly affluent. Yet, despite this progress, many children remain malnourished. FrieslandCampina recognises this through its investment in the Southeast Asian Nutrition Surveys (SEANUTS). The recently completed study highlights a significant issue known as the 'triple burden' of malnutrition.

Malnutrition manifests in different ways across the region, with some children being stunted while others are overweight. Across the board, all suffer from some form of micronutrient deficiency. The triple burden of malnutrition means that many of these children will face developmental challenges, leaving them disadvantaged for the rest of their lives.

FrieslandCampina understands the goodness of dairy and its potential to transform lives. The company continually invests in understanding consumers' nutritional needs, ensuring its portfolio evolves to meet these requirements. FrieslandCampina is committed to addressing the triple burden of malnutrition by providing access to nutritious and delicious dairy products to as many children as possible. This involves making these products as nutritious and delicious as they can be both affordable and readily available, so every child has the opportunity to reach their full potential.

The company is dedicated to giving children a strong start to the day, promoting happier, healthier lives, advancing societal progress, and fostering a more resilient future.

Nourishing Generations Without Waste

With rapid urbanisation and increasing consumption levels in Asia, packaging waste has also grown. FrieslandCampina envisions a future where every pack it produces is responsibly managed, from its creation to collection and repurposing, with the aim of achieving circular packaging by 2050.

Currently, 86% of its packaging consists of cans and beverage cartons. While cans are widely recyclable and recycled at scale, the company is committed to advancing circularity in beverage cartons. By doing so, it aims to reduce its CO_2 footprint and pave the way for nourishing future generations without waste.

Local Milk Sourcing

FrieslandCampina's ambition for 2030 in Asia is to establish a comprehensive domestic milk supply strategy aligned with its ESG goals and business objectives. The focus in this region is on Food Security, Farmer Livelihood, and Responsible Farming.

Food Security: The company is working towards achieving self-sufficiency in local milk production by supporting the dairy farming industry in increasing domestic milk volumes. This also involves sourcing more from local farms while adhering to strict quality standards.

Farmer Livelihood: Through its Dairy Development programme, FrieslandCampina supports the livelihoods of local farmers by building sustainable farming capabilities and providing accreditation, which in turn enhances productivity and yield.

Responsible Farming: The company is committed to reducing the environmental impact of milk production by aligning with ESG goals. FrieslandCampina is focussed on lowering the carbon footprint of milk, implementing waste and water management systems at the farm level, and enforcing animal welfare and biodiversity policies in collaboration with local farms.

SUSTAINABLE INITIATIVES ACROSS ASIA: LEADING EPR, RECYCLING, AND CIRCULAR ECONOMY EFFORTS

FrieslandCampina Vietnam leads the way in implementing EPR laws by co-founding PRO VN in 2019 and establishing a collection and recycling partnership with Truong Thinh (collector) and Dong Tien (recycler) to manage used beverage cartons.

In Indonesia, FrieslandCampina has partnered with Repal to create 50,000 pallets from used packaging materials, particularly those that are lower value and more difficult to recycle. These pallets are now used in the new Cikarang plant.

FrieslandCampina Hong Kong (FCHK) collaborated with Carbon Wallet, a popular green rewards platform in the city, to launch a recycling reward programme in early April. Through this partnership, FCHK sponsors additional rewards in the Carbon Wallet app to encourage recycling among Hong Kong consumers, who can earn up to 10X points sponsored by BLACK & WHITE®, DUTCH LADY®, and LONGEVITY® by recycling dairy product packaging.

> Sustainable dairy plant spanning 35 soccer fields

FrieslandCampina's new plant in Cikarang, Indonesia, spans 25.4 hectares—equivalent to 35 football pitches—and is designed to process 400,000 kilogrammes of fresh milk daily. The facility will produce 700 million kilogrammes of dairy products annually, with the potential to increase output to 1 billion kilogrammes. Constructed in alignment with FrieslandCampina's Climate Plan targets, the plant will play a significant role in reducing greenhouse gas emissions. Green innovations, including biomass boilers, wastewater recycling, and a solar-paneled roof, will collectively achieve a 45 percent reduction in CO_2 emissions, a 22 percent saving in electricity, and a 25 percent reduction in water consumption.

FrieslandCampina
nourishing by nature

FRIESLANDCAMPINA AMEA PTE LTD
50 Raffles Place I #24-03/05 I Singapore 048623
W: www.frieslandcampina.com
T: +65 6580 0100

HERE TECHNOLOGIES

Driving Sustainability and Innovation in Location Technology

HERE has been a pioneer in mapping and location technology for almost 40 years. Today, HERE's location platform is recognised as the most comprehensive in the industry, powering location-based products, services, and custom maps for organisations and enterprises worldwide. From autonomous driving and seamless logistics to new mobility experiences, HERE enables its partners and customers to innovate while maintaining control over their data and ensuring privacy. Established in Singapore in 2006, HERE continues to lead the way in location technology.

NET-ZERO GOALS AND SUSTAINABILITY EFFORTS

The Sustainability Advisory Committee (SAC) serves as the central hub for HERE's ESG strategy and initiatives. Denise Doyle, HERE's Chief Product Officer, is the executive sponsor of the SAC and HERE's ESG programme. Established in 2021, the SAC was created to instil accountability and transparency on ESG topics throughout the company.

From an enterprise carbon footprint perspective, HERE's net-zero goals are validated and approved by the Science-Based Targets initiative (SBTi). Although SBTi requires net-zero scope 1+2 emissions by 2050, HERE has set a more ambitious target of 2035, recognising the urgent need to decarbonise operations. The baseline year for measurement, approved by SBTi, is 2019.

HERE conducts an annual greenhouse gas inventory to understand the main contributors and track progress towards the net-zero goal. In terms of scope 1+2 emissions, the largest contributor is office electricity (including heating and cooling). At a functional level, HERE collaborates with teams such as Real Estate, Enterprise Applications, and Data Acquisition to measure emissions reductions and implement initiatives to stay on the path to net-zero.

In 2023, HERE began transitioning offices to use 100% renewable energy. So far, the offices in Tampere (Finland), Eindhoven (The Netherlands), and all German sites have made this transition. Additionally, the Chicago office transitioned to 100% renewable energy in June 2023.

From a scope 3 perspective, the largest contributor to greenhouse gas emissions is purchased goods and services, particularly cloud computing, which is both emissions and water-intensive. HERE partners with vendors on various initiatives, including increasing vendor sourcing of renewable energy, shifting usage to more "green" geographies, reducing cloud usage, and moving to lower-powered processors. Since 2021, HERE's largest cloud compute vendor has been able to reduce emissions associated with HERE's usage by 88%.

ANNUAL OKRS AND KPIS FOR SUSTAINABILITY SUCCESS

Each year, HERE establishes OKRs (Objectives and Key Results), KPIs (Key Performance Indicators), and milestones across critical teams to advance its enterprise sustainability goals. Key objectives include delivering resources to help customers understand the HERE's sustainability-associated value propositions, enhancing overall gender balance and senior leadership gender balance within HERE, and refining HR processes such as onboarding after long-term leaves and conducting exit interviews. Additionally, HERE aims to identify and address systems and data gaps for reporting.

Specific metrics tracked include total greenhouse gas (GHG) emissions, emissions associated with office electricity, and the percentage of company vehicles that are electric and/or hybrid.

CORE VALUES AND THE IMPACT OF EMPLOYEE RESOURCE GROUPS

HERE upholds a set of Core Values that guide actions and define its culture; 'Be Bold', 'Be True', 'Learn Fast', 'Give Back' and 'Win Together'. The company aims to create a work environment where every employee can confidently say, "I belong at HERE."

In 2023, HERE had five Employee Resource Groups (ERGs) : EARTH, WIN (Women's Initiative Network), Pride, Vamos and Unity + Power.

EARTH (Environmental Action Rising Through HERE) comprises employees with a passion for environmental mindfulness. WIN's mission is to promote gender equality and support the career development of HERE's female employees. HERE Pride's mission is to foster a more inclusive world.

Vamos, an ERG with an empowering motto, aims to promote, support, and enhance talent growth within the LatinX community. Unity+Power seeks to advance and represent Black and African culture through professional development and engagement opportunities.

COMMITMENT TO SUSTAINABLE SOLUTIONS AND ELECTRIC VEHICLE TRANSITION

HERE has prioritised sustainability as a key product pillar, focussing on developing solutions that support the sustainable goals of its customers, particularly in the transition to electric vehicles (EVs). The company has created a range of products designed to address the needs of EV drivers, such as EV Charge Points and EV Range Factors.

Notable initiatives include collaborations with customers to implement sustainable solutions. For instance, HERE powers TRAXEN's iQ-Cruise, a cloud-based intelligent cruise control system that enhances fuel efficiency by 10%, while also improving safety and drivability. In partnership with PSA, HERE's solutions have contributed to a reduction of 10 million kilograms of CO_2 through the OptETruck system, which optimises the movement of trucks, drivers, and shipping containers in and out of the world's largest transshipment hub, leading to up to a 50% reduction in empty truck runs.

HERE also supports the HERMES Driver application, which results in a 10% reduction in CO_2 emissions by providing highly accurate navigation, multi-stop routes, and improved tour efficiency. Additionally, HERE has aided HOLCIM DIGITAL by integrating real-time location data into their ConcreteDirect application, saving 800,000 hours across 200,000 job sites and significantly reducing CO_2 emissions.

Through these initiatives, HERE demonstrates its commitment to advancing sustainable practices and facilitating the transition to electric vehicles.

COLLABORATIVE SOLUTIONS FOR SMART MOBILITY

HERE partnered with Iteris to create innovative smart mobility solutions, providing contextual awareness to address dynamic, real-world traffic challenges faced by public agencies, transportation engineers, transportation planners, infrastructure operators, and roadway construction teams.

Continental and HERE collaborated with IVECO to enhance safety and fuel-saving features in commercial vehicles using HERE maps designed for Advanced Driver Assistance Systems (ADAS), including data to comply with the EU's Intelligent Speed Assistance (ISA) requirements.

Bettermile, a provider of smart geospatial SaaS solutions, extended its partnership with HERE for dynamic route calculation and real-time tracking for last-mile parcel delivery. Murata Manufacturing Co., Ltd. integrated HERE map and traffic data into its traffic counter system to support traffic management efforts in Jakarta, one of the world's most congested cities. RGNT collaborated with HERE to create an exclusive electric vehicle-focussed motorcycle route planning and navigation system, enhancing the efficiency and range of RGNT's all-electric motorcycles.

COMMITMENT TO SUSTAINABLE SOURCING

HERE introduced a Sustainable Sourcing programme, evaluating its suppliers' sustainability performance, starting with the most critical suppliers. Suppliers are required to abide by HERE's stringent Supplier Code of Conduct, which stipulates human rights, working conditions, health and safety, environmental standards, compliance management systems, diversity, inclusion, and the necessity to abide by the laws and policies in relevant countries.

HERE has also implemented a supplier engagement strategy focussed on environmental, social, and governance issues, consisting of a double materiality assessment covering our entire value chain.

HERE's Conflict Mineral policy applies to all HERE employees and explicitly includes all external temporary labour, subcontractors, employees of outsourced service providers, suppliers, and business partners. The United Nations has found that the trade of certain rare earth minerals helps finance civil conflict in and around the Democratic Republic of the Congo (DRC), characterised by extreme levels of violence. These minerals include tin, tantalum, tungsten, and gold (commonly referred to as "3TG"), as well as other raw materials such as cobalt, regardless of their country of origin (collectively, "Conflict Minerals"). HERE is committed to ensuring that any Conflict Minerals used directly or in its supply chain are responsibly sourced and do not contribute to the financing of civil conflict.

COMMITMENT TO GLOBAL HUMANITARIAN EFFORTS AND SUSTAINABLE SOLUTIONS

HERE has been a dedicated partner of Rise Against Hunger and other international hunger relief organisations since 2017, supporting the mission of addressing food insecurity worldwide. Through this partnership, HERE has delivered approximately 1.2 million meals across 10 countries via 25 global events. This initiative has directly impacted around 5,500 lives in various communities and engaged over 6,000 volunteers.

HERE also prioritises corporate philanthropy in response to humanitarian crises, including donations to the Mexican Red Cross for Hurricane Otis relief and to the International Red Cross for medical assistance in the Israel-Hamas conflict.

HERE TECHNOLOGIES
1 Wallich Street | #37-01 I Singapore 078881
W: www.here.com
T: +65 3158 6767

ING

Putting Sustainability at the Heart of What They Do

ING is a leading European universal bank. Their more than 60,000 employees serve more than 38 million customers, corporate clients and financial institutions in over 40 countries. ING's purpose is to empower people to stay a step ahead in life and in business. In Singapore, ING has over 500 employees, and established its local office in 1987. For its Wholesale Banking clients, they provide specialised lending, tailored corporate finance, debt and equity market solutions, payments & cash management and trade and treasury services.

Committed to achieving net-zero greenhouse gas emissions in its lending portfolio by 2050 or sooner, ING also aims to mobilise €150 billion in sustainable finance annually by 2027.

SUSTAINABILITY AT ING

The biggest challenge society is facing is the climate crisis. If the world doesn't work together and act, it will result in devastating and lasting impacts on life as we know it.

ING consider themselves to be a pioneer in the financial sector and they have been working with sustainability across their business for many years.

They aim to put sustainability at the heart of what they do. Society is transitioning to a low-carbon economy. So are their clients, and so is ING.

Their biggest impact is with their lending portfolio, and they are aiming to steer the highest emitting sectors in their loan book with the Paris Agreement's goal to limit global warming to 1.5 degrees Celsius, or net zero greenhouse gas emissions by 2050.

With their inclusive approach they engage with clients to help them to become more sustainable instead of just offboarding them. They set and refine interim targets to help their clients in the transition to a net zero society. In this way, they are pursuing the goal to minimise global climate change.

STRIVING FOR NET ZERO IN THEIR OWN OPERATIONS

ING monitors and manages their environmental impact closely and they believe in being transparent about the climate impact of their operations.

They aim to source 100% renewable electricity each year for all ING buildings where they have management control worldwide, using RE100 technical criteria as a reference for reporting.

They are also improving the impact of their business travel, for example through electrifying their fleet. They remain committed to integrating sustainability in their procurement processes. Their science-based targets help keep them on track, and their Environmental Programme will help them meet these targets.

FINANCING TO SUPPORT GLOBAL CLIMATE GOALS

ING has financed and will continue financing green energy projects through green loans and bonds, sustainability-linked products and other innovative products and financing constructions. Sometimes the bank does say 'no' to companies, sectors and projects. Over recent years ING have taken important steps on their oil & gas policy, like no longer financing projects for new oil & gas fields and the infrastructure that supports them; and also deciding to completely phase out financing to upstream oil & gas by 2040. As announced in their Climate Progress Update 2024, they have recently taken the next move by stopping all new general financing to pure-play upstream oil & gas companies that continue to open new fields – so, including general corporate financing and bonds. ING also announced a next step on LNG driven by guidance from the International Energy Agency.

LNG is natural gas that gets cooled down to liquid to make it easier to transport. They will stop providing new financing for new LNG export terminals after 2025. ING is aiming to triple the financing for renewable energy by 2025 to €7.5 billion annually, up from €2.5 billion in 2022.

Terra, their internal transition management approach, guides them as they steer their portfolio towards the low-carbon technology and energy sources needed to reach net-zero goals. This includes hydrogen, carbon capture and energy storage and moving away from high-carbon technology and energy sources.

SUPPORTING CLIENTS IN THEIR TRANSITION

ING believes helping clients improve is more effective than excluding clients alto-

gether. They advise and finance clients who are working to make their businesses more sustainable.

They believe that an inclusive approach is the only way to make any meaningful positive impact. From climate to human rights and financial health, they seek to increase their impact through partnerships (such as co-creating climate alignment methodology with the 2° Investing Initiative) and coalition-building (like the Net-Zero Banking Alliance).

ING is taking an important step in measuring their progress to steer the most carbon-intensive parts of their loan book towards net zero by 2050 with their Terra approach.

They are including new data points into their systems that will allow them to analyse where their clients are on their road to climate alignment. This means they are integrating climate insights into their financing process on the client level.

Some examples of data points that will be included are whether their clients have net zero targets, intermediate 2030 targets, net zero transition plans and where they are on their convergence pathway.

Sectors in scope within Terra to date are power generation, oil & gas, automotive, aviation, shipping, cement, steel, aluminium, dairy, commercial real estate and residential real estate.

ALIGNMENT TO THE SUSTAINABILITY AGENDA IN SINGAPORE

ING's activities align with the Singapore Green Plan 2030, reflecting a shared commitment to achieving net zero. Recognising the need for systemic change, ING views that its role is to engage with and incentivise its clients to decarbonise their businesses and to increase the capital flows to the transition that is required to meet net-zero targets. This includes increasing the number of green loans for green buildings and renewable energy companies and providing sustainability-linked loans to Singapore-based companies. ING is widely recognised for its sustainable finance leadership globally as well as in the Asia Pacific region. It has been able to grow its sustainable finance business significantly each year over the past 5 years, having mobilised billions of USD in sustainable capital for clients in the Asia Pacific region.

Furthermore, ING's Transport & Logistics (T&L) Shipping Finance team actively engages with the maritime ecosystem in Singapore. ING's global head of Shipping is a member of the Maritime Advisory panel set up by the Ministry of Transport (MOT) and Maritime and Port Authority of Singapore (MPA), chaired by Singapore's Minister of Transport. ING further contributes to discussions on the strategic objectives for the maritime industry including the decarbonisation of shipping.

T&L Singapore's Shipping Finance team has been involved with MPA, PSA, SSA over the years and is a part of the Shipping Energy Transition and other industry roundtables. ING APAC's head of Transport & Logistics has been a council member of the Singapore Shipping Association (SSA) and was the Chairman of the Ship Finance committee for the SSA from 2021 to 2023.

Additionally, ING stands out as the only commercial bank involved in the Silk Alliance - Green Corridor, a regional green corridor cluster in Asia based in Singapore, with MPA and PSA as key members. As the lead for the Finance work stream, ING works closely with the members of the alliance including leading shipping companies such as Pacific International Lines (PIL), Mediterranean Shipping Company (MSC), X-Press Feeders and Wan Hai Lines to evaluate financing solutions to accelerate the transition.

ING, through its global network, is also connected to the Port of Rotterdam which has its own green corridor initiative and is an important partner to Singapore.

ING is a founding Member of the Poseidon Principles which aims to drive the industry towards low carbon alternative fuels and enable the decarbonisation of shipping in line with pathways proposed by IMO (The International Maritime Organization).

At a global level, ING takes on a leadership role as the Treasurer of the Poseidon Principles and also serves as the Chair of the Technical Committee, with the latter role based in Singapore. The Shipping team leverages on this position by sharing relevant information and insights with stakeholders, clients and prospects in the region.

Through these initiatives, ING demonstrates its dedication to fostering sustainable practices in alignment with Singapore's ambitious environmental goals.

GREENKNOT, PIONEERING A SUSTAINABILITY PLATFORM OUT OF SINGAPORE

One of ING's key initiatives, developed out of Singapore, is 'GreenKnot,' a sustainability management platform designed to support the sustainability transition of ING's shipping clients. GreenKnot helps ship financiers understand the drivers of shipping emissions, manage progress towards decarbonisation goals, evaluate alternative fuel technologies, and conduct portfolio impact analyses for financing decisions.

GreenKnot's integration within the T&L Shipping Team positions ING as a sustainability leader.

ING's Award-Winning Leadership in Sustainability-Linked Financing

ING has recently been recognised by Global Finance Magazine in their Sustainable Finance Awards 2024 as the "Best Bank for Transition/Sustainability Linked Loans in Asia Pacific". This recognition demonstrates the key role ING plays in helping their clients in their transition towards a low-carbon society and steering their financing towards meeting global climate goals.

ING in APAC has also won a number of deal specific awards at The Asset Triple A Sustainable Finance Awards 2024 and The Asset Triple A Sustainable Infrastructure Awards 2024, further demonstrating their commitment to sustainability.

ING BANK N.V. SINGAPORE BRANCH
1 Wallich Street | #12-01 Guoco Tower | Singapore 078881
W: www.ingwb.com
T: +65 6535 3688

JUNGHEINRICH

Committed to Delivering Sustainable Material Handling Solutions

Jungheinrich's Asia-Pacific (APAC) headquarters, located in Singapore, spearheads operations across the region with seven direct sales companies and over fourteen partner companies. In the APAC region, Jungheinrich offers an extensive range of electric material handling equipment, including pallet trucks, stackers, order pickers, reach trucks, forklifts, and very narrow aisle (VNA) trucks. The company also provides advanced racking systems and intralogistics solutions such as Automated Guided Vehicles (AGVs).

Jungheinrich's solutions in the APAC region are supported by a robust Key Account and After Sales setup, complemented by a regional training and spare parts centre in Singapore, established in 2001. The company has identified six key focus areas for sustainable action: Climate Neutrality, Eco-Efficiency and Circular Economy, Sustainable Business Models, Products and Services, Employees and Societies, and Governance. These initiatives underscore Jungheinrich's dedication to sustainability and responsible corporate practices.

AN AMBITIOUS ROADMAP TO SUSTAINABILITY AND CLIMATE NEUTRALITY

Jungheinrich has set ambitious targets to contribute to climate neutrality. By 2030, the company aims to achieve net zero greenhouse gas emissions for Scope 1 and 2, and by 2050, net zero emissions across Scope 1, 2, and 3, in accordance with the Science Based Targets initiative (SBTi).

To reduce resource and energy consumption, Jungheinrich targets 0% landfill waste worldwide by 2030 through internal processes and established recycling systems. The company is committed to providing intralogistics with sustainable products and solutions, aiming to boost revenue with sustainable products in line with the EU Taxonomy Regulation.

Promoting the health and safety of employees is another key focus, with a target to improve the lost time injury rate (LTIR) to 12.5 by 2025. Jungheinrich also ensures transparent and sustainable procurement, aiming for 80% of global relevant purchasing volume to be "sustainable spend" by 2025.

Jungheinrich strives to achieve top ratings as proof of its sustainability performance, with key performance indicators including being awarded in the world's top 1% of sustainable companies by EcoVadis for three consecutive years, along with recognition from CDP, MSCI ESG Ratings, and ISS ESG, aligned with its comprehensive sustainability targets.

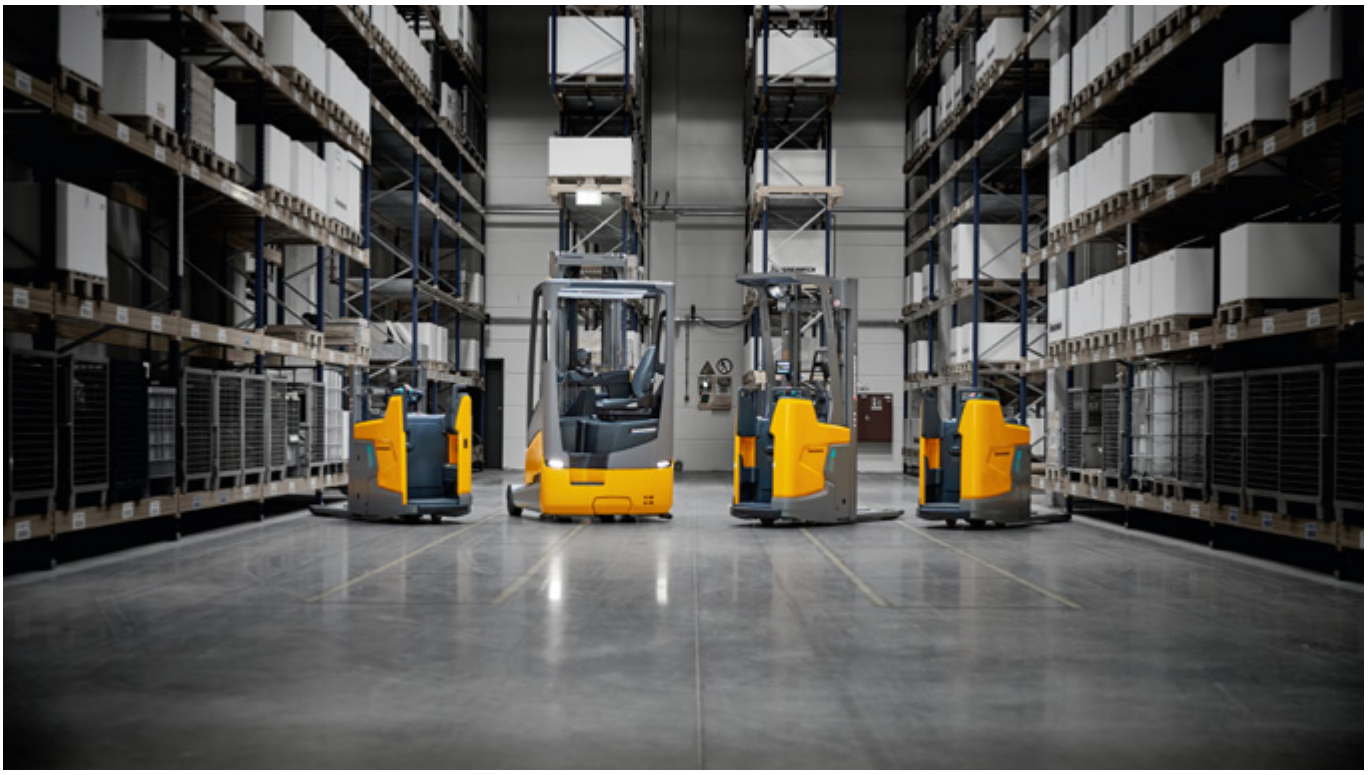
SUSTAINABLE SOLUTIONS: ZERO EMISSION VEHICLES AND COMPONENTS

Jungheinrich's POWERLiNE truck series sets a new standard in innovation and sustainability with its integrated lithium-ion battery and advanced ergonomic design. POWERLiNE vehicles maintain a CO_2 e-neutral footprint up to the point of delivery, thanks to production powered by renewable energy sources and ongoing efforts to reduce energy consumption during manufacturing. Unavoidable emissions are offset by investing in high-quality climate protection projects.

In Kuwait, Jungheinrich's zero-emission components have facilitated the construction of the world's first automated vertical farm. In the APAC region, notable projects include the implementation of a fully automated warehouse at a third-party logistics company in Singapore, showcasing Jungheinrich's commitment to advanced, sustainable intralogistics solutions.

LITHIUM-ION TECHNOLOGY

With over 70 years of expertise in electric mobility and a decade in lithium-ion technology, Jungheinrich stands at the forefront of sustainable innovation, being the first manufacturer to integrate lithium-ion technology into forklift trucks. Their products equipped with lithium-ion technology emit around 20% less CO_2e compared to lead-acid batteries, offer a longer lifespan, and can be refurbished or reused in a cradle-to-cradle approach. By 2025, 50% of Jungheinrich trucks delivered to customers will be fitted with lithium-ion batteries.



Transforming High Emission Industries Through Sustainable Intralogistics

Sustainable intralogistics plays a crucial role in transforming high-emission industries. Globally, over 35 billion tonnes of CO_2e are emitted annually (Global Carbon Project 2021), with intralogistics responsible for approximately 4% of these emissions (Fraunhofer 2022). Although this is a relatively small proportion, intralogistics products and solutions significantly impact key high-emission sectors such as transport, logistics, manufacturing, trade, and agriculture. For instance, the transport sector alone accounts for 20% of global emissions (EDGAR/JRC 2021).

Jungheinrich's lithium-ion batteries consume approximately 20% less energy in daily use compared to lead-acid batteries. When powered by green electricity, CO_2e emissions from lithium-ion trucks can approach zero during the use phase. Additionally, using a refurbished truck can save around 80% CO_2e compared to a new one. To support this, Jungheinrich has established a dedicated refurbishment hub in Bangkok, Thailand, which has refurbished over 1,000 forklift trucks in APAC since its opening.

PROACTIVE SUPPLIER MANAGEMENT FOR SUSTAINABLE SUPPLY STABILITY

Engaging suppliers in a holistic and proactive supplier management strategy is central to Jungheinrich's supply stability. Existing and new suppliers are risk-classified based on ecological, economic, and social criteria. To enhance transparency among relevant suppliers, Jungheinrich conducts a sustainability self-assessment with the support of the Integrity Next platform.

Already, 700 suppliers have participated in this voluntary assessment, which covers key areas such as anti-corruption and anti-bribery, occupational safety, energy management, conflicts of interest, human and labour rights, environmental protection, and supply chain responsibility.

Jungheinrich's Sustainability Efforts in Asia

Jungheinrich promotes energy-efficient solutions for material handling, offering customers the latest electric equipment technology and fully automated warehouse systems that consume less energy. Continuous innovation in product design at the China plant aims to make products more eco-friendly by using recycled materials.

Jungheinrich fosters sustainable living through hybrid working arrangements, allowing employees to work remotely up to 60% of the time, thereby reducing commuting-related CO_2e emissions. The company encourages the use of public transport (MRT) and has initiated tree planting projects in Singapore, Malaysia, Thailand, and India. For every internal combustion truck replaced, Jungheinrich plants a tree, resulting in over 2,000 trees planted to date, with a further 2,500 trees planned in 2024 across APAC.

JUNGHEINRICH

JUNGHEINRICH LIFT TRUCK PTE LTD (JUNGHEINRICH AG)
7 Joo Koon Way I Singapore 628945
W: www.jungheinrich.com.sg
T: +65 6558 7600

LOMBARD ODIER

Rethink Everything

At Lombard Odier, the aspiration is to be the innovative bank of choice for private and institutional clients seeking a tailored, sustainable approach to wealth and asset management. Since 1796, the bank has served its clients across seven generations, delivering over 220 years of stability through more than 40 financial crises. Lombard Odier offers wealth management services to private and institutional clients in the region through its offices in Singapore, Hong Kong, and Tokyo, as well as to the clients of its Strategic Alliances with leading financial institutions in the region.

Lombard Odier's global team of wealth planners, bankers and investment experts work in close collaboration to provide truly holistic, tailored services. The bank's award-winning single, global banking platform offers clients a secure and integrated financial management tool. As a private partnership that emphasises long-term thinking, Lombard Odier has integrated ESG criteria into its investments since 1997.

CLIC® ECONOMY IS UNDERWAY

Lombard Odier Investment Managers (LOIM) is the institutional asset management business of the Lombard Odier Group. Through LOIM, the firm provides a range of investment solutions to a diverse group of long-term oriented clients. Sustainability is central to its investment philosophy; it believes sustainability is the founding principle of long-term economic and investment outcomes and will drive returns over the long term.

Lombard Odier believes that the shift to a Circular, Lean, Inclusive and Clean Economy – which it refers to as the CLIC® Economy – is underway and that it is creating unrivalled investment opportunities for investors focussed on this space.

Shared solutions and cascading effects across the economy mean that companies may unlock business opportunities across different sectors, redrawing the structure of our economy. Entire value chains will be reshaped, supported by policy, innovation and market forces, and this will create new structural growth opportunities.

This transition is unfolding through a series of system changes and the company believes it is critical to invest based on a conviction as to the end-state of the transition and how we get there. To do this, Lombard Odier and its longstanding research partner, Systemiq, announced the launch of holistiQ, the sustainable investing unit of Lombard Odier Investment Managers, in June 2023. The team of experts at holistiQ come from diverse backgrounds in a range of fields, including investment specialists, scientists, geospatial analysts and people with experience in different areas of business, government, consulting and finance. This unique mix of experience delivers detailed, science-backed research, focussed on accelerating system changes and accessing new profit pools and new markets for investors.

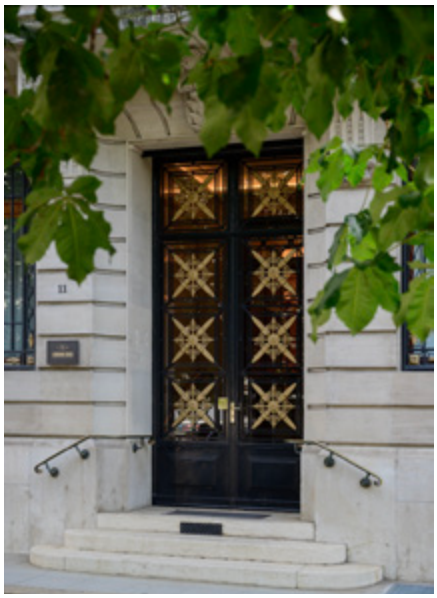
Being at the Frontier of the Sustainability Transition

Lombard Odier believes that as a core part of this work, it must address two fundamental questions related to the transition. First, to evaluate which companies are sustainable by assessing their alignment with the transition. This ultimately involves determining whether a company has a positive or adverse impact and whether it is accelerating or impeding the transition. Second, to examine how companies are financially exposed to the transition. This involves assessing their potential risks and returns to determine whether the transition serves as a tailwind or a headwind. This evaluation can be approached from the perspective of risk management and promoting resilience within a portfolio, or as a potential source of additional returns. Ultimately, the aim is to be at the frontier of the shift towards a more productive, sustainable economy.

JOINING FORCES FOR SUSTAINABLE INITIATIVES

Lombard Odier's sustainability focus is embedded in its investment philosophy and research partnerships, which include the University of Oxford, the Alliance to End Plastic Waste and the Circular BioEconomy Alliance, among others.

In terms of membership certifications and signatories to sustainability initiatives, this includes being the first B Corp certified global wealth and asset manager, a private ESG performance certification of for-profit companies based on the company's ability to meet social and environmental performance standards, accountability standards and disclose information, a signatory of Climate Action 100+ and the UNPRI, and more.



MONITORING THE ENVIRONMENTAL IMPACT

As a certified B Corp since 2019, the firm considers the social, environmental, and economic impacts of its actions on all stakeholders. Committed to achieving net zero for its own operations by 2030, Lombard Odier is guided by its Corporate Sustainability team, which has developed a plan to achieve this goal by addressing the material impact areas of its carbon footprint and involving all offices globally, using 2019 as the baseline year. Lombard Odier's main KPIs for carbon footprint include CO_2 emissions related to business travel, energy consumption, waste and treatment, and supplier expenses.

Additionally, Lombard Odier's B Impact Assessment, conducted every three years as part of the B Corp recertification process, provides KPIs and metrics to monitor impact in five key areas: governance, employees, environment, community, and customers.

In 2023, Lombard Odier's global carbon footprint from its own operations was 8,375 tonnes CO_2, a reduction from 9,160 tonnes in 2019, the baseline year which has been restated to include additional emission sources. The company's efforts to reduce emissions—across travel, energy, waste management, supply chain, employee commuting, and air conditioning—thus have a direct environmental impact.

A Broader Social Impact

In HR, Lombard Odier tracks several key metrics, including the percentage of senior managers who are women, the gender distribution across all staff, the number of promotions, average employee tenure, participation in the annual global employee survey, and the percentage of employees engaging in training programmes.

Diversity efforts within HR have a broader social impact, as gender diversity and equal pay align with the CLIC® economy and social framework. Additionally, the employee volunteering day provides an opportunity for staff to contribute directly to social or environmental initiatives within their local communities.

SUSTAINABILITY COMMITMENTS ACROSS THE ENTIRE VALUE CHAIN

In 2021, Lombard Odier published its Supplier Code of Conduct, reaffirming its commitment to ensuring that all suppliers align their business practices with the Ten Principles of the UN Global Compact. The firm's dedication to reducing Scope 3 carbon emissions across its value chain inherently places pressure on partners and suppliers to support the achievement of its emissions reduction goals.

Lombard Odier is also committed to maximising the circularity of its devices to address the growing challenge of electronic waste. The firm sells or donates old devices to partner organisations and manufacturers, such as the L'Institut de Formation et d'Appui aux Initiatives de Développement (IFAID) mission in the Democratic Republic of the Congo, Uganda Connect, Actions et Travail Social Hors Murs (BUPP), and other humanitarian projects organised by local schools.

Strategic Alliances in Asia Pacific

Lombard Odier has established onshore Strategic Alliances with some of the region's leading financial institutions, in markets including Singapore, Thailand, the Philippines, Japan, Taiwan and Australia. Today, alongside Lombard Odier, they form an Ecosystem of Strategic Alliances.

Sustainability is a top priority for Lombard Odier's Strategic Alliances, with the Ecosystem firmly committed to raising awareness of Net Carbon targets across the region.

Headquartered in Singapore, the firm is committed to helping Singapore be positioned as a leading hub for green finance and services, supporting Asia's transition to a low-carbon and sustainable future.

> Lombard Odier received the 2019 Green Mark Office Interior (Gold) Award from the Building and Construction Authority of Singapore. In March 2019, the firm introduced a Sustainable Purchasing policy, replacing stationery and cleaning products to those with green labels / from certified sustainable resources (where the cost is reasonable and affordable).

Additionally, posters and labels were placed throughout the office to raise awareness of environmental sustainability.

LOMBARD ODIER
9 Raffles Place | #46-02 Republic Plaza | Singapore 048619
W: www.lombardodier.com
T: +65 6305 7788

LUFTHANSA GROUP

Pioneering the Future of Sustainable Aviation

Lufthansa Group is a leading aviation conglomerate with a global presence and is the largest airline group in Europe. In the fiscal year 2023, the Group, boasting 109,000 employees, achieved revenue of EUR 35.4 billion. Structurally, the Lufthansa Group encompasses two main segments: Passenger Airlines and Aviation Services. Aviation Services includes the logistics and MRO (maintenance, repair and operations) segments, alongside additional businesses units including Lufthansa Systems and Lufthansa Aviation Training.

COMMITMENT TO ACHIEVING CO_2 NEUTRALITY

Lufthansa Group was the first European airline group to set a scientifically-based reduction target in alignment with the Paris Climate Agreement of 2015. Through fleet optimisation, operational efficiency, and the increased use of Sustainable Aviation Fuel (SAF), Lufthansa Group aims to halve net CO_2 emissions by 2030. This goal is certified by the independent and internationally recognised Science Based Targets initiative (SBTi), which aims to lead the way towards a zero-carbon future. Lufthansa Group also aspires to achieve CO_2 neutrality by 2050 and actively participates in initiatives to eliminate single-use plastics, reduce food waste, and increase waste recycling.

SWISS, FRONTRUNNER IN ENVIRONMENTAL MANAGEMENT

SWISS, a Lufthansa subsidiary, has made significant strides in environmental management for the 2023 reporting year. The airline's environmental management system has received its first validation under Europe's Eco-Management and Audit Scheme (EMAS). This milestone has also garnered the prestigious international ISO 14001 certification for environmental management systems. In light of these achievements, SWISS will start publishing an annual environmental report. This report aims to highlight the airline's commitment to sustainable and responsible business practices, ensuring transparency and accountability in their environmental efforts.

The AeroSHARK Technology

AeroSHARK is a durable bionic film that mimics shark skin and optimises airflow, leading to significant fuel savings. Using sharkskin technology, global long-haul aircraft fleets can potentially save nearly five million tonnes of kerosene annually.

In collaboration with BASF, a leading global chemicals and coatings manufacturer, Lufthansa has developed this functional biomimetic technology. The film features a barely perceptible ribbed texture of small protrusions known as riblets. Sized in patches for easy and targeted application, the film contains millions of prism-shaped riblets, each 50 micrometres high. When applied to the aircraft in a specific manner and aligned with the airflow, the riblets reduce friction, achieving efficiency gains similar to those in nature, and can also improve lift if attached to the wings.

The riblet film is easy to apply (even on large commercial aircraft), is highly resilient, withstanding large temperature shifts, pressure differentials, and ultraviolet radiation at high flight levels.

Sustainable Fleet Management

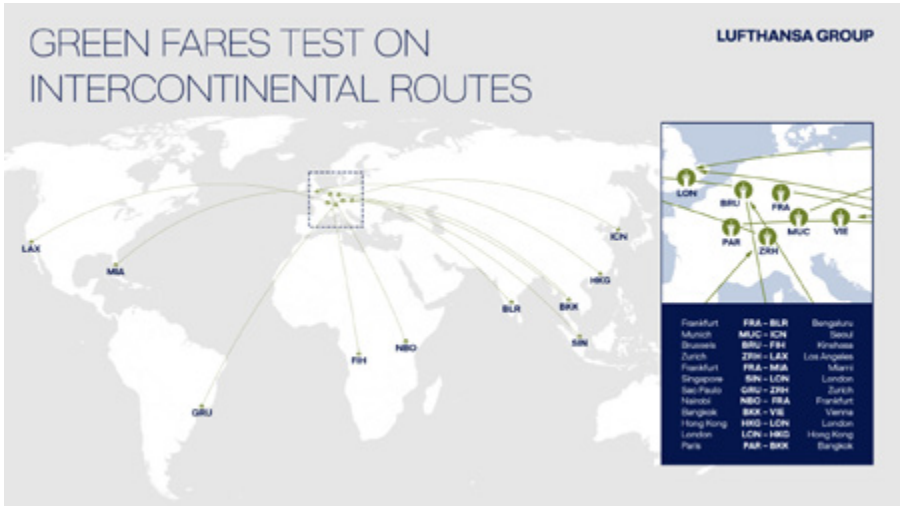
In collaboration with Airbus and Boeing, Lufthansa Group is pioneering sustainable fleet innovations for the future. By adopting practices such as flying more direct routes and implementing real-time calculations for optimal routings and altitudes, Lufthansa Group is minimising fuel consumption and CO_2 emissions. Additionally, when retiring an aircraft from its fleet, Lufthansa Group ensures it is either sold to another airline for continued operation or responsibly recycled. This collaboration aims to advance sustainable practices in aviation, enhancing operational efficiency during flight and ensuring responsible management of aircraft at the end of their service life.

Sustainable Aviation Fuel

Advancing the production of Sustainable Aviation Fuel (SAF) is a key priority for Lufthansa. In partnership with fuel providers and companies like Synhelion, Lufthansa is at the forefront of innovative solutions. Notably, Lufthansa was the first airline to produce SAF from solar energy and operate a flight using solar fuel, marking a significant breakthrough in eco-friendly aviation. Collaborating closely with travel agencies and corporations, the airline is actively promoting the adoption of SAF.

REDUCING SINGLE-USE PLASTIC AND FOOD WASTE

In collaboration with its catering partners, Lufthansa Group is focussed on reducing single-use plastic and minimising food waste. Lufthansa Group is also committed



to reducing in-flight food waste through continual improvements in catering practices, ensuring a reduction in food waste and contributing to a more sustainable in-flight experience.

GREEN FARE

Lufthansa Group has pioneered a groundbreaking initiative in the aviation industry with the launch of Green Fares. These fares are designed for environmentally conscious travellers by integrating sustainability into the ticket pricing structure. The Green Fares have proven particularly effective in boosting sales in regions with a strong focus on sustainability, such as the Nordic countries, Germany, and the Netherlands. This initiative not only appeals to eco-minded passengers but also stimulates domestic travel by providing a greener travel option.

Building on their success in Europe, Lufthansa has expanded the Green Fares to Asia, with Singapore as a key testing ground. This expansion aims to meet the growing demand for sustainable travel options among environmentally aware travellers in the region.

TRANSPORTATION

Lufthansa Group is enhancing its intermodality efforts by integrating various modes of transportation. This approach combines air travel with local land transport options, expanding destination choices for travellers and improving overall travel efficiency and convenience.

Through these comprehensive efforts, the Lufthansa Group is setting a new standard in the aviation industry, offering innovative and sustainable travel solutions that cater to the growing demand for eco-friendly options.

EMPOWERING YOUNG PEOPLE AND FOSTERING A CULTURE OF SUSTAINABILITY

Founded in 1999 by Lufthansa Group employees, help alliance has been a non-profit limited liability company under the Lufthansa Group umbrella since 2017. It is dedicated to providing young people worldwide with access to education and empowering them to lead self-determined lives. With the support of Lufthansa's volunteer project coordinators and supporters, the airline remains committed to creating a self-determined future for disadvantaged individuals with personal conviction and passion.

Additionally, the company fosters a culture of sustainability among its workforce through various training programmes and initiatives, ensuring all employees are equipped to integrate sustainable practices into their work.

COLLABORATION WITH SINGAPOREAN AND REGIONAL AUTHORITIES AND STAKEHOLDERS

In Singapore and the ASEAN region, Lufthansa Group is dedicated to promoting sustainability awareness, advocating for green aviation policies, and encouraging the use of Sustainable Aviation Fuel (SAF). The company actively collaborates with local partners, government authorities, and industry stakeholders to advance sustainability in aviation. This strategy aligns with initiatives like the Singapore Green Plan 2030, with Lufthansa Group actively participating in the design and implementation of regional sustainability objectives and plans.

LUFTHANSA GROUP

LUFTHANSA GROUP
390 Orchard Road | #13-01 Palais Renaissance | Singapore 238871
W: www.lufthansagroup.com

MAINSTREAM RENEWABLE POWER

Delivering a Sustainable Future with Renewable Energy

Mainstream Renewable Power develops, constructs, and operates solar, onshore wind, and offshore wind assets across Europe, Latin America, Africa, and the Asia-Pacific region. With a global pipeline of 23.9 GW, including 1.0 GW in operation, and 400 employees working across five continents, Mainstream delivers renewable energy solutions and creates pathways to energy security and net-zero targets. Founded in 2008, it has built up significant industry expertise and by sharing this with industry players, it has become a trusted partner in helping to create pathways to net zero.

DEDICATED TO ADVANCING RENEWABLE ENERGY

By building large-scale wind and solar farms, Mainstream generates clean, reliable, and affordable energy, thereby curbing CO_2 emissions and promoting sustainable development.

The company is on a mission to lead the global transition to renewable energy, with sustainability at the core of everything it does. From asset development to construction and operation, and in their collaborations with partners, all activities are carried out with sustainable practices in mind. Central to this mission is the company's contribution to six of the United Nations' Sustainable Development Goals: Quality Education, Gender Equality, Clean and Affordable Energy, Decent Work and Economic Growth, Climate Action, and Peace, Justice, and Strong Institutions.

In developing projects, the organisation is dedicated to creating positive, long-term value for stakeholders and society through socially and environmentally sustainable development. For the past six years, the Annual Sustainability Report has provided a comprehensive summary of the company's achievements and targets in sustainability practices throughout its business.

INNOVATION IN RENEWABLE ENERGY

Mainstream delivers large-scale renewable energy assets that displace the demand for fossil fuels, thereby reducing greenhouse gas emissions and accelerating the transition to a climate-safe future. For example, last year, Mainstream's renewable energy production contributed to avoiding 595,205 tonnes of CO_2 emissions.

The company has also implemented a process to develop science-based targets for emission reductions and has submitted a letter of commitment to the Science Based Targets initiative (SBTi), a corporate climate action NGO. By the end of 2025, Mainstream will submit its emissions reduction targets, in line with a net zero trajectory, for verification by the SBTi.

As a leader in the energy transition, Mainstream aims to turn sustainability innovation into a competitive advantage by incorporating climate- and nature-positive solutions in its projects. As part of its innovation efforts,

the company seeks to drive the development and implementation of digital solutions to understand and reduce environmental impacts and associated costs in the renewable energy industry.

IMPACT ON BIODIVERSITY

One million species are currently at risk of extinction, according to the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES). Mainstream's mission to lead the global transition to renewable energy means it is fully committed to combating climate change. However, with climate change projected to become the strongest driver of biodiversity loss in the coming decade, the organisation is working systematically across its business to construct and generate renewable energy in the most sustainable way, with the ultimate goal of contributing to biodiversity net gain.

Mainstream works to avoid, reduce, restore, and replace impacts on biodiversity, in that order. The organisation assesses whether or not projects should be implemented, and how they should be carried out, in accordance with the mitigation hierarchy for impacts on biodiversity.

For example, before starting construction on a Solar PV facility in the Free State Province of South Africa, Mainstream conducted a 'search and rescue' exercise for any at-risk plant species that might have been located on the proposed site. While no threatened

plant species were discovered during the site survey, several species protected under local conservation laws were identified. The objective was to identify, remove, and where possible, rescue or relocate species of concern, other rare species, or plants that can help relocated species thrive in their new locations.

Activities such as this ensure Mainstream stays true to its core value of Sustainability, while protecting South Africa's precious flora and adding to the country's capacity for clean, affordable, renewable power.

COMMITMENT TO GOOD GOVERNANCE

Mainstream is dedicated to creating long-term value for shareholders, local communities, and the planet with integrity and respect. Good governance systems ensure economic, environmental, and social impact while monitoring risk and identifying new opportunities.

Mainstream's compliance programme is grounded in the Company's Code of Conduct, Sustainability Policy, and Speak Up Procedure. These documents establish the minimum standards for integrity and compliance within Mainstream. Additional governing documents provide further guidance on business ethics and integrity. The comprehensive, risk-based compliance programme includes regular integrity risk assessments and internal monitoring to detect potential issues. It aims to prevent, identify, and address unlawful conduct, ethical misconduct, and adverse impacts on human rights within Mainstream's operations and supply chain.

ENGAGED IN LOCAL COMMUNITIES

Mainstream actively engages with a diverse range of stakeholders, including governments, business leaders, policymakers, suppliers, and most importantly, local communities. It invests in community initiatives that enhance employment, education, healthcare, and the local environment sustainably.

Mainstream has a long-standing record of collaborating with community leaders to identify projects that will provide the most significant benefit to the community. The resulting Community Investment Plans consider each project phase and aim to establish a long-term roadmap that ensures the social licence to develop, build, and operate the project. Last year, Mainstream invested EUR 1.2 million in such projects across South Africa, Chile, Vietnam, and the Philippines, benefiting around 30,000 people. These initiatives help strengthen local licences to operate and ensure a sustainable impact in the markets served.

A PLEDGE TO TRANSITION AWAY FROM FOSSIL FUELS

Mainstream is well-placed to play a leading role in meeting the ambitious deployment targets set for the wind and solar industries, as it strives to build a sustainable future for the world.

In 2023 nearly 200 countries pledged to transition away from fossil fuels at the COP28 climate change conference. This marked the first time COP nations identified fossil fuels as a leading cause of the climate crisis.

At the same summit, members committed to working together to triple the world's installed renewable energy generation capacity to at least 11,000 GW by 2030. Mainstream wholeheartedly welcomes these pledges and joined as a signatory in a letter to President Sultan Al Jaber and all parties, urging for a 1.5C aligned outcome in response to the global stocktake.

Mainstream is positioned to play a leading role in delivering ambitious deployment targets set for the wind and solar industries, striving to build a sustainable future for us all.

MAINSTREAM RENEWABLE POWER

MAINSTREAM RENEWABLE POWER ASIA HOLDINGS PTE LTD
391B Orchard Road I Level 22 I Ngee Ann City Tower B | The Great Room | Singapore 238874
W: www.mainstreamrp.com

NATIXIS

At the Forefront of Sustainable Finance and Climate Impact Management

Natixis Corporate and Investment Banking (CIB) is a leading global financial institution with a strong presence in close to 30 countries. Operating within the Global and Financial Services division of Groupe BPCE, the second-largest banking group in France, it offers a comprehensive suite of services including advisory, investment banking, financing, corporate banking, and capital market services to corporations, financial institutions, financial sponsors, and sovereign and supranational organisations. This includes green and sustainable products and services.

Natixis CIB has a dedicated Green and Sustainable Hub (GSH), established in 2016, to guide its transition and that of its clients towards sustainability.

GREEN WEIGHTING FACTOR

Natixis CIB was one of the first banks to measure the climate impact of its banking portfolio and to commit to aligning its balance sheet to well below 2°C, in line with the Paris Agreement. To accurately track and steer the climate impact of its activities, the GSH developed the Green Weighting Factor (GWF) in 2017. The GWF is an internal climate-oriented tool that assigns a rating at the project/asset or general-purpose level. The rating is based on a seven-colour scale (ranging from dark brown to dark green) and is applied to the risk-weighted asset of each transaction. This system essentially incentivises green financing and penalises negative climate impacts. Since its rollout, the GWF has evolved from an innovative, operational, deal-by-deal decision-making tool to an effective transition steering mechanism.

Content Creation and Research

Content creation and research are key differentiators of the GSH, which has established the Centre of Expertise and Innovation. This involves analysing sustainability needs and emerging trends in sustainable finance markets (such as transition plan assessment, climate change adaptation, strategic autonomy, and nature), monitoring and assessing advancements in sustainable finance regulations and taxonomy development across the European Union, the Americas, Asia-Pacific, the Middle East, and Africa, and developing methodologies to help clients incorporate sustainability into capital deployment (e.g., SDG alignment) and impact reporting.

Monitoring Sustainable Finance Regulations Worldwide

Since 2022, the GSH has developed dedicated tools for monitoring sustainable finance regulatory developments (including Taxonomy, CSRD, EU GBS, SFDR), primarily in the EU but also in other regions such as the UK, Americas, and Asia-Pacific. The aim of this regulatory intelligence is to help clients understand the objectives of regulators and the resulting risks, opportunities, and challenges.

Investor Insights and Solutions

The GSH has a dedicated sub-team focussed on the distribution of green and sustainable products and solutions, as well as building up-to-date market intelligence on sustainability-driven investor demand. This market intelligence includes developing qualitative overviews of investors' sustainability considerations (ESG profiles), creating an in-house methodology to rank investors based on ESG credentials (ESG scoring), analysing ESG credential characteristics (e.g., SFDR), and providing bond fund overviews. The team also conducts surveys and interviews with market participants, such as the 2024 survey on the inclusion of biodiversity in investment criteria and interviews regarding the coal exclusion list.

On the thematic side, the GSH focusses on developing innovative investment solutions for climate, water, and biodiversity (thematic equity indices or baskets). It has also created unique instruments such as equity-linked green notes and green fixed-income structured notes.

Leadership in Sustainable Finance: Guiding Best Practices Across Sectors

Natixis CIB's GSH Team is also actively involved in market initiatives and standard-setting. It engages in market-led initiatives to provide guidance and best practices to both the public and private sectors. This includes participating in discussions as

well as co-chairing and developing guidance materials. Natixis CIB is a member of the ICMA Principles Executive Committee for the fourth consecutive year and has co-chaired and co-authored the Transition Finance Handbook and the Sustainability-Linked Bond Principles, including their most recent updates. Additionally, Natixis CIB is part of the Singapore Sustainable Finance Association, supporting the Natural Capital and Biodiversity Workstream, and co-chairs the APLMA Green & Sustainable Lending Committee and the Impact Disclosure Taskforce.

RECOGNITIONS AND ACHIEVEMENTS

In 2023, Natixis CIB participated in 78 thematic transactions. The bank received several prestigious awards, including Investment Bank of the Year 2023 by Environmental Finance; Investment Bank of the Year for Sustainability-Linked Loans and Private Equity Derivatives by The Banker; the IJGlobal ESG Awards 2023 for ESG Infrastructure & Energy Bank; and the International Financing Review (IFR) Awards 2023 for ESG Insight. These accolades confirm Natixis CIB's strong position in the market and its support for new developments and innovations.

NATIXIS CIB'S COMPREHENSIVE REGIONAL SUPPORT AND EXPERTISE IN APAC

Natixis CIB offers corporate and financial institution clients in Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, Singapore, South Korea, Taiwan, and Thailand tailored financing and capital markets solutions, as well as access to global financial markets. It also supports the development of Natixis CIB's European and international clients in the region.

The bank has a dedicated GSH APAC Team based in Singapore and Hong Kong, providing specialised expertise to its regional clients. At the core of Natixis CIB's

operations are environmental, social, and technological transitions. Helping clients in their transitions is paramount, and the bank has stringent rules and strong advisory capabilities. Every aspect is considered: the carbon impact of each loan, the environmental impact, the social impact, and the governance impact.

Energy Transition in APAC

Energy transition has become a central topic in the Asia-Pacific region, with significant investments expected in the coming decades. The region heavily relies on coal and oil & gas and has one of the fastest-growing energy demands. This presents a clear challenge for countries in the region to address their transition strategies, but it also offers a great opportunity. To decarbonise energy systems, USD 5 trillion per year will be needed up to 2030. This will bring opportunities in electrification, data centres, semiconductors, renewable energy, green hydrogen, new low-carbon technologies, and sustainable finance, which can be a powerful ally in mobilising the much-needed capital.

Regulators play a crucial role in this ongoing transition. APAC regulators are actively designing the appropriate legal frameworks to facilitate this shift, including new ESG disclosure requirements and robust green and transition taxonomies. Hong Kong, Singapore, Japan, and Australia are among the countries putting these measures in place to support economic players in this journey.

Financial institutions play a crucial role in supporting this transition. Natixis CIB aids its clients in their transition by offering innovative solutions, investment products, and advisory services. This includes engaging with all types of energy providers (oil & gas, power and renewables, metal & mining, and new energies such as hydrogen) as well as all sectors that need to transition. Investing will be critical to deploying and enhancing the physical infrastructure assets required for this transition. Natixis CIB is well-positioned to support its clients on this journey through its recognised expertise in these key sectors and its in-depth sustainable finance structuring capabilities, with recent deals closed with Air France, Repsol, EdgeConnex, and Fosun Pharma.

NATIXIS CORPORATE AND INVESTMENT BANKING

NATIXIS CORPORATE AND INVESTMENT BANKING
5 Shenton Way I #23-01 UIC Building I Singapore 068808
W: www.cib.natixis.com
T: +65 6224 1455

NESTE

Leading the Charge in Sustainable Aviation Fuel, Renewable Diesel and Renewable Raw Materials for Polymers and Chemicals

Neste is the world's leading producer of sustainable aviation fuel and renewable diesel and a pioneer in developing renewable feedstock solutions for various uses in the polymers and chemicals industries. It is also advancing chemical recycling technologies and capacity to address the plastic waste challenge. Neste's ambition is to make the Porvoo refinery in Finland the most sustainable refinery in Europe and to achieve carbon-neutral production by 2035.

Neste has been heavily investing in the research and development of renewable fuel technology and expanding the renewable raw material base suitable for refining since the mid-1990s. After successfully piloting renewable diesel production at the Porvoo refinery, Neste embarked on the large-scale construction of renewable diesel refineries, first in Singapore in 2010 and then in Rotterdam the following year.

These refineries use Neste's proprietary NEXBTL™ technology to produce renewable diesel from renewable raw materials, which are 100% waste and residue raw materials, such as waste animal fats, used cooking oil, and residue streams from the vegetable oil industry.

HIGH STANDARDS FOR SUSTAINABILITY

Neste's business is built on sustainability. The company refines waste, residues, and other innovative raw materials into renewable fuels and more sustainable feedstocks for plastics and other materials. Its renewable and circular solutions contribute to running societies more sustainably and help reduce dependency on virgin fossil raw materials.

Neste sets high standards for sustainability. The company's work is guided by the Neste sustainability vision, which includes aspirational targets for climate, biodiversity, human rights, and its supply chain and raw materials. In collaboration with its partners, Neste aims for a carbon-neutral and nature-positive value chain by 2040.

Expanding capacity for renewable and circular products is a key driver towards Neste's sustainability targets. Through strategic investments, the production capacity of renewable and circular solutions will significantly increase in the coming years.

With its ambitious sustainability commitments and currently available solutions, Neste aims to show leadership and determination in playing its part to limit global warming to 1.5°C, in line with the objectives of the Paris Agreement.

HUMAN RIGHTS AND TACKLING INEQUALITY: A BUSINESS IMPERATIVE

Neste is actively addressing the importance of human rights on multiple fronts. Recognising that human rights are best promoted through collaboration, Neste has signed two partnership agreements with Unilever to advance living wages and supplier equity, diversity, and inclusion.

Neste is an active member of the World Business Council for Sustainable Development (WBCSD) Business Commission to Tackle Inequality (BCTI), a cross-sector, multi-stakeholder coalition of over 60 organisations with a mission to mobilise the private sector to address inequality and generate shared prosperity for all. Additionally, Neste is a member of the Consumer Goods Forum's Human Rights Coalition, which aims to end forced labour through focussed and collective action.

ENHANCING A CULTURE OF SUSTAINABILITY AND WELL-BEING

Neste has a global Sustainability team comprising over 50 experts focussing on critical topics such as supply chain, human rights, biodiversity, climate, LCA (Life Cycle Assessment), and GHG (Greenhouse Gas) calculations, as well as regulatory and voluntary reporting. The team operates across four continents: Europe, North and South America, and Asia-Pacific.

Neste provides its employees with ongoing opportunities to enhance and strengthen their sustainability knowledge through workshops and knowledge-sharing sessions. This collaborative learning approach ensures that knowledge is integrated back into their work across various businesses, departments, and teams. Neste values cross-functional projects and engagements throughout the company.

Additionally, the well-being of employees is a key focus for Neste. The company regularly holds wellness sessions with experts in psychology and well-being and organises volunteering days to give back to society.

THE EVOLUTION OF NESTE'S SINGAPORE REFINERY

The original Singapore refinery occupies 19 hectares and began operations in 2010, primarily producing renewable diesel with a capacity of 800,000 tonnes per annum. Over the years, the organisation has continued to innovate and invest, leading to several transformations at the Singapore refinery.

At the end of 2018, Neste decided to expand its renewable product production capacity in Singapore. Construction commenced at the beginning of 2019, and with a final investment of EUR 1.6 billion, mechanical completion was achieved at the end of 2022. This expansion doubled Neste's renewable products production capacity to 2.6 million tonnes per annum,

with up to 1 million tonnes can be sustainable aviation fuel (SAF) production.

Neste's Singapore refinery is now the world's largest SAF producer in terms of capacity.

Neste invests over 25% of its workforce in research and development. To maintain its competitiveness in renewable and circular solutions, Neste continues to expand its pool of new and existing renewable raw materials through innovations and partnerships with experts worldwide.

SUSTAINABLE PRACTICES IN NESTE'S SUPPLY CHAIN

Neste is committed to ensuring a safe and healthy workplace, fair labour practices, and an increased commitment to sustainability across its supply chain.

The company uses only sustainably-produced renewable raw materials that fully meet the sustainability requirements specified by legislation in its key markets. Renewable raw material suppliers are carefully selected, and materials are sourced only from traceable origins. All suppliers are required to adhere to the Neste Supplier Code of Conduct, which includes criteria on human and labour rights, occupational health and safety, climate, environment, and ethical business conduct. Additionally, renewable raw material suppliers must comply with Neste's Responsible Sourcing Principle, which includes additional criteria on deforestation and GHG emissions. Before contracts are signed, all suppliers undergo rigorous sustainability due diligence, and Neste regularly monitors their performance.

Neste actively engages with its renewable raw material suppliers through workshops to collaboratively develop innovative supply chain solutions, continuously improve sustainability, and resolve any grievances.

Identifying and selecting reliable partners is crucial to the sustainability of Neste's supply chains. Knowing the origin of raw materials is a fundamental requirement, which has helped Neste gain visibility throughout the entire supply chain, including the suppliers' suppliers.

COMMITMENT TO REDUCING EMISSIONS AND EXPANDING SUSTAINABLE AVIATION FUEL IN ASIA-PACIFIC

Neste is committed to reducing its customers' GHG emissions by at least 20 million tonnes CO_2 annually by 2030. Additionally, the company aims to achieve carbon-neutral production by 2035 (Scope 1 & 2) and has set a concrete target for Scope 3 emissions, aiming to reduce the use-phase emission intensity of sold products by 50% by 2040 compared to 2020 levels.

Asia-Pacific is the world's largest aviation market, and Neste's Sustainable Aviation Fuel (SAF) is already in use by airlines in Singapore, Japan, Hong Kong, Malaysia, New Zealand, and Australia. Neste's integrated SAF supply chain to Changi Airport further increases the availability of its product for Asia-Pacific and global airlines in Singapore, including Singapore Airlines and Emirates.

Neste is collaborating with partners and industry leaders in Asia-Pacific on trials using Neste renewable diesel. Singapore also serves as a regional hub for raw materials sourcing to support increased production capacity and sales.

SUPPLIER ENGAGEMENT AND COLLABORATION

Neste is one of the eight companies driving the sustainable palm oil landscape programme in the Siak and Pelalawan districts in Indonesia, through the Siak Pelalawan Landscape Programme (SPLP). The SPLP is a collaborative initiative involving the private sector, dedicated to supporting the Siak and Pelalawan district governments in implementing the Green Siak District Roadmap in Siak and the District Action Plan for Sustainable Palm Oil in Pelalawan. The programme is executed by Proforest and Daemeter, in close collaboration with the district governments and NGOs.

Through this collaborative effort, Neste aims to ensure a positive sustainability impact in the region by addressing environmental and social issues such as tackling deforestation, maintaining and enhancing key conservation areas, preventing exploitation, and improving smallholder livelihoods. These efforts extend beyond palm oil production to multiple commodities, including rubber and pineapple.

NESTE ASIA PACIFIC PTE LTD
7 Temasek Boulevard | Suntec Tower One #34-01 | Singapore 038987
W: www.neste.com
T: +65 6631 2300

PEAK ENERGY

A Combination of Solar, Wind, and Storage Technologies for a Transition Towards Renewable Energy

Peak Energy is a renewable energy developer and independent power producer that generates 100% green energy by designing, funding, building, and operating both large (utility-scale) and small (corporate-sized) solar and wind farms. These farms generate electricity for corporates that want to power their operations with green electricity, ensuring no carbon release into the atmosphere.

Incorporated in Singapore in November 2023, Peak Energy serves as the APAC renewable energy arm of Stonepeak, one of the world's largest infrastructure asset managers.

Peak Energy has an active pipeline of more than 5.5GW of renewable energy projects throughout Asia Pacific. With 237MW already in operation, we have helped decarbonise more than 352,000,000 kWh of energy, representing over 245,000 kt of CO_2 avoided.

DECARBONISING POWER SYSTEMS

Peak Energy, an Independent Power Producer (IPP), is dedicated to developing renewable energy systems to help decarbonise electricity grids and infrastructures across various markets. By leveraging cutting-edge renewable technologies, Peak Energy aims to transform the energy landscape, reducing reliance on fossil fuels and promoting a sustainable future.

A key aspect of Peak Energy's mission is to collaborate with corporate clients, particularly those in energy-intensive sectors such as big tech companies. By supplying these clients with clean energy, Peak Energy helps them decarbonise their operations and advance their sustainability goals. This partnership approach not only supports the environmental objectives of these corporations but also enhances their operational efficiency and corporate responsibility.

In a groundbreaking move, Peak Energy's team pioneered the first rooftop and on-site energy solutions in Southeast Asia, providing clients with access to cheaper and cleaner energy. This innovation underscores Peak Energy's dedication to making renewable energy accessible and cost-effective, thereby driving the transition to a greener energy future.

A PARTNERSHIP WITH DIGITAL EDGE

In June 2024, Peak Energy announced a partnership with Digital Edge, one of Asia's largest data centre platforms. Through this partnership, Peak Energy and Digital Edge will jointly pursue an initial pipeline of 500 MW of operating capacity for both existing and planned data centres over a three-year period.

Peak Energy, which focusses on a combination of solar, wind, and storage technologies, will target renewable energy projects in countries where Digital Edge has existing deployments, including Japan, Korea, Indonesia, India, and the Philippines, as well as other fast-growing markets. These projects will support the decarbonisation of up to 1 GW of power and generate more than 1,300 GWh per year, equivalent to removing 216,000 cars from the road. This partnership allows both Digital Edge and Peak Energy to advance their respective business and sustainability objectives.

AMBITIONS IN CORPORATE RENEWABLE ENERGY SOLUTIONS

Multinational corporations across various industries face significant challenges in securing renewable energy to power their operations, especially in the Asia-Pacific region. Regulatory constraints and physical limitations of the electric grid in several countries exacerbate this issue.

Peak Energy was established to facilitate access to renewable energy for corporate customers. The company installs and operates solar PV systems on their sites and provides access to solar and wind farms where feasible. Peak Energy's core business involves the installation and operation of zero-carbon electricity generation facilities,

ensuring that corporate customers receive 100% green energy.

Peak Energy has set an ambitious target to achieve 2 GW of solar and wind operating capacity across APAC by 2030. To put this into perspective, 2 GW can power approximately 1.5 million households for a year. The key performance indicator of Peak Energy's success is the number of megawatts of solar and wind power installed and operated annually. Through these efforts, Peak Energy is not only advancing corporate sustainability but also driving the transition to a greener energy future.

THE NEED FOR NEW POWER PLANTS IN SOUTHEAST ASIA: PEAK ENERGY WILL MEET THE CHALLENGES

Southeast Asia is one of the world's fastest-growing regions and is quickly becoming a global manufacturing hub. However, it is also at the epicentre of the climate crisis, facing significant challenges such as air pollution, water scarcity, rising temperatures, and low-lying coastlines.

According to the 2023 IEA Report (International Energy Agency), Southeast Asia will need to invest USD 170-185 billion per year in renewable energy to meet climate targets, a substantial increase from USD 30 billion in 2022. Meanwhile, electricity demand in Southeast Asia is forecast to grow at an annual rate of 3.7%, double the global growth rate. This surge is driven by a growing middle class, urbanisation, and the electrification of transportation. Consequently, the region will require significant new power plants, with a pressing need to replace fossil fuel power plants with renewable energy sources, primarily solar and wind.

Meeting the Urgency of Decarbonisation

Peak Energy is poised to meet these challenges head-on. By investing in and developing renewable energy infrastructure, Peak Energy is not only addressing the urgent need for sustainable power but also driving the transition to a greener future for Southeast Asia.

Peak Energy believes the energy transition is progressing too slowly, with the planet likely to experience a much greater temperature increase than the targeted 1.5°C by 2050. This pace is also insufficient for corporate companies aiming to decarbonise their operations.

In Japan and Korea, which have deregulated markets, Peak Energy already offers both onsite and off-site PPA solutions to its customers. In Thailand, the Philippines, Indonesia, Vietnam, and Malaysia, Peak Energy partners with its customers to deliver onsite PPA solutions while closely monitoring regulatory changes to craft off-site PPA solutions tailored to specific requirements.

Developments are happening rapidly. Thailand announced a 2 GW off-site PPA pilot project for 2025 in June, and Vietnam passed the DDPA (Direct Power Purchase Agreement) pilot scheme in July. Opportunities are emerging across the region, making it crucial to act swiftly.

Committed to installing and operating zero-carbon electricity generation facilities, Peak Energy is dedicated to ensuring that the region's growing energy demands are met with clean, renewable energy solutions.

PEAK ENERGY

PEAK ENERGY DEVELOPMENT PTE LTD
15A Duxton Hill | Singapore 089598
W: www.peakenergy.asia

PHILIP MORRIS INTERNATIONAL (PMI)

Rewilding Nature, Reimagining the Future

Philip Morris International (PMI) is a global company committed to sustainability and innovation. With a diverse and dedicated team, PMI focusses on creating a positive impact through various initiatives and partnerships aimed at fostering a better future. The company's ongoing efforts are directed towards reducing its environmental footprint and promoting responsible business practices worldwide.

PMI's sustainability efforts have a significant impact, including preventing deforestation through its Zero Deforestation Manifesto. Recognised with CDP's A rating, PMI effectively protects ecosystems and supports social responsibility.

SUSTAINABILITY STRATEGY

PMI has a sustainability strategy guided by a comprehensive materiality assessment. The company views sustainability as a core business aspect, fostering innovation, growth, and long-term value. PMI's 2025 Roadmap includes eight specific strategies and 11 goals addressing priority areas and other material ESG topics, ensuring meaningful contributions to societal challenges and driving long-term success.

PMI sets and tracks the achievement of sustainability targets using a Market Sustainability Scorecard, which evaluates global programme alignment, local governance, and stakeholder engagement to guide local strategies and ensure global alignment.

Sustainability is integrated into executive compensation and preparing for external verification and regulatory requirements. This ensures transparency and consistency in reporting. The key performance indicators are refined based on stakeholder feedback and evolving standards to enhance data robustness and align with global sustainability trends.

Diversity and Sustainable Workplace Practices

Sustainability is deeply embedded in PMI's corporate culture, fostering equitable employment and well-being. PMI's commitment to diversity is reflected in 41.8% of management positions being held by women, surpassing its 40% target.

By investing in professional development, ensuring a safe work environment, and aligning practices with sustainability goals, PMI aims to positively impact both the organisation and society, creating a supportive and empowering workplace.

Sustainability Leadership and Employee Education

PMI's 2025 Roadmap is led by a Chief Sustainability Officer, who defines and coordinates corporate sustainability strategy, programme implementation, and performance reporting. Each market and region has a reporting line to the Chief Sustainability Officer.

There are online training programmes on sustainability practices available and supported by PMI. These programmes help employees understand their role in achieving sustainability goals. The local team in Singapore, together with local teams in Hong Kong and China, joinlty organises briefings and lunch-and-learn sessions on biodiversity and sustainability, which are published on the company's intranet for employee engagement.

INVENTORY MANAGEMENT TECHNOLOGY

As part of continuous innovation, PMI Singapore has recently introduced a digital tool that enables retailers to easily check product freshness of their existing stocks of the products.

The tool was deployed to retailers to help them efficiently manage their stocks by First-In-First-Out (FIFO) practices so that they can ensure stock freshness.

The tool has been implemented with a user guide provided to all retailers. PMI also measures the tool's usage and gathers feedback from retailers to further enhance the tool.

VALUE CHAIN SUSTAINABILITY STRATEGY

PMI upholds responsible business practices throughout its value chain, extending to the supply chain with a focus on human rights and environmental considerations. 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.

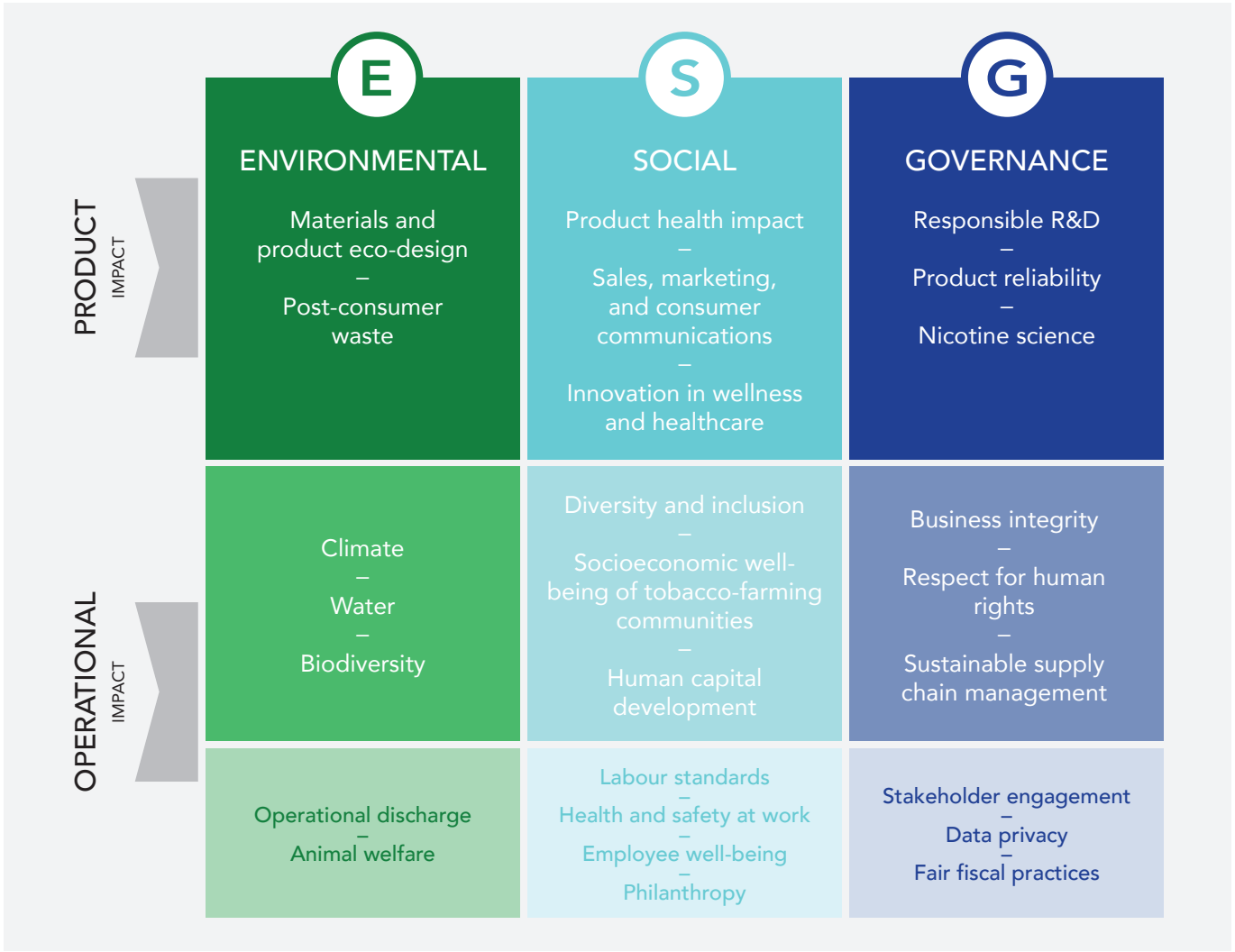
PMI's supply chain sustainability strategy details PMI's ambitions to set process and performance standards for its suppliers and stakeholders across tiers within the supply chain. Built into PMI's contractual agreements, PMI expects all its suppliers to demonstrate high sustainability performance and 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.

PMI's collaboration with value chain partners enhances labour conditions and environmental practices, mitigating risks and strengthening its reputation.

TANGIBLE SUSTAINABILITY INITIATIVES ALIGNED WITH SINGAPORE'S GREEN PLAN

PMI Singapore's main sustainability initiative focusses on preserving nature with a deeper appreciation for biodiversity. This initiative is crucial given the rapid urban expansion in Singapore, which has led to the clearing of primary forests and natural vegetation. Its efforts aim to counteract these impacts through meaningful partnerships with external stakeholders, that involve key activities include a rewilding project with Nature Society along the rail corridor to restore local biodiversity, nature walks organised by

SUSTAINABILITY STRATEGY



the employees, and participation in global events such as World Clean Up Day.

PMI's focus on preserving nature and biodiversity complements the Green Plan's targets for enhancing green spaces and increasing tree planting. By engaging in rewilding projects and tree planting, PMI contributes to the Green Plan's goal of expanding green areas and improving urban biodiversity.

Efforts to reduce post-consumer waste through initiatives such as transitioning to e-invoicing and using sustainable packaging also align with the Green Plan's targets for waste reduction and sustainable living. These initiatives not only support the Green Plan's objectives but also integrate sustainability deeply into its operations and practices.

PMI's local programmes focus also on reducing waste and promoting circularity aligned with the Green Plan's waste management and sustainable living objectives. By aligning sustainability efforts with the Green Plan's targets and engaging in collaborative projects, PMI contributes to Singapore's broader environmental goals and demonstrates its commitment to advancing sustainability in the region.

PHILIP MORRIS SINGAPORE PTE LTD
3791 Jalan Bukit Merah I #08-18 E-Centre @ Redhill I Singapore 159471

PRUDENTIAL ASSURANCE

For Every Life, for Every Future

Prudential Assurance Company Singapore (henceforth referred to as Prudential), an indirect wholly-owned subsidiary of Prudential plc (henceforth referred to as Group), is a leading life insurance company with more than one million customers in Singapore.

Prudential has been serving the financial and protection needs of the country's residents for over 90 years by delivering a suite of product offerings in protection, savings and investment through multiple distribution channels, including a network of more than 5,000 financial consultants.

Prudential has an AA-financial strength rating from leading credit rating agency Standard & Poor's, with S$53.3billion funds under management as of 31 December 2023.

PRUDENTIAL'S SUSTAINABILITY STRATEGY

In 2023, Prudential refreshed its sustainability strategy to align with its new Group purpose "For Every Life, For Every Future". This new strategy reflects the company's commitment to creating long-term value for all stakeholders including employees, business partners, customers, shareholders and the wider community by addressing environmental, social and economic challenges.

Prudential's sustainability strategy is anchored on three main pillars: simple and accessible health and financial protection, responsible investment and sustainable business. These are underpinned by a foundation of good governance and responsible business practices.

SIMPLE AND ACCESSIBLE HEALTH AND FINANCIAL PROTECTION

Prudential aims to make health and financial security simple, accessible and affordable. This is achieved through a range of products and services designed to meet the diverse needs of its customers. For instance, PRUSafe Income (PSI) is an affordable income protection plan that provides income and recovery benefits when customers are unable to work due to an injury or medical condition, including mental illness.

To support Singaporeans in living well for longer, Prudential partnered with Doctor Anywhere (DA) to provide home-based healthcare services for customers. Besides health screenings, the services also include telemedicine and subsidised flu and travel vaccinations which are administered by DA's team of nurses and doctors at the convenience of one's home. Through this partnership, Prudential makes preventative healthcare more accessible and convenient to its customers.

Prudential is deeply committed to building resilient communities that can withstand and thrive amidst various challenges. This is done through its community investment efforts focussed on advocating for financial literacy and health inclusion, supporting underprivileged families in early childhood nutrition and helping seniors improve their health and wellbeing. Digi Kakis by Prudential was launched last year to help seniors build confidence in using digital devices while improving their cognitive and social skills.

RESPONSIBLE INVESTMENT

As a major asset owner, Prudential leverages its investments to promote a just and inclusive transition to a net zero future. The company has pledged to become a net zero asset owner by 2050 and is committed to deploying its investments in ways that support sustainable development. It adopted a new transition finance target in 2024 to direct investments to both "green" as well as "brown to green" assets, supporting companies which are on the pathway to become more carbon-efficient.

SUSTAINABLE BUSINESS

Prudential is committed to embedding sustainability across its operations and value chain to amplify the pace and scale of its impact.

The company places a strong emphasis on empowering its employees, recognising that an engaged and skilled workforce is essential for long-term success. Prudential also promotes a culture of diversity and inclusion, ensuring that all employees feel valued and respected. This involves implementing policies and practices that support gender diversity and equity, age inclusivity, opportunities for upskilling and career progression, as well as flexible work arrangements.

The company is also focussed on reducing the carbon footprint of day-to-day operations and improving resource efficiency within its offices. This includes digitalising its

processes, minimising wastage by reducing the usage of disposables and cultivating a culture of recycling within the organisation. In 2023, the company achieved more than 10 per cent reduction in carbon emissions per full-time employee.

To ensure that its supply chain is sustainable, Prudential applies responsible procurement practices to ensure they do not inadvertently support companies that engage in unsustainable environmental practices or exploitative labour practices.

RESEARCH PARTNERSHIP WITH NTU AND EOS

Prudential also hopes to leverage its position as a leading life insurer to drive sustainability causes through thought leadership and advocacy. An example is the company's research partnership with the Earth Observatory of Singapore (EOS) at Nanyang Technological University (NTU). The research explores the impacts of climate change on air quality and health in ten key markets across Asia and Africa, including Singapore. The first phase of the study examined historical records of air quality and health impacts in the markets between 2000 to 2020 and the second phase of the study, to be concluded in 2024, will entail projecting future air quality and its health impacts on individuals.

PRUDENTIAL

PRUDENTIAL ASSURANCE COMPANY SINGAPORE
7 Straits View I #06-01 Marina One East Tower I Singapore 018936
W: www.prudential.com.sg
T: +65 6539 8227

RAVAGO

World-Class Plastic Recycling

Ravago's primary business is plastic recycling and compounding, providing plastic waste management services to petrochemical companies on Jurong Island, as well as to local plastic product manufacturers and consumers.

Ravago Manufacturing Singapore (RMS) is a wholly-owned subsidiary of the Ravago Group, a Belgium-based multinational corporation and a global leader in the distribution, resale, recycling, and compounding of commodity, engineering, and specialty plastic and rubber polymers. Ravago operates across all regions of the world. Established in 1978, its goal is to develop and operate a world-class plastic recycling and compounding facility in Singapore, providing consistent, high-quality, competitively priced recycled resins to customers and partners worldwide.

A COMMITMENT TO A CIRCULAR PLASTIC ECONOMY IN SINGAPORE

Ravago is at the forefront of creating a truly circular plastic economy by collaborating with the entire plastic supply chain, from producers and converters to collectors. Committed to Operation Clean Sweep, Ravago actively works to prevent the loss of microplastics to the environment, recognising that landfill, incineration, and exporting plastic waste are not sustainable solutions.

Aligned with its global vision and as a market leader in Singapore, Ravago is investing in recycling infrastructure as a long-term solution for environmental and societal benefits. The company offers comprehensive post-industrial and post-consumer waste recycling services, including the collection, sorting, and recycling of polymer wastes. Ravago emphasises the importance of developing sustainable solutions to manage plastic waste locally, in compliance with the Basel Convention, as neighbouring countries increasingly close their doors to plastic waste imports.

Ravago has set an ambitious target to achieve near 100% in-house recycling of the plastic waste it collects. Starting with an 85% recycling rate in 2019, the installation of a new washing line in 2020 has significantly improved these figures, reaching 96% in 2021, 97% in 2022, and 98% in 2023. The efficiency and progress of these recycling efforts are meticulously tracked and easily retrievable through Ravago's ERP system.

Through these initiatives, Ravago not only demonstrates its commitment to sustainability but also leads by example in the transition towards a circular economy for plastics.

Additionally, Ravago participates in other sustainability and quality initiatives, including EcoVadis, IKEA IWAY, Responsible Care, SQAS, RSPO Certified Sustainable Palm Oil, GRS, and ISCC.

THE FIRST HYBRID WASHING LINE IN SINGAPORE

Ravago's state-of-the-art recycling line processes over 1,000 MT of materials per month with only three operators managing the line at any given time. Post-consumer wastes, which are dirty and have high organic contaminants, are very difficult to recycle mechanically and are generally sent to landfill, incinerated, or exported.

In December 2020, Ravago introduced the first hybrid washing line in Singapore, capable of processing both dirty film wastes and floor sweeps. A water treatment line was also installed to create a closed-loop system for recycling water used in the washing line. Since its installation, Ravago has been able to recycle dirty post-consumer wastes locally, increasing the rate of in-house recycling from 85% in 2019 to 98% currently. This equates to 5,000 MT of post-consumer film wastes and 1,000 MT of floor sweeps since the installation. This represents an average of 150 tonnes a month, or 1,800 tonnes per year, equivalent to about 80 forty-foot containers of waste that can be recycled locally rather than being exported or incinerated.

Ravago plants use advanced machines from EREMA, a leading plastic recycling extruder manufacturer in Austria. Their size reduction lines are equipped with hydraulic cutters, shredders, and crushers from renowned European brands, providing Ravago with a competitive edge over other recyclers.

Successfully Recycling High Volumes of Plastic Waste

With the first and only hybrid washing line in Singapore, Ravago has successfully recycled a high volume of dirty and challenging plastic wastes that would otherwise be incinerated or exported.

Although the installation of the washing line was a single event, Ravago continues to reap increasing benefits from this equipment. In line with Ravago's tagline, "We want to give back to the world what it has given us," the company believes it is its responsibility to contribute actively by doing what it does best. This includes educating and inspiring the younger generation to develop an interest in plastic recycling and creating a resilient workforce for the environmental services industry.

Moreover, increasing recycling volumes by handling more post-consumer wastes means Ravago's plant capacity will be fully utilised, leading to greater efficiency, cost reduction, and an improved bottom line.

These efforts enhance Ravago's global image, positioning it as a leading and pioneering recycler in closed-loop solutions.

Recycling Carpets into Chairs

Ravago collaborates with a carpet supplier in Singapore to recycle polypropylene (PP) carpets used in exhibitions and events. These carpets, which are currently sent for incineration, are recycled and compounded to produce plastic chairs, giving new life to valuable resources.

CONTINUOUS DIALOGUES AND COLLABORATIONS

As the leading plastic recycling company in Singapore, Ravago is dedicated to engaging in continuous dialogues, engagement, and feedback sessions with the National Environment Agency (NEA) and the Ministry of Sustainability and the Environment (MSE) on various critical environmental and plastic recycling topics. These efforts include participating in the Waste Management (WM) Sectoral Tripartite Committee Meeting, the GWDF Dialogue Session, and the CleanEnviro Summit Singapore (CESG) Catalyst.

Furthermore, Ravago is exploring with MRFs (Material Recovery Facilities) to recycle HDPE bottles, a challenging waste stream that requires a thorough washing and sorting process. The company aims to recycle 2,000 MT of this waste stream annually, which is currently either exported or incinerated.

The company also collaborates with brand owners, petrochemical companies, and converters to develop closed-loop programmes for sustainable packaging, aiming to use at least 30% recycled resin in place of virgin raw materials. Currently, 42.5% of the resin used in Ravago's own FFS resin bags is recycled.

The company contributes to industry roundtables on the International Instrument on Plastic Pollution and collaborates on the development of guidance documents for degradable plastics, such as biodegradable, oxo-degradable, oxo-biodegradable, and compostable plastics, in Singapore.

The company is also involved in designing and assessing a take-back scheme for packaging waste, exploring potential research and development areas for plastics, and enhancing energy efficiency within the waste management sector.

IN LINE WITH SINGAPORE'S GREEN PLAN 2030 AND ZERO WASTE MASTER PLAN

In Singapore, Ravago's sustainability initiatives focus on three key areas: upcycling post-consumer wastes for more stringent packaging applications, increasing the plastic recycling rate to contribute towards Singapore's Green Plan 2030 and Zero Waste Master Plan, and attracting and grooming future leaders and talents for the Environmental Service industry.

In addition, to attract and groom young talent and build a skilled and resilient workforce for the environmental services industry, Ravago sponsors the NEA-Industry Scholarship for Polytechnic students. This initiative aims to train these students to become future leaders in the company or to lead sustainability projects.

In collaboration with regional value chain partners, Ravago aims to extend its sustainability actions and amplify their impact across the Asia region in the near future.

RAVAGO MANUFACTURING SINGAPORE PTE LTD
7 Tuas Avenue 14 | Singapore 638952
W: www.ravago.com
T: +65 6863 4138

ROCHE

Access to Healthcare: A Core Element of Sustainable Business Strategy

Founded in 1896 in Basel, Switzerland, Roche has grown into the world's largest biotechnology company and a global leader in in-vitro diagnostics. Committed to scientific innovation, Roche develops medicines and diagnostics to improve global healthcare outcomes. Roche is a pioneer in personalised healthcare, aiming to transform healthcare delivery. By collaborating with various stakeholders and leveraging its expertise in Diagnostics and Pharma along with clinical data insights, Roche strives to provide optimal care worldwide. Roche began its operations in Singapore in 1973.

SUSTAINABILITY APPROACH: INTEGRATING SOCIETY, ENVIRONMENT, AND ECONOMY

Sustainability is integral to Roche's business strategy and is part of everyone's job at the company. Roche's holistic approach to sustainability encompasses three dimensions: Society, Environment, and Economy. The company contributes to a better society by developing new medicines and diagnostic methods that offer life-changing benefits for patients. Roche's long-term goal is to reduce its environmental impact, including a 50% reduction in the environmental impact of its operations and products from 2019-2029, and achieving net zero greenhouse gas emissions by 2050. This includes emissions from scope 1 and 2, focussing on reduction efforts rather than relying on carbon offsets. In 2023, Roche's scope 1 and 2 emissions decreased by 6.9% due to increased use of sustainable energy.

The company is also committed to phasing out Substances of Very High Concern (SVHCs) from its products and partnering with suppliers to reduce their greenhouse gas emissions and enhance the sustainability of its supply chain. Roche fosters innovation, translating science into pioneering medicines and diagnostics that aid patients, while continuing to create quality jobs that provide secure livelihoods for families and competitive returns for investors.

Roche has committed to the Science Based Targets initiative (SBTi) to achieve absolute net zero for scope 1, 2, and 3 greenhouse gas emissions. The SBTi promotes necessary climate action in the private sector by enabling organisations to set science-based emissions reduction targets. Roche also joined the Sustainable Markets Initiative (SMI) Health Systems Taskforce, launched at the 26th United Nations Climate Change Conference (COP26) in 2021, to address emissions across supply chains, patient care pathways, and clinical trials.

Roche is a founding member of the Pharmaceutical Supply Chain Initiative (PSCI), a collaboration of more than 40 pharmaceutical companies and suppliers with a shared vision to promote responsible business practices in pharmaceutical supply chains. In 2023, Roche's scope 3 emissions decreased by 7.4%.

Roche Procurement supports the company's mission by collaborating with suppliers to achieve sustainability. As of February 2023, Roche is actively collaborating with suppliers responsible for nearly 20% of its Category 1 and 2 emissions.

Green Chemistry and Green BioPharma

Roche is committed to reducing the use of hazardous substances and collaborates actively with industry peers and organisations to promote Green Chemistry and Green BioPharma manufacturing practices.

For example, Roche launched the BenchMark ULTRA PLUS system, incorporating several innovative features based on customer feedback, including remote monitoring with a connected device, new indicator lights, a retractable work surface, new slide drawers that mitigate fluid ingress/egress, a new integrated touchscreen, and more environmentally friendly waste segregation and degradation. Sustainable packaging uses fewer raw materials and weighs less, providing a smaller carbon footprint during transportation.

EMPOWERING EMPLOYEES FOR SUSTAINABLE PRACTICES

The Roche Corporate Sustainability Charter serves as the foundation for governance at Roche, guiding their global efforts towards sustainability. Employees worldwide are pivotal in driving these initiatives, actively participating in grassroots campaigns aimed at reducing CO_2 emissions from business travel, minimising packaging waste, and promoting recycling. Roche prioritises continuous education through internal training systems, ensuring all employees are equipped with the knowledge and skills for sustainable practices.

At the Roche manufacturing site in Singapore, an annual Sustainability Week engages employees with a best practice roadshow, interactive recycling workshops, and insightful talks by guest speakers. In 2023, in collaboration with Zero Waste SG, the site and offices focussed on waste reduction and recycling initiatives, reinforcing sustainability principles among its workforce. Initiatives like the Live Well event underscore Roche's commitment to physical, health, and environmental wellness. Roche hosts workshops and talks that promote sustainable practices such as food waste repurposing, eco-friendly cleaning solutions, and community tree-planting initiatives. These efforts reflect Roche's dedication to empowering employees and fostering sustainable practices across its global operations.

ADVANCING 'ACCESS TO HEALTHCARE'

Access to healthcare is a core element of Roche's sustainable business strategy. Roche has long supported Universal Health Coverage (UHC), a key component of the United Nations Sustainable Development Goals (SDGs). The company works at the global, regional, and local levels, collaborating with multiple stakeholders to address the care gap, from screening programmes to healthcare workforce capacity building and beyond. Innovation remains at the heart of Roche. Over the past ten years, Roche has brought more than 20 new medicines to patients. Today, Roche is a leader not only in cancer treatments but also in neuroscience, ophthalmology, and haemophilia A. Roche is also the market leader in in-vitro diagnostics, with a growing portfolio of more than 500 diagnostic assays on over 100,000 instruments worldwide, delivering breakthrough innovations with the greatest possible patient and market impact.

Throughout the COVID-19 pandemic, Roche facilitated access to more than 1.5 billion tests, demonstrating its proactive role in global healthcare provision. Roche maintains a rigorous Product Stewardship Programme focussed on enhancing the societal value of its products from inception through to end-of-life, while minimising negative impacts on both people and the environment.

Efforts in Healthcare Digitalisation

Roche has made significant strides in enhancing and expanding its efforts in healthcare digitalisation, focussing on lab insights, clinical workflow optimisation, clinical decision support, and patient monitoring. These initiatives primarily target laboratories, healthcare providers, and patients.

For instance, Roche's Navify digital solutions securely integrate data across care settings, connecting the healthcare community and accelerating access to innovation and insights. The Navify approach emphasises open digital ecosystems to address interoperability and enable a patient-centric model rather than a disease-centred approach.

SOCIAL INITIATIVES: LEADING WITH IMPACT

Roche has been named one of the most sustainable companies in the pharmaceuticals industry by the Dow Jones Sustainability Indices for the thirteenth consecutive year. In 2021, Roche made a significant social impact: 16.4 million patients treated, 27 billion tests conducted, 80 new molecular entities in clinical development, and 44% of management positions held by women.

Globally, Roche holds an annual "Children's Walk" to raise funds for children in need. In 2024, the company hosted the 21st Roche Children's Walk. This employee-driven event supports projects through the independent global charity Roche Employee Action and Charity Trust (Re&Act), benefiting local projects in the 75 countries where Roche operates and beyond. Over the years, more than 315,000 Roche employees have participated, raising over CHF 23 million for children in need. In 2024, employees from Roche and Chugai in Singapore collaborated to organise a combined Children's Walk. Local beneficiaries included Club Rainbow and the Children's Cancer Foundation. All funds raised were directed towards initiatives focussing on education, nutrition, primary healthcare, and social development for children.

Roche's Sustainability Efforts in Singapore

At Roche's manufacturing plant in Singapore, the site has partnered with Sembcorp to install solar panels, providing green energy equivalent to 15% of the site's total electricity consumption. The goal is to achieve 100% green electricity usage by 2025. The site has implemented the Heat Recovery Wheel project, resulting in annual energy savings of approximately 75MWh.

Another notable project involves utilising silica gel technology to capture wasted heat from exhaust air, which is then used to pre-cool outdoor hot air with minimal energy consumption.

Roche Singapore prioritises sustainability by adhering to Roche's K6 directive, which minimises the use of refrigerants with Ozone Depletion Potential (ODP) in equipment such as refrigerators and water dispensers.

Additional sustainability measures include the installation of programmed timers for light switches, waste segregation, and a robust reduce, reuse, and recycle policy throughout the offices. Roche Singapore has also eliminated single-use plastic bottles and paper cups, partnered with e-waste vendors for responsible disposal, and prioritised the reuse of existing furniture during office renovations. The site's commitment to sustainability is further underscored by its preference for Green Mark Buildings (BCA) in site locations, reflecting Roche's dedication to environmentally friendly building practices.

ROCHE DIAGNOSTICS ASIA PACIFIC
8 Kallang Avenue | #10-01/09 Aperia Tower 1 | Singapore 339509
W: www.roche.com
T: +65 6272 7500

STANDARD CHARTERED

Here for Good: Promoting Environmental Stewardship and Social Responsibility

Standard Chartered stands among the world's top-rated banks, holding an A1 rating from Moody's Investor Services, and an A+ rating from Standard & Poor's and Fitch Ratings. To date, the bank has achieved the distinction of being the first and only bank awarded the "enhanced Significantly Rooted Foreign Bank" (eSRFB) status by the Monetary Authority of Singapore (MAS).

Standard Chartered in Singapore is an integral part of a global banking group, which operates in 53 of the world's most dynamic markets and serves clients in an additional 64. The bank's mission is to drive commerce and prosperity through its unique diversity, encapsulated in the brand promise, "Here for good." With a 165-year history in Singapore dating back to the establishment of its first branch in 1859, Standard Chartered has firmly rooted itself in the region. Today, Standard Chartered in Singapore comprises over 9,000 employees.

The bank offers over 40 Sustainable Finance products spanning corporate business, wealth management, and business banking.

STANDARD CHARTERED'S SUSTAINABILITY VISION

Standard Chartered is committed to advancing sustainability through a series of ambitious goals, designed to promote environmental stewardship and social responsibility.

The bank aspires to mobilise USD 300 billion in sustainable finance by December 2030, playing a pivotal role in driving the global transition towards a greener economy. The firm further aims to achieve net zero emissions in its financing activities by 2050, with interim targets set for 2030 in its most carbon-intensive sectors. Furthermore, Standard Chartered is on track to eliminate carbon emissions from its own operations by 2025, with plans to reduce absolute financed thermal coal mining emissions by 85% by 2030.

The bank's dedication extends to supporting financial inclusion and economic empowerment, with a commitment to provide USD 3 billion in financing to microfinance institutions by December 2024. Standard Chartered also aims to double its sustainable investing assets under management (AUM) by December 2025 and integrate ESG considerations into its Wealth Management advisory services.

Standard Chartered's Commitment to Sustainable Performance Amongst Employees

To prepare its employees for opportunities in areas such as sustainable finance, Standard Chartered has invested SGD 8 million in training and upskilling programmes.

In 2022, Standard Chartered launched the 'Understanding Sustainability' learning module, pledging to plant a tree for every employee who completed it. Since its launch, this initiative has resulted in the planting of over 15,000 trees across seven of the bank's footprint markets, and local non-governmental organisations (NGOs) oversee their care.

Standard Chartered also introduced mandatory e-learning modules on the topic of risk and offered 35 hours of bespoke classroom-based training to nearly 4,000 colleagues in its Frontline and Risk teams.

TECHNOLOGY & INNOVATION

Standard Chartered leverages cutting-edge technologies and collaborates with industry partners to build, track and maximise the potential of its impact. This includes investments into risk assessment tools, climate models and extensive climate data platforms, as well as tapping on academic expertise in climate science and building internal stress testing models.

For its private wealth clients, the bank has created digital platforms to support its sustainability investment advisory services, integrating tools for relationship managers and user-friendly client interfaces.

COMMITMENT TO SUSTAINABLE ENGAGEMENT

Standard Chartered's commitment to sustainability extends beyond its network to external partners, with the bank conducting engagement campaigns to educate its suppliers about climate change. This effort

includes assessing how well suppliers are aligning with science-based targets (SBTs) and setting near- to medium-term commitments.

Additionally, the bank collaborates with corporate clients to assess their exposure to climate-related risks and to understand their decarbonisation strategies and net-zero pathways. In 2022, Standard Chartered conducted Climate Risk Assessments (CRAs) for approximately 2,100 entities, covering around 65% of its corporate net nominal exposure.

Sustainable Financing with Landmark Projects Worldwide

Standard Chartered acted as sole arranger and sustainability structuring agent of the USD 50 million Reg S Step-Up Puttable Green Notes for Access Bank, acted as ESG coordinator for the world's first green Islamic repo for CIMB Bank Berhad in Malaysia, and placed the first ESG-structured Formosa note by a bank in Taiwan.

Together with Credit Suisse, Standard Chartered announced EUR 2.4 billion in green financing for the delivery of the Ankara-Izmir high-speed railway project to improve Turkey's transport infrastructure. The electric-powered rail project meets Green Loan Principles, as well as various internationally-recognised sustainability standards.

SOCIAL, ENVIRONMENTAL & FINANCIAL IMPACT

Standard Chartered's social lending made up USD 3.5 billion of its total Sustainable Finance asset pool in 2023, encompassing categories such as healthcare and education.

The bank's operational green assets helped divert 3.04 million tonnes of CO_2 in 2023, equivalent to over 660,533 cars removed from roads.

In addition to these, the bank's assets have helped supply over 13 million cubic metres of water, enabled over 1,400,000 microfinance loans, and disbursed nearly 17,000 SME loans.

AWARDS AND RECOGNITION

Standard Chartered has received several prestigious accolades for its commitment to sustainability and excellence in banking.

In 2022, the bank was named Most Sustainable Transaction Bank in the Asia Pacific region by The Asian Banker Transaction Finance Awards. Furthermore, in 2023, Global Finance recognised Standard Chartered as the Best Private Bank for Sustainable Investing in Asia, and the bank also received the EuroCham Sustainability Award 2023, highlighting its leadership in sustainable finance and banking solutions.

SINGAPORE & ASEAN FOCUS

Singapore is home to the majority of Standard Chartered's global business leadership, its technology operations, as well as SC Ventures, its innovation hub.

In 2021, Standard Chartered created an ASEAN hub in Singapore and is the only international bank with a presence in all 10 ASEAN markets.

Standard Chartered collaborates closely with MAS, participating in Industry-wide Stress Tests to hedge against 'transition risk'. The bank shares its expertise in advancing transition frameworks and green financing, while also accelerating decarbonisation efforts. Additionally, it supports data-driven solutions like Project Greenprint and the AI-powered Project NovA!.

As a founding partner, Standard Chartered plays an active role in Climate Impact X (CIX), a global marketplace, auction house and exchange for trusted carbon credits.

Aligned with Singapore Green Plan 2030 Roadmap

Standard Chartered fully endorses the Singapore Green Plan 2030 and the Net Zero 2050 goals, with its sustainability efforts spanning multiple pillars of the Green Plan.

For instance, the bank served as a bookrunner for the Singapore Government's SGD 2.4 billion inaugural green bond, with proceeds directed towards financing initiatives under the Green Plan, including the Jurong Region Line and the Cross Island Line.

In support of the Energy Reset pillar, Standard Chartered acted as the Joint Mandated Lead Arranger and Bookrunner for OUE's SGD 978 million sustainability-linked loan, the largest sustainability-linked loan in the Singapore real estate sector in 2022.

Finally, the bank contributed to the Resilient Future pillar by advancing sustainable agriculture through a USD 200 million Sustainability-Linked Trade facility with Singapore-listed agribusiness company Wilmar in 2023.

STANDARD CHARTERED BANK (SINGAPORE) LIMITED
Marina Bay Financial Centre I 8 Marina Boulevard #27-01 I Singapore 018981
W: www.sc.com/sg
T: +65 6981 2476

STMICROELECTRONICS

30 Years of Sustainability in the Semiconductor Technologies

STMicroelectronics (ST) is a team of over 50,000 innovators dedicated to advancing semiconductor technologies. ST collaborates with more than 200,000 clients and numerous partners to design and develop products, solutions, and ecosystems that address their challenges and opportunities, all while supporting a more sustainable world. Globally, the company reported revenues of USD 17.3 billion in 2023.

ST has had a presence in Singapore since 1969 and employs more than 5,000 people in its Singapore operations. ST is the first semiconductor company, still in operation, to have established a semiconductor activity in Singapore. Today, ST has four major sites in Singapore: a front-end production plant (wafer fab), a global logistics centre, a back-end R&D centre (assembly and testing), as well as its regional headquarters for the Asia region.

The company is steadfast in its commitment to achieve carbon neutrality for Scope 1 and Scope 2 emissions, and partially for Scope 3, by 2027.

KEY MILESTONES IN STMICROELECTRONICS' SUSTAINABILITY JOURNEY

Sustainability has been part of STMicroelectronics' DNA for nearly 30 years. In the early 1990s, ST was one of the first multinational companies to implement an environmental policy with publicly disclosed targets that exceeded legal requirements.

Over the years, ST has achieved several significant milestones in its sustainability journey. In 1993, the company introduced its first environmental policy, followed by the publication of its first environmental report in 1997. The ST Foundation was established in 2001, reinforcing ST's commitment to social responsibility. In 2002, ST became one of the first semiconductor companies to be certified under OHSAS 18001, a safety management system later replaced by ISO 45001 in 2022.

ST's dedication to sustainable practices continued in 2005 when it became one of the founding members of the Electronic Industry Citizenship Coalition (EICC), now known as the Responsible Business Alliance (RBA). This initiative promotes sustainable and responsible practices within ST's operations and encourages suppliers to adopt similar standards.

A major milestone was achieved in 2019 when ST reached its 2025 CO_2 reduction goal six years ahead of schedule. This accomplishment was made possible by implementing robust measures across its sites and leveraging standardised management systems such as ISO 14001 and ISO 50001. In 2020, ST announced its commitment to becoming carbon neutral by 2027 for Scope 1 and Scope 2 emissions, and partially for Scope 3 emissions. Most recently, in 2024, ST issued its 27th Sustainability Report, highlighting the company's ongoing efforts and progress in sustainability.

DRIVING RESEARCH AND INNOVATION

In 2023, STMicroelectronics (ST) invested US$2.1 billion in research and development (R&D) to drive innovation. ST's Sustainable Technology programme, launched in 2011, classifies products into four categories: low-carbon products, power-efficient products, planet-friendly applications, and human-welfare applications. In 2023, the company classified 82% of its new products as responsible, an increase from 77% in 2022. The company also made significant progress towards its 2027 goal of generating at least 33% of its revenues from responsible products, reaching 23.2% in 2023, compared to 22.6% in 2022. Furthermore, ST ensures that all new products undergo its eco-design process, underscoring the company's commitment to sustainability and innovation.

STELLAR AUTOMOTIVE MICROCONTROLLERS (MCUS)

ST's Stellar automotive microcontrollers (MCUs) are advanced microcontrollers designed for automotive applications, they exemplify reduced energy consumption, significantly improving car efficiency and reducing CO_2 emissions. These MCUs offer a reduced lifetime carbon footprint compared to previous-generation MCUs.

A case study on the body platforms of a major original equipment manufacturer (OEM) compared the emissions of a next-generation platform using Stellar MCUs with a current platform using existing MCUs. The results demonstrated that the manufacturing process for the Stellar device produced 40% less CO_2 emissions than the previous generation solution for the platform.

ENERGY EFFICIENCY

In 2023, ST reduced energy consumption per unit of production by 17% compared to 2016, aligning with the company's 2025 goal of a 20% reduction. By the end of 2023, ST achieved an annual energy saving of approximately 139 GWh—comprising 115 GWh of electricity and 24 GWh of methane gas—compared to 112 GWh in 2022. This progress is in line with the objective of saving at least 150 GWh per year by 2027.

In France

The Rousset site in France completed a project to retrofit 27 scrubbers, saving 3.0 GWh and reducing CO_2 emissions by 600 metric tonnes. To explore additional energy savings, ST collaborated with EDF DALKIA to conduct assessments across all French sites. This collaboration led to the implementation of adiabatic cooling towers at the Crolles site in France. This method, which uses evaporation to cool water, proved more efficient than traditional chillers, resulting in an energy saving of 0.9 GWh in 2023.

In Singapore

Throughout, ST sites implemented various energy-saving initiatives. At the Ang Mo Kio site in Singapore, a programme was initiated to replace older auxiliary vacuum pumps and chillers with more efficient models and upgrade of CDA dryer systems, resulting in an aggregate saving of 9.2GWh annually. These equipment upgrades have since been adopted at most front-end manufacturing sites. Additionally, ST's sustainability initiatives in Singapore and ASEAN include decarbonisation efforts through GHG abatement and energy efficiency management programmes, featuring the installation of an industrial District Cooling System (DCS) on the Ang Mo Kio TechnoPark.

This project involves a central plant that cools water and distributes it through a network of underground pipes to various buildings. This centralised approach enhances efficiency, reduces environmental impact, and saves space, as individual buildings no longer require their own chillers. This setup also lowers power and maintenance costs.

The AMK TechnoPark is ST's largest wafer-production fab by volume. Bringing DCS to AMK will thus have significant ripple effects. Conventionally, projects of this size target mainly urban developments. The ST and SPGroup infrastructure is thus unique because it's one of the first at such a scale to cool an industrial manufacturing plant and the largest in Singapore. Most projects from competing fabs retrofit new chillers. Beyond energy savings, removing chillers and cooling towers within the ST plant becomes a strong key enabler for ST decarbonisation journey.

Footprint and Handprint

In addition to consistently working on reducing its product footprint, STMicroelectronics also strives to increase its product handprint. Handprint refers to the positive impact of ST's products on the systems or applications they are integrated into. This can involve enabling environmentally friendly or socially beneficial applications, contributing to a reduction in the overall footprint of the application, or consuming less energy than existing alternatives.

RESPONSIBLE BUSINESS AND SUSTAINABILITY EXCELLENCE

ST has been an active member of the Responsible Business Alliance (RBA) since 2005. With over 6,000 direct suppliers worldwide, ST's supply chain has a significant potential impact on people and the environment.

In 2023, all new material suppliers were assessed for sustainability risk, identifying 373 suppliers across 541 facilities as being at risk. That year, ST launched a company-wide programme dedicated to carbon footprint assessment, covering 95 suppliers representing more than 60% of their annual spend in 2022.

ST participated in the Dow Jones corporate sustainability assessment for the 25th consecutive year in 2023, maintaining its presence in the Dow Jones Sustainability Index World and Europe indices, as well as other major sustainability indices, including FTSE4Good, EuroNext VIGEO Europe 120, Eurozone 120, Benelux 120, CAC 40 ESG, MIB ESG, ISS ESG Corporate Rating, and Vérité40. As of 2023, ST received an MSCI ESG Rating of AAA(1).

Furthermore, ST has been included in the Bloomberg Gender Equality Index since 2018. They received an A- score for CDP water security, placing them in the 'leadership' band, which is higher than the Europe regional average of C and the electrical and electronic equipment sector average of C. Additionally, they received an A- for CDP climate change, also in the leadership band, surpassing the Europe regional average of B and the electrical and electronic equipment sector average of C.

COMMITMENT TO SUSTAINABILITY AND COMMUNITY IMPACT

Over the past 28 years, ST's sustainability efforts have yielded significant results: an 84% reduction in perfluorinated compounds emissions, a 76% decrease in water consumption, a 56% reduction in electricity consumption, and a 336% increase in waste recycling.

In 2023, ST implemented over 810 community and education initiatives across 42 sites in 23 countries. These initiatives included US$3.5 million in cash donations, US$2.6 million in in-kind donations, and more than 156,000 hours of company time, accounting for 50% of the total contribution. Through the "STEM Your Way" programme, ST raises awareness among young people about the importance of STEM subjects and inspires them to explore STEM-related careers. In 2023, ST organised over 610 STEM events and initiatives, marking a 35% increase from the previous year. These efforts benefited over 100,000 individuals, including students and teachers.

STMicroelectronics

STMICROELECTRONICS ASIA PACIFIC PTE LTD
5A Serangoon North Avenue 5 | Singapore 554574
W: www.st.com
T: +65 6216 5000

STUDIO 28

Driving Global Impact Through Sustainability and Innovation

The company's expertise spans multiple critical sectors, including the transport industry (aviation, automotive, shipping), the sustainability and circular economy (decarbonisation, CO_2 credits, recycling), and the energy sector (bio-fuels, e-fuels, hydrogen). Studio 28's value proposition lies in Sales Strategy, Business Development, Negotiation, Partnership Strategy, and Government/Public Affairs & Advocacy, positioning it as a key partner for organisations looking to develop sustainable solutions.

PARTNERING WITH GLOBAL PLAYERS FOR MAXIMUM IMPACT

Studio 28's focus on collaborating with large international players is key to driving substantial sustainability outcomes. By partnering with multinationals, corporations, and leading industry stakeholders, it ensures that its projects scale effectively and reach a broad global audience. For instance, the company is currently working with a plastic bio-recycling company that has developed groundbreaking technology to enable the circularity of plastic in packaging and textiles. Plastic waste remains a major global issue, contributing to environmental degradation across oceans and landfills. This technology offers a game-changing bio-recycling process, ensuring that plastics can be fully recycled and reused without losing quality. Studio 28's role extends to forming strategic partnerships with international organisations to integrate this innovation into their supply chains, pushing forward the circular economy and significantly reducing reliance on virgin plastics.

Similarly, Studio28 is deeply engaged in the sustainable aviation sector. It collaborates with a company that supplies Sustainable Aviation Fuels (SAF) to airlines and corporations globally, addressing the urgent need for decarbonisation within the aviation industry. SAF provides a renewable and cleaner alternative to conventional jet fuel, relying on resources such as waste oils and agricultural residues. With aviation responsible for 2-3% of global carbon emissions, the adoption of SAF is essential in reducing these emissions. By fostering partnerships and generating demand for SAF, The company assists airlines and corporate clients in lowering their carbon footprints, achieving sustainability targets, and contributing to the global shift towards cleaner aviation.

FOUNDING A NON-PROFIT TO PROMOTE SAF IN ASIA

Beyond corporate partnerships, Studio 28 also works across the public, private, and non-profit sectors to drive sustainability. The company's CEO founded a non-profit association dedicated to advancing the development and adoption of SAF in Asia: the Asia SAF Association (ASAFA). This initiative takes a regional approach by bringing together all relevant SAF stakeholders—airlines, fuel producers, airports, technology providers, financers, governments, and NGOs.

Asia represents one of the fastest-growing aviation markets in the world, and its participation in the global SAF transition is critical. However, the region faces unique challenges, including regulatory hurdles, infrastructure limitations, and a fragmented market.

The non-profit tackles these challenges head-on, advocating for policy changes, fostering cross-border collaborations, and driving investment in SAF research, production, and distribution across Asia. By aligning Asia with global SAF targets while addressing its specific challenges, Studio 28 contributes to the wider goal of reducing global aviation emissions.

INNOVATION AND COLLABORATION: KEY DRIVERS OF CHANGE

Innovation is central to all Studio 28's projects. Whether it's supporting bio-recycling technologies or promoting SAF, the company is committed to pushing the boundaries of what is possible in sustainability. But innovation alone is not enough. Collaboration across industries and borders is essential to ensure these solutions are scalable and impactful.

For example, SAF adoption requires a comprehensive global supply chain linking sustainable fuel producers with airlines and airports. This includes not only advance-

ments in fuel production but also infrastructure development, regulatory frameworks, and global partnerships to support SAF use at scale. Studio 28 actively facilitates these partnerships, ensuring the necessary connections are made to bring these innovations to market.

Studio 28 is also deeply involved in the financial aspects of sustainable projects. Transitioning to clean fuels and technologies, particularly in sectors like aviation, requires significant capital. By working with investors and financial institutions, Studio 28 helps de-risk investments and create compelling financial models for companies looking to adopt sustainable practices.

LOOKING AHEAD: A COMMITMENT TO SUSTAINABLE PROGRESS

Studio 28 remains committed to driving sustainability on a global scale. It carefully selects projects based on their potential to make a significant impact on the industries that matter most to global sustainability efforts. By focussing on sectors like transport, energy, and the circular economy, Studio 28 ensures that its contributions are both strategic and transformative.

As the company looks to the future, it sees vast potential for growth in the areas of plastic recycling and sustainable aviation, alongside new opportunities in emerging sectors. By remaining at the forefront of innovation and fostering critical collaborations, Studio 28 is confident that it will continue to lead the charge in creating a sustainable future for both businesses and the planet.

In conclusion, Studio 28's systemic approach to sustainability, rooted in strategic partnerships and innovative solutions, ensures that it delivers valuable and large-scale impact. By aligning with global players and focussing on the sectors that matter most, Studio 28 not only contributes to a sustainable future but also sets new standards for how industries can evolve in response to the environmental challenges of our time.

Studio28

STUDIO28 LTD
7A Kovan Road I Singapore 544897
T: +65 8387 6379

STX GROUP (STX)

Empowering a Sustainable Future, One Commodity at a Time

STX Group is a leading global environmental commodity trader and climate solutions provider, dedicated to advancing the global transition towards a low-carbon economy. With nearly 20 years of experience in environmental commodities trading and 25+ years in climate solutions consulting, the company has been at the forefront of developing and promoting market-based solutions that drive decarbonization efforts worldwide.

Headquartered in Amsterdam, STX Group operates through 14 offices globally, with a diverse team of over 500 employees representing over 50 nationalities.

SUSTAINABILITY STRATEGY

STX aims to develop emissions reduction targets for all three scopes by late 2025. In order to quantify the impact that STX is able to generate, the company is refining a calculation methodology based on the EU RED II and RED III directives. The methodology quantifies the avoided emissions (Scope 4) generated through the trading of STX physical products, such as biofuels and biogas.

Since 2021, Vertis Environmental Finance has been an integral part of the group, enhancing its ability to connect suppliers of decarbonization initiatives with vital financing, ensuring that investments support genuine green and renewable energy projects.

Today, STX serves over 7,000 corporate customers worldwide, driven by its mission to mainstream green commodities in finance and empower corporations to actively contribute to the fight against climate change.

Looking ahead, STX's priorities include compliance with the EU CSRD (Corporate Sustainability Reporting Directive) and the integration of ESG risk management practices into its overarching risk management framework.

Strive by STX

As part of its business, STX provides Climate Solutions to corporations globally. STX created a brand specifically for this reason: Strive by STX. Strive by STX is the climate action arm of STX Group and its sole purpose is to guide corporations globally on their decarbonization journey, offering a wide range of climate solutions and access to the environmental commodities market.

STX'S COMMITMENT TO A GREENER, INCLUSIVE WORKPLACE

Whenever possible, STX prioritizes green initiatives in its offices, including a sustainable food system via its catering partners, waste separation and mindful printing practices. Central to STX's values are its key stakeholders: its dedicated employees.

Recognizing that people perform at their best in a supportive and trusting environment, STX implements policies that promote both physical and mental well-being. A sustainable future requires the involvement of everyone, regardless of background, culture, or individual differences. Emphasizing diverse voices and perspectives is vital to achieving the company's mission of a decarbonized world.

STX strives to create a workplace where everyone is encouraged to be their authentic self. The company's workforce is diverse, representing over 50 nationalities. In terms of gender diversity, 34% of employees identified as female and 66% as male in 2023.

TECHNOLOGY AND INNOVATION

STX deploys comprehensive climate solutions to help clients decarbonize while also effectively measuring, reducing, and managing its own carbon footprint. Sustainability is embedded in the company's mission, driving product and service innovation to achieve long-term environmental impact. STX offers a wide range of products designed to integrate renewable energy sources into the energy mix, while also providing financial tools that position environmental commodities as essential components of the market.

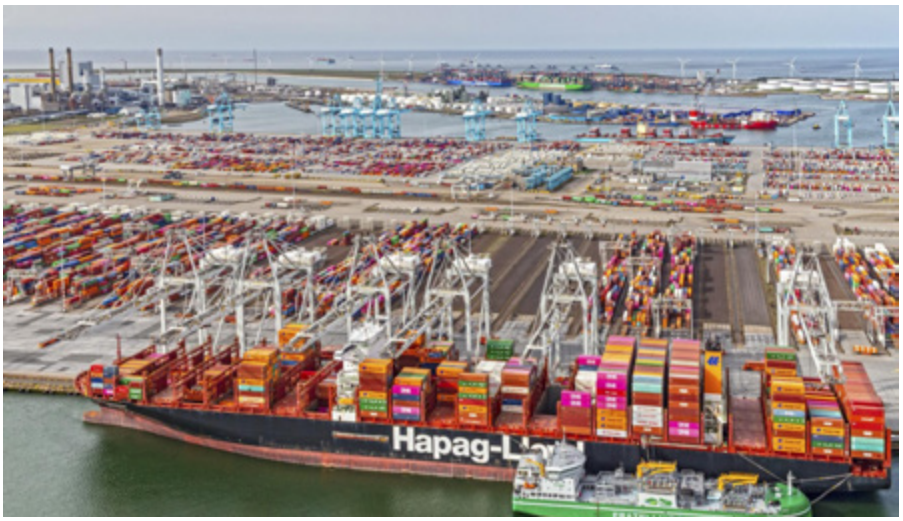
Notable innovations include the launch of a credit facility using environmental commodities as collateral and the financing of a biomethane plant. Recently, STX completed the largest ship-to-ship bunkering of 2,200 metric tons of liquefied biomethane for a container vessel, showcasing its renewable energy and decarbonization solutions tailored for the maritime industry.

Development of a Biomethane Plant

STX has invested heavily in technology to advance renewable energy production, including its partnership with BioValue for the construction and development of a biomethane plant. As a vital renewable component in the current fuel mix, biomethane's role in decarbonization has grown significantly. It also plays a crucial part in reducing carbon emissions within the transportation sector.

SUSTAINABLE SUPPLY CHAIN AND FUEL SOLUTIONS

STX does not have a complex supply chain. 94% of the purchased goods and services are service based companies (consultancy, SaaS, platforms, etc.) and the providers are



mostly based in the EU. Therefore, the risks of non-responsible practices within the supply chain of STX are quite limited.

For physical products such as biofuels and biogas, STX has held ISCC (International Sustainability and Carbon Certification) since 2020. Under this certification, the entire value chain of the fuel, from point of origin to final use, is audited annually by an external auditor to ensure compliance with the scheme's guidelines. These guidelines encompass regulations on deforestation, product restrictions, labor conditions, and safe working environments, among other key principles.

STX is beginning activities within the fuels value chain, working closely with fuel suppliers to build business cases aimed at reducing emissions and enhancing sustainability. Although this area of business is still under development, STX is positioning itself as a key partner in lowering the carbon footprint of the transport sector by providing sustainable fuel solutions.

STX recently enabled Hapag-Lloyd to bunker the largest quantity of liquefied biomethane to date. This pioneering deal demonstrates that bunkering large quantities of liquefied Biomethane is possible and scalable. The transaction marked Hapag-Lloyd's entry into using liquefied biomethane as sustainable shipping fuel and therefore an important step on their path to reach their goal of becoming net-zero by 2045. Liquefied biomethane is an established sustainable bunker fuel that can have net-zero emissions depending on the feedstock and is commercially available in Europe, Asia and North America.

STX'S ENVIRONMENTAL COMMODITIES AND SCOPE 4 EMISSION IMPACT

STX is positioned as a key enabler of financial instruments, specifically environmental commodities, that support both the energy transition and global decarbonization efforts. Recently, STX began calculating Scope 4 emissions, which quantify the avoided emissions enabled by a product or service compared to a conventional alternative.

In 2023, STX's biofuels and biogas helped reduce emissions by approximately 637,000 tonnes of CO2 equivalent, compared to traditional mineral oil and gas.

In the same year, STX launched a syndicated borrowing base credit facility of up to EUR 150 million. This was a major industry milestone, as it marked the first time the banking sector recognized the full value of a diverse range of environmental commodities as collateral—an essential step in levelling the playing field for the energy transition. Due to high demand at launch, the facility is now being expanded to EUR 375 million with an ESG KPI link.

SINGAPORE & ASEAN FOCUS

STX recognizes its vital role in the APAC region and feels a strong responsibility to support companies of all sizes in understanding their options, navigating upcoming regulations, and, most importantly, taking action to reduce emissions.

A key target of the Singapore Green Plan is to quadruple solar energy deployment by 2025. Through its daily activities in trading environmental commodities linked to these installations, STX facilitates the flow of financial investments from interested end-users to the owners of solar projects, enabling further investments in new technologies and helping to expand renewable energy capacity.

STX's expertise, highlighted by its recent bioLNG transaction in the shipping sector, aligns with the Energy Reset goal of the Green Plan. Under the Green Energy target, STX contributes indirectly to international goals, such as the International Maritime Organization's objective to cut greenhouse gas (GHG) emissions from international shipping by at least 50% by 2050 (compared to 2008 levels), with a long-term aim of phasing out GHG emissions within this century. BioLNG is emerging as a viable solution for decarbonizing the shipping industry.

In addition, STX actively supports the Singapore-Rotterdam Green and Digital Shipping Corridor (GDSC) through its recent bioLNG transaction with Hapag-Lloyd, a major partner in the Singapore-Rotterdam trade route.

STX

STX GROUP
Afro Asia I 63 Robinson Road, #16-01 I Singapore 068894
W: www.stxgroup.com
T: +65 6371 9516

TOTALENERGIES

More Energy, Less Emissions

TotalEnergies is a global integrated energy company that produces and markets energies: oil and biofuels, new low-carbon energies, renewables, and electricity. Its 100,000 employees are committed to provide energy that is more reliable, affordable and sustainable to as many people as possible. Present in over 120 countries, and active in Singapore since 1982, TotalEnergies places sustainability at the heart of its strategy, its projects and its operations.

Rising to the dual challenge of meeting the energy needs of an ever-growing world population while reducing global warming, TotalEnergies has continuously stayed the course of its integrated and balanced multi-energy transition strategy – hydrocarbons, especially LNG and Integrated Power – reasserting its ambition of achieving carbon neutrality by 2050, together with society.

As part of its transition strategy to achieve its 2050 Net Zero Ambition, together with society, the company affirms its purpose: to provide as many people as possible with energy that is more reliable, more affordable and more sustainable, and has placed Sustainability at the heart of its strategy, its projects and its operations. Its commitment is based on the values defined in the company's Code of Conduct and its approach to sustainability is structured around 4 axes:

- Climate and sustainable energy,
- Caring for the environment,
- Acting for the well-being of employees
- Having a positive impact for stakeholders

LOW-CARBON INVESTMENTS

TotalEnergies continues to adopt a disciplined investment approach. In 2023, the Company invested $16.8 billion of which 35% in low-carbon energies, mainly in power. These massive investments have made it possible to increase its capacities in renewable electricity production (by +6 GW in 2023), storage, flexible production, and distribution (60,000 charging points for electromobility at the end of 2023 including more than 1,000 high-power charging points).

STRENGTHENING PRESENCE IN RENEWABLE ENERGIES

As part of its transition strategy to achieve is 2050 Net Zero Ambition, together with society, TotalEnergies is building a world class cost-competitive portfolio combining renewables (solar, onshore and offshore wind), low carbon fuels and flexible assets (flexible gas power plants, energy storage) to deliver clean firm power to its customers. In 2023, TotalEnergies' net electricity production amounted to 33 TWh, including 19 TWh of renewable power. The Company aims to grow its power generation to more than 100 TWh by 2030. Its growth in power, with a renewable electricity generation portfolio representing more than 80 GW (including 22 GW of gross capacity already installed), positions TotalEnergies as one of the world's leading solar and wind developers in 2023, with an ambition to be among the world's top 5 by 2030 (excluding China).

In Asia, TotalEnergies renewables activities in operation and under development encompasses solar (large scale and distributed generation), offshore wind and biogas.

COMPREHENSIVE SOLAR SOLUTIONS FOR BUSINESS

Spotlight on Distributed Generation (DG) Solar Asia Pacific.

Dedicated to distributed solar energy for B2B customers and active since 2018 in Asia, TotalEnergies Renewables Distributed Generation (DG) is a major provider of integrated distributed solar energy solutions for the commercial and industrial sector in 11 countries in the Asia-Pacific (APAC) region, producing approximately 500 GWh of clean electricity annually. Its joint venture with ENEOS Corporate in 2022 aims to jointly develop 2GW of decentralised solar capacity in the region in the next five years.

Supporting customers in their decarbonisation journey.

TotalEnergies Renewables DG's fully integrated no-CAPEX solutions are designed to help customers reduce their energy bill and lower their carbon footprint. Its business model is designed to offer specialised, competitive solutions to B2B customers through long-term Power Purchase Agreement (PPA). To meet their needs, TotalEnergies Renewables DG provides a range of tailor-made photovoltaic (PV) solar systems that can be

installed on rooftops, car-port structures, water spaces or vacant land.

PPAs provide a viable financial model that allow customers to adopt solar energy without upfront capital expenditures, making it easier for businesses to transition to renewable energy. Through these corporate PPAs, long-term energy solutions that provide cost savings and price stability are available, making decarbonisation efforts more attractive and more feasible for businesses to adopt.

Managing the entire process for customers —development, financing, construction, and operation of solar PV systems installed on its customers' sites, PV Solar Systems are targeted to be fully operational within 6-12 months depending on the site. Customers pay only for the power generated, resulting in immediate energy bill savings supporting their sustainability efforts.

Beyond the business model, a key differentiator in today's competitive market is the rigorous standard of safety requirements. TotalEnergies ENEOS, a joint venture between two global energy majors, stands out due to its long-running expertise and high-level industry standards. Prioritising Health, Safety, and Environment (HSE) not only safeguards the workforce and the communities served but also reinforces its value as a responsible and reliable partner in the renewable energy sector.

TAILORED SOLUTION TO MEET INDUSTRIES' NEEDS AND REQUIREMENTS

Diversifying its business portfolio, TotalEnergies Renewables DG extends standard rooftop solar solutions to include BESS (Battery Energy Storage System), floating technology, agri PV projects and offsite solutions. The most recent projects that highlights the innovative solutions offered to customer in the APAC region include:

Hybrid Solar and Energy Storage System

Kulara Water project in Cambodia featuring a 800 kilowatt-peak (kWp) ground-mounted solar system connected to a 1344 kilowatt-hours (kWh) battery system. In this project, solar energy is used during the day and excess power is stored in the batteries for use during the night.

Floating Solar and Agri-PV Projects

TotalEnergies ENEOS first floating solar project S. Kijchai Enterprise in Thailand: a unique 1.8-megawatt peak (MWp) floating solar PV system project signed, delivering an innovative tailor-made solution that precisely meets the customer's demands.

TotalEnergies ENEOS first agricultural ground-mounted solar project with Hiep Phat International Agricultural Co. Ltd in Vietnam. This 2.1 megawatt-peak (MWp) ground-mounted solar PV system supports the customer's plan to grow plants below the panels, including herbs for food to grow organic chickens and develop its agricultural businesses.

WHAT THE FUTURE HOLDS

The increasing awareness and urgency around climate change has fuelled demand for renewable energy solutions. Governments and corporations are setting ambitious sustainability targets, creating a favorable environment for renewable energy investments.

TotalEnergies Renewables DG APAC portfolio continues to expand its portfolio in existing markets and new markets (Taiwan and South Korea in 2024). In July 2024, the company achieved another milestone with over 200 MWp of operating onsite solar assets in 9 countries, in partnership with more than 190 B2B commercial and industrial (C&I) sites.

Future of distributed generation is related to its expansion in size but also in diversification of its offer while further supporting our B2B customers. The company contracts PPA with its customers for 15 to 20 years, and as such, enters a long-term partnership with its B2B customers. The evolution of the company towards a multi-energy approach will allow it to expand its offers to its customers on their energy transition to decarbonation, tailoring solutions to meet each customer's specific needs, complying with local regulations and anticipating new market trends.

TotalEnergies

TOTALENERGIES RENEWABLES DG DEVELOPMENT ASIA PTE LTD
182 Cecil Street I #27-01 Frasers Tower I Singapore 069547
W: www.solar.totalenergies.asia

WABIO

Turning waste to bioenergy. A greener world here and now

WABIO Group is an international leader in biogas technology and biomethane production. The company designs, oversees construction, commissions and operates the currently most efficient biogas plants. WABIO processes its biogas into biomethane (RNG - renewable natural gas), technical CO_2 and/or electricity. WABIO's biomethane is used as injection to the gas grid, for cooking and heating in homes, and in compressed format (bio-CNG) for transport vehicles or industrial use, or in liquified form (bio-LNG) as biofuel for heavy duty transportation. Its by-products are organic fertiliser and technical CO^2 in the form of dry ice or liquid CO^2 for the beverage industry, for example. All from organic and animal waste sources, using WABIO's own energy for production, and in a circular manner. Clean energy at its best!

WABIO's biogas plants generate renewable green biogas to power industries, homes, and transport systems.

CONVERTING WASTE TO GREEN BIOGAS ENERGY

The agricultural, food and beverage sectors, and cities generate enormous quantities of organic solid waste, which is indiscriminately dumped or burnt by farmers with little to no knowledge of waste disposal practices. Global leaders are therefore prioritizing effective waste management regime initiatives with ever-increasing agricultural production to reduce human and environmental health stress while increasing farmers' awareness.

Farmers see an immense potential for agricultural waste in generating bioenergy. It does not just reduce the health menace arising from open-field agricultural solid waste composting and fermenting, but it also aids in alternative energy production. Not to mention that energy costs for a biogas plant are limited to electricity and heat usage, which WABIO plants produce themselves. A fully circular model. WABIO is at the leading edge of offering biogas technologies to turn waste into (energy) wealth. It transforms any organic feedstock into electric power, biomethane, bio-compressed natural gas (bio-CNG), bio-liquified natural gas (bio-LNG), heat, green liquid CO_2, dry ice, and carbonised CO_2 and even green hydrogen!

"We have come a long way from starting as an R&D company in 1990 to constructing the world's biggest commercial biogas plant (of 30 MWth) in 2020. Our waste-to-green-energy technology is the culmination of years of experience and research applied directly into its plants," says Raphael Fitz, CEO of WABIO. Today, the WABIO plant designs reach up to 120 MWth and are still growing. WABIO's intense passion for making the world a better place is seen in its work and name, an abbreviation for "We Are Bioenergy." With its best-in-class biogas plant technology, WABIO does not simply solve waste management challenges, but WABIO makes waste profitable with practically unlimited plant sizes.

BIOENERGY OPERATIONS WITH BREAKTHROUGH TECHNOLOGY

Operations start with the trucks delivering agricultural and solid municipal waste to the plant. The waste is separated based on wet and dry fractions and taken to different treatment areas. A pre-treatment process helps separate packaging material and sort inert inorganic materials like metals, glass, gravel and plastic.

Organic substrates are taken to pasteurising systems, where pathogens are eliminated by heating the substrate at min. 70 degrees Celsius for one hour. The next stop is a hydrolysis tank as a separate treatment station tank to enable material (especially lignocellulosic material) to be digested efficiently. Thereafter it runs through three separate fermentation stations, each of them enhancing the efficient fermentation of different materials. This is where most of the biogas is produced, at about 40 degrees Celsius. It is then transported to the gas storage system.

Biogas is cleaned, compressed, and used to produce either biomethane or other CH4 (methane) products, heat or electricity. WABIO's biogas technology stands out from the rest of conventional biogas practices as it can generate more than 4 times as much green energy from municipal solid organic waste as conventional refuse-derived fuel (RDF) plants.

WABIO® is also the only proprietary and patented methane fermentation operation – aka biogas technology- to efficiently process lignocellulose, the plant dry matter basic structural part of a plant cell wall. Such materials include rice husk, rice straw, wheat straw, palm and sugar cane waste, food and animal waste and many others.

WABIO has established partnerships with ambitious net-zero pledged players in the food and agricultural domain. They guarantee the feedstock and the offtake agree-

ment, while WABIO makes revenue from the sales of electric power, methane products, industrial gases, and its by-products, e.g. organic fertilisers. Through its endeavors, WABIO is helping the food & beverage and agricultural sectors get a step closer to achieving an ideal circular economy.

A COMBINATION OF NOT ONE BUT MANY ALTERNATIVES TO FOSSIL GAS

There are several sustainable alternatives to fossil gas that can be used to reduce greenhouse gas emissions and transition to a more sustainable energy system. Those are namely directly produced renewable electricity such as wind and solar power, green hydrogen from various sources and biogas. While each source is largely discussed, the place of biogas is still far below its potential. So why is biogas important in the context of climate change and energy source mix? The reality is that there is not one alternate source of energy but a mix of energies, depending on the geographical, environmental, and socio-political contexts. The solution to energy transition is in proposing an energy mix that is adapted to the regional context with a combination of measures to improve energy usage – in other words, identifying the most sensible and effective solution for each specific context. Proposing only one source of energy is unrealistic due to the intermittency of renewable power (wind, sun, waves, etc.) and to the availability of raw material sources (such as mining and feedstock) required for operation.

PRESENCE IN THE APAC

WABIO's main market is Germany, its home base market, along with other EU countries. In the Asia Pacific region, WABIO has delivered a 30Mth plant in the Harbin area, China, that runs only on wheat straw as waste input, to deliver biomethane as Bio-CNG for transport vehicles. It also has an operational 12MWth plant in East Kalimantan, Indonesia, running on palm waste since 2010. WABIO plans to expand in the region, as the regulatory environment matures.

"We have come a long way from starting as an R&D company in 1990 to constructing the world's biggest biogas plant in 2020. Our waste-to-green-energy technology is the culmination of years of experience and research." Rapahel Fitz, the CEO of WABIO Technologie GmbH

WABIO

WABIO
101 Telok Ayer Street | #03-02 | Singapore 068574
W: www.wabio.asia
T: +65 9454 4545

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300+
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150+
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33 %
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~USD $11,170,854
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IB CONTINUUM

Website: xwa.edu.sg
Enquiries: +65 6230 4230
Email: admissions@xwa.edu.sg
Address: 2 Yishun Street 42, Singapore 768039

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SINGAPORE AND BEYOND EXCELLENCE IN SUSTAINABILITY

EuroCham SINGAPORE

BIOME

Claiming Subconscious Narratives for Impactful Growth: The Sum of Your Decisions Tells A Story

Biome Entertainment is a Singapore-based social enterprise for narrative excellence innovation through counsel and integrated media messaging services, providing systematic and strategic ESG communications and culture-building for internal and external growth solutions. As a globally active media and entertainment specialist, Biome also develops original feature film IP. Working with clients, Biome helps organisations uncover and redefine the underlying narratives that drive their operation practices. This approach not only reduces costs but also strengthens market authority and tackles complex challenges related to productivity, governance, talent development, and corporate social responsibility (CSR). Biome views storytelling as a vital tool that connects economy and trade with humanity, dialogue, and social governance. The company believes that sustainability efforts can enhance humanitarian leadership in industries, bringing benefits to both economies and communities. For Biome, storytelling is seen as a form of social responsibility.

UNCOVERING THE STORY YOU'RE ALREADY TELLING

Every business operates based on an underlying worldview which contextualises how the entity functions within a market ecosystem, informing the sum of organisational choices. It also often reveals mindsets regarding leadership, employee upskilling, and feedback loops. But what if the sum of these business decisions tells a different story from the mission statement? This is a widespread issue across various sectors and a significant barrier to achieving sustainability leadership.

At Biome Entertainment, the company frames and addresses this issue through what they refer to as the "Subconscious Narrative" of an organisation. Uncovering the Subconscious Narrative is the key to organisational excellence and a corporate culture that enables sustainability legacy-building. Investigating their methods and practices, Biome has developed not just a toolkit for other organisations, but also amplified industry leadership and B2B impact excellence.

STORYTELLERS FOR STEWARDSHIP

In recent years, the idea of a "business narrative" has become both a buzzword and a surface plaster for PR, while businesses have had to spend enormous sums on external positioning. However, external branding does not address the crucial alignment of strategic stewardship and organisational mission.

To succeed sustainably in every way, businesses must embrace their compliance and goals as mutual growth factors from the inside out. Especially in impact finance, decisions on operations and corporate culture need to consistently align with the storyline set by the sustainability roadmap to reinforce and expand outcome-driven value chains.

The human brain is wired to utilise narrative structure – stories – to make sense of experiences and knowledge. Economists' theories have by now widely adopted interdisciplinary approaches that acknowledge societal narratives, though their structures probably remain best understood through the craft of storytelling itself.

Biome taps into the brain's natural process of recognising problems and finding solutions, utilising creative storytelling techniques from fields such as cinema, literature, design thinking, economics, social sciences, and psychology to enhance this understanding. With this core expertise and a strong focus on social impact, Biome delivers a distinctive, boutique value proposition. The company redefines Subconscious Narratives, empowering organisations and leaders to intentionally and intelligibly enhance both their performance metrics and relationships.

CASE STUDY: TRANSFORMATIVE CORPORATE VIDEO STRATEGY: FROM ONE VIDEO TO A FIVE-PART SERIES

When an organisation approached Biome for a corporate video, the team sought to explore how the media project could significantly boost the client's KPIs. The client aimed to communicate a major rebrand in support of expansion plans and had a clear vision for their goals. However, the challenge lay in addressing vastly different target audiences. A single stand-alone video, while aligned with the brief, might not have fully addressed the client's broader needs.

Biome conducted a two-month investigation into the organisation's corporate culture through anonymous surveys, staff interviews, and field research. As a result, they developed a five-video series, rather than a single video, all within the original budget. The deliverables captured the organisation's mission and value proposition from the inside out. The client received 39 minutes of original content, shot to cinema standards both on location in downtown Singapore and in a custom-built film studio. In addition to the video series, they were provided with integrated branding collateral for both the organisation and their partner. The video series was utilised to raise funds, engage stakeholders, enhance corporate culture awareness, develop talent, and strengthen the client's authority and presence in their field.

Empowered to Evolve with Conscience

Biome views strategy as a catalyst for evolving Standard Operating Procedures (SOPs), helping organisations achieve both their short-term and long-term goals while maintaining cost efficiency. The focus is on purposeful, collective progress toward building a united, global community.

The most successful businesses and leaders align their corporate identity with their core intentions. These early adopters of reflective practices regularly evaluate whether their organisations truly "walk the talk." When standardised processes do not align with organisational goals, conflicting narratives can emerge, potentially hindering progress and innovation.

CASE STUDY: INNOVATING THE INDUSTRY

Biome produced a short film focussed on female empowerment, centred on a protagonist facing psychological and emotional instability, ultimately spiralling into a crisis she must overcome. The role required an actor capable of portraying an intense emotional breakdown. Concerns arose over potentially high costs, as filming emotionally charged scenes often takes considerable time. However, the key success factor in capturing these challenging moments revealed both the problem and its solution. This led to a strategic pivot, allowing Biome to redefine industry best practices for social sustainability while also reducing costs.

Intimacy Coordination, a well-established film department in Hollywood, is still relatively new in Southeast Asia. Typically reserved for scenes involving nudity, it is not commonly used for dramatic scenes without explicit content. Recognising that a safe work environment was essential for improving performances while reducing the shooting schedule, Biome introduced an Intimacy & Mental Health Coordinator early in the script phase. By planning all film set activities through a lens of female empowerment and staff well-being, in line with the film's narrative, Biome's innovative approach resulted in fast, socially responsible outcomes and a 50% reduction in production costs. This strategy also attracted the attention of a major camera brand with a CSR interest in the project's approach. The crew, feeling motivated and supported, delivered their best work, while high-skilled talents from Singapore and Europe joined the production.

Currently, Biome is exploring the film's potential as a social impact and engagement tool with a charity partner, preparing for international screenings, and expanding its value chain. Additionally, the new process they implemented has positioned them at the forefront of the industry, showcasing their values and identity.

Impacting For Impact

The sustainability conversation in APAC's impact finance landscape is increasingly focussing on how products and business partners contribute to another organisation's ESG impact.

Biome aligns its services with the sustainability goals of its partners, creating a ripple effect that benefits partnerships, supply chains, and communities. As impact measures evolve, Biome closely monitors how its services influence the ESG outcomes of clients, vendors, and partners. By applying a cross-departmental process that integrates various impact factors, Biome helps clients reduce the costs of media projects. This approach often leads to shorter production schedules, which in turn reduces carbon emissions and the environmental footprint related to logistics, equipment use, and water resources.

Biome advocates for communication as a tool for fostering positive socio-economic change. By identifying synergies, promoting community social impact, and ensuring cultural sensitivity, Biome supports intercultural collaboration and leadership that is both unified and humanistic. Understanding an organisation's identity and intentions is key to shaping meaningful intergenerational impact.

BIOME ENTERTAINMENT

BIOME ENTERTAINMENT PTE LTD
300 Beach Road I #32-07 The Concourse I Singapore 199555
W: www.biomeentertainment.com

MARQUIS ENERGY GLOBAL

The Next Generation of Bio-Ethanol

Recent technological advancements in biofuel production have positioned the new generation of bio-ethanol as a crucial tool for decarbonisation, thanks to its versatility, availability, and affordability. Nearly 50 years into its journey, Marquis has focussed on continually innovating towards a circular carbon economy to distribute this low-carbon energy source on a global scale.

Situated on the river in Hennepin, Illinois, the Marquis production facility is the largest dry-mill bio-ethanol facility in the world, producing 1.5 billion litres of bio-ethanol annually. As part of the Marquis group of companies, Marquis Energy Global (MEG) was established in Singapore in 2017, with a presence in both Asia and Europe. Committed to the circular carbon economy, MEG ensures the efficient transportation and distribution of this low-carbon fuel worldwide, enhancing the sustainability impact of Marquis.

TECHNOLOGICAL ADVANCEMENTS

Bio-ethanol has significantly evolved to become more sustainable, with dramatic improvements in crop yields being a key contributor. Since the 1920s, corn yields have increased sevenfold, with some of the highest yields surrounding the Marquis Industrial Complex, surpassing 200 bushels per acre.

As part of the International Sustainability and Carbon Certification (ISCC) process, Marquis collaborates with local farmers to promote transparency and sustainable farming practices, enhancing soil health and ensuring all emissions (Scope 1, 2, and 3) are measured, calculated, and verified. Advancements in seed technology and precision farming have driven yields up while enabling site-specific operations, reducing waste and enhancing productivity with precise input application, resulting in less fertiliser usage and reduced irrigation.

The Marquis Industrial Complex is strategically located on top of the Mt. Simon sandstone formation, ideal for CO_2 storage. The Marquis Carbon project, set for completion in 2025, will permanently store 1.2 million tonnes of CO_2 annually through Bio-Energy Carbon Capture and Storage (BECCS). Additionally, the facility is installing Combined Heat and Power (CHP) to reuse heat generated during production, further trending the Marquis bio-ethanol CI towards net zero and even negative values.

These advancements ensure that corn-ethanol and Marquis meet stringent sustainability criteria, maintaining their status as competitive and environmentally friendly energy sources.

Decarbonising Transport

Marquis Energy Global (MEG) plays a pivotal role in reducing greenhouse gases (GHGs) in transportation by distributing low-carbon bio-ethanol to the EU and Asia. This fuel is utilised by fuel blenders to decrease GHGs and emissions in petrol.

Since the implementation of the Renewable Energy Directive (RED) in 2009, the EU has set ambitious renewable energy targets for transportation, with bio-ethanol being integral to these efforts. In 2019, the use of bio-ethanol in the EU reduced GHG emissions by an estimated 9 million tonnes, equivalent to removing approximately 2 million cars from the road. A study by the University of Illinois at Chicago found that higher ethanol blends can reduce vehicle emissions, lower GHGs, and improve urban air quality.

Bio-ethanol is also making strides in aviation as a sustainable feedstock for Sustainable Aviation Fuel (SAF). Marquis is exploring the feasibility of building a SAF plant to further decarbonise both road transport and aviation. In aviation, bio-ethanol can be converted into SAF, reducing emissions from combustion and the formation of contrails, which are significant sources of pollution.

Alternative Sustainable Options to Electric Vehicles

Bio-ethanol presents a practical and affordable alternative to electric vehicles (EVs), especially in regions where EV infrastructure is underdeveloped. Its compatibility with existing fuel infrastructure allows for immediate reductions in greenhouse gas emissions and air pollutants. In densely populated Asian megacities, crop-based bio-ethanol offers a versatile fuel solution that can be rapidly deployed to improve air quality and reduce carbon footprints.

Several automakers have recognised the benefits of hybrid vehicles. A comparative study conducted in the EU evaluated Battery Electric Vehicles (BEVs) against Plug-in Hybrid Electric Vehicles (PHEVs) fuelled with an E85 (85% bio-ethanol) blend. The findings revealed that hybrids combined with bio-ethanol could have lower emissions than BEVs. This approach provides an option that uses fewer natural resources for battery production due to the smaller battery size required for hybrids.

Marquis is also pioneering next-generation fuels with even lower carbon intensity. Partnering with LanzaTech, Marquis is utilising biogenic CO_2 from the fermentation process and enzymes to produce e-fuels. Actively working on this breakthrough to prepare for the future of no-carbon fuels, this method allows for the recycling of CO_2 already released into the atmosphere.

Sustainable Aviation Fuel in Singapore and Asia

Bio-ethanol has been a common oxygenate for on-road fuel in Asia since the early 2000s and has emerged as a key component in the quest for sustainable energy in the region. For aviation, Singapore recently introduced the Sustainable Aviation Air Hub Blueprint, mandating the use of Sustainable Aviation Fuel (SAF). A key advantage of this initiative is its feedstock-agnostic approach, fostering competition and innovation. This inclusive policy framework enables the integration of various sustainable feedstocks, including crop-based bio-ethanol, into the aviation fuel supply chain. By creating a framework to increase SAF volumes, Singapore promotes competitive pricing and enhances the overall sustainability of aviation fuel.

Building on these benefits, Marquis has strategically established storage tanks in Asia, optimising energy and cost savings in the bio-ethanol supply chain. Marquis is actively involved in promoting the use of bio-ethanol in Singapore, aligning with Singapore's Green Plan Roadmap.

ADVANCING A SUSTAINABLE FUTURE THROUGH COMMUNITY AND INNOVATION

Reflecting on the advancements and potential of bio-ethanol, Marquis leads the way towards a circular carbon economy. Rooted in community, Marquis envisions a future where the next generation can enjoy a more sustainable world with less carbon. Marquis believes that these strong community ties foster better innovations, supporting both the environment and society for a harmonious and sustainable energy future.

MARQUIS ENERGY GLOBAL

MARQUIS ENERGY GLOBAL PTE LTD
76B Tras Street | Singapore 079015
W: www.marquisinc.com

NANYANG TECHNOLOGICAL UNIVERSITY (NTU)

Walking the Talk as a Sustainable Campus

Nanyang Technological University, Singapore (NTU) is one of the top universities in Asia and ranks within the top 50 globally. As a living testbed for tomorrow's technologies and a model of sustainability, NTU aims to become carbon neutral by 2035. Despite accommodating over 42,000 students and employees on its 200-hectare campus, NTU has successfully reduced carbon emissions and waste by 30% since 2011. The university has received multiple accolades for its sustainability efforts and ranks among the world's top 50 universities in the 2024 QS World University Sustainability Rankings.

SUSTAINABILITY STARTS ON CAMPUS

Over the years, NTU has developed its expertise in sustainability through extensive efforts in education, research, and innovation. As a leading research-intensive university, NTU recognises the need to address global threats to sustainability and other grand challenges facing the world. In 2021, the University launched its 15-year Sustainability Manifesto, grounded in the belief that sustainability efforts must begin on campus, and that the University must exemplify its commitment to sustainability in practice.

The NTU campus is a model of sustainability, with 100% of its eligible buildings certified BCA Green Mark Platinum, the highest green building rating from Singapore's Building and Construction Authority (BCA). NTU also boasts eight Zero-Energy buildings on campus, the highest number among organisations in Singapore.

Furthermore, NTU is home to two of the largest Mass Engineered Timber buildings in Asia, with the latest addition, Gaia, launched in 2023. This innovative construction technology has allowed the University to minimise the buildings' environmental impact, including embodied and operational carbon levels.

NTU has also installed over 25,000 photovoltaic (PV) solar panels on the roofs of campus buildings to offset the University's electricity consumption with green energy. This is one of the largest PV installations by a single entity in Singapore, accounting for about 1.5% of the total PV capacity in the country. NTU's PV farm generates approximately 11.7 million kWh of electricity annually, enough to power more than 2,870 four-room HDB flats for a year.

SUSTAINABLE PRACTICES AND ENERGY CONSERVATION AT NTU

NTU actively manages and reduces carbon emissions from campus operations through various measures. One significant initiative is the implementation of more Passive Displacement Ventilation (PDV) systems for energy-efficient space cooling. Unlike traditional systems, PDV relies on natural convection for air circulation, saving NTU about 2.4 million kWh of electrical energy annually, equivalent to powering over 580 four-room HDB flats for a year.

For water conservation, NTU introduced plug load controllers that cut off the power supply to water dispensers after operating hours, preventing unnecessary energy use in maintaining hot or cool water. This initiative saves an estimated 469,970 kWh of energy annually, enough to power over 110 four-room HDB flats for a year. Additionally, more than 1,100 urinals were treated with probiotic pellets, reducing water used for flushing and saving about 68,427.77 m^3 of water annually.

NTU also installed automatic systems to close the sashes of approximately 1,000 fume hoods in various labs when not in use, eliminating energy wastage. This measure saves 3.4 million kWh of electrical energy annually, sufficient to power over 850 four-room HDB flats for a year.

COLLABORATIVE EFFORTS LEADING TO EMERGING TECHNOLOGIES

Investment in sustainability-related research and development is crucial as it creates a broader impact for Singapore and beyond. NTU achieves this through collaborations

with key industry players, leading to the implementation of emerging technologies that promote environmental sustainability. Some notable initiatives from NTU include:

- NTU researchers from the Energy Research Institute (ERI@N) using metal-eating microbes to recycle lithium-ion batteries.
- NTU exploring a hybrid energy generation system, in collaboration with NUS and Keppel Infrastructure, that utilises wind, solar, and tidal energy.
- NTU advancing sustainable lithium battery technologies in collaboration with Livent Corporation.
- NTU establishing a joint research institute with Indonesia to co-develop research and academic programmes focussing on climate change and sustainable development.
- NTU improving solar recycling in partnership with Maxeon Solar Technologies.

SUSTAINABILITY IN THE CURRICULUM

As an Institute of Higher Learning, NTU is dedicated to fostering greater awareness and commitment to environmental sustainability through education. This is demonstrated by the University's integration of sustainability principles into its curriculum across various disciplines, equipping students with the knowledge and skills to address global sustainability challenges effectively.

To date, NTU offers more than 200 sustainability-related courses for students of all levels and backgrounds, as well as working professionals. Sustainability is also available as a second major for all single-major programmes across four colleges. Additionally, an interdisciplinary PhD programme in AI and Sustainability aims to produce a new generation of scientists with expertise in Artificial Intelligence to tackle critical environmental challenges. This programme is the latest among the University's degree offerings in its Business, Computing & Data Science, Engineering, Humanities, Arts & Social Sciences, Medicine, Science, and Graduate colleges.

ENGAGING ACTIVITIES IN SUSTAINABILITY AND ENVIRONMENTAL STEWARDSHIP

NTU organises a variety of programmes and activities covering a wide range of sustainability and environmental stewardship topics. For example, the University's annual student-led Green for Good event galvanises the NTU community into collective action to cultivate environmentally friendly practices. NTU's Sustainability Month attracted more than 15,000 participants and over 70 partners and featured "NTreeU," a tree-planting initiative supporting the National Parks Board's OneMillionTrees movement. Through these initiatives, the university community is empowered to collectively contribute to environmental protection.

NTU'S CONTRIBUTIONS TO ADVANCING CLEAN ENERGY IN SINGAPORE

NTU's Sustainability Manifesto and its related initiatives align with the Singapore Green Plan 2030, which champions sustainable development. For instance, recent research from NTU uncovered a significant geothermal resource in Singapore, which could provide a consistent source of clean energy alongside solar power. In resource-limited Singapore, such discoveries are crucial for national-level decarbonisation efforts.

To help Singapore develop smarter, more resilient energy grids, the Renewable Energy Integration Demonstrator-Singapore testbed, led by ERI@N, explores the compatibility of various renewable sources with energy storage systems such as batteries and hydrogen fuel cells. Data from this testbed will be used to advance the development of more intelligent and robust energy grids in Singapore. NTU's work and efforts support ongoing national initiatives to develop new sustainability solutions, creating a greater impact for Singapore and the region in the long run.

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

NANYANG TECHNOLOGICAL UNIVERSITY (NTU)
50 Nanyang Avenue | Level 6, Administration Building | Singapore 639798
W: www.ntu.edu.sg
T: +65 6791 1744

OCBC

Promoting the Greening of our Economies: Tailored ESG Solutions

With a deep history in Asia, OCBC offers comprehensive banking, wealth management, insurance, and asset management services across ASEAN and Greater China, complemented by a presence in leading economies such as New York, London, and Sydney. As One Group, OCBC supports clients' ambitions across borders with deep local knowledge – whether growing their personal wealth or capturing business opportunities.

OCBC is committed to leveraging its multifaceted businesses to channel capital towards sustainable initiatives that promote the greening of our economies. Concurrently, it is dedicated to enhancing the wellbeing of employees and the communities it serves, while upholding robust governance systems to ensure the soundness of its operations.

On the sustainable investing front, OCBC prioritises understanding customers' individual goals, needs, and preferences through ESG product offerings targeted at four different customer segments – high-net-worth individuals, retail customers, corporate clients, and institutional clients.

A SUSTAINABILITY FRAMEWORK

OCBC's LIFFR (Lasting Value, Integrity, Forward-looking, Respect, and Responsibility) forms the foundation of its Sustainability Framework. These core values guide the bank's approach to sustainability, emphasising long-term climate actions and community development efforts to deliver positive environmental and societal impacts responsibly.

The OCBC Sustainability Framework underscores the company's "ABC" sustainability imperatives: 'Accelerating the Transition to a Net-Zero Future', 'Bringing Impact to Communities', and 'Conducting Our Business Responsibly'. It also highlights the ESG factors prioritised to drive performance and impact.

THE TRANSITION TO A NET-ZERO FUTURE

When it comes to sustainable financing, OCBC is committed to accelerating the transition to a net-zero future and believes that supporting the climate transition is crucial in helping to shape a sustainable world. The bank has been offering its clients solutions across sectors as early as 2018 and continues to expand its sustainable finance expertise across key markets in Singapore, Malaysia and Greater China.

Fabric dyeing at Ghim Li's fabric mill.

OCBC's efforts through these initiatives demonstrate their leadership in fostering sustainable development and supporting businesses in their journey towards sustainability.

In 2023, OCBC launched the OCBC 1.5°C loan, taking a concrete step to partner with clients on their net-zero journey. This market-first sustainability-linked loan was designed to drive the transition to a low-carbon economy, offering corporations a reduced interest rate on their loans when they meet or exceed carbon emissions reduction targets aligned with internationally recognised, science-based net-zero decarbonisation pathways.

OCBC collaborated with City Developments Limited (CDL) to deliver its first 1.5°C net-zero-aligned corporate loan. The three-year £200 million sustainability-linked loan reflects CDL's commitment to decarbonising its business, aiming for a net-zero carbon target by 2030 for new and existing wholly-owned assets and developments under its direct operational and management control.

The insights gained from working with clients who take up the OCBC 1.5°C loan have enabled OCBC to better support their transition plans with suitable advisory and financing solutions.

Green Loans and Carbon Credits

OCBC partnered with Frasers Centrepoint Trust to deliver Singapore's first comprehensive green financing solution, valued at S$419 million. This includes a green loan and carbon credits. Proceeds from this innovative financing solution will be used for the refinancing of a maturing facility, asset enhancement initiatives, decarbonisation projects such as procurement of energy effi-

Republic Plaza, CDL's flagship development in the heart of Singapore's central business district

OCBC has close to 420 branches and representative offices in 19 countries and regions

cient technology for a shopping mall building (Tampines 1), and other general corporate purposes. The carbon credits, sourced through OCBC's Emissions Trading Desk, will be invested in Verra or Gold Standard certified carbon reduction nature-based projects.

Simplifying Carbon Accounting for SMEs

OCBC collaborated with STACS, a leading ESG data and technology company in Asia, to simplify carbon accounting for SMEs. By leveraging STACS' technology, Ghim Li Group was able to share its data and reports with both OCBC and its customers, providing context on how the company measures, reports, and manages its carbon emissions. This resulted in OCBC offering a S$16 million sustainability-linked loan to support Ghim Li Group's ongoing commitment to monitoring and reducing its emissions. Through collaboration with technology partners, OCBC is dedicated to simplifying sustainable finance for SMEs across diverse industries and will continue to develop their ecosystem of enabling partners to support clients in their sustainability journey.

Promoting Sustainable Practices in the Hospitality Sector

OCBC provided Shangri-La, a major international luxury hospitality group, with a market-first sustainable finance solution in the hospitality industry. This groundbreaking HK$1.3 billion/RMB1.15 billion loan aims to support Shangri-La's general corporate funding, focussing on achieving pre-determined sustainability targets. This initiative marks a significant step in promoting sustainable practices within the hospitality sector, offering financial incentives linked to environmental and social performance improvements.

NET-ZERO TARGETS AND EXCEEDING SUSTAINABLE FINANCE GOALS

In 2022, OCBC joined the Net-Zero Banking Alliance (NZBA) and in 2023 set ambitious, quantitative, and credible net-zero targets for emissions from their portfolio across six high-emissions sectors: Power, Oil and Gas, Real Estate, Steel, Aviation, and Shipping.

The targets are guided by robust decarbonisation pathways aimed at achieving net-zero greenhouse gas (GHG) emissions while limiting global warming to 1.5°C. In 2023, OCBC recorded S$56 billion in committed sustainable finance, surpassing its S$50 billion target two years ahead of schedule.

OCBC'S ACCOLADES IN SUSTAINABLE FINANCE

OCBC has received numerous prestigious awards in recognition of its commitment to sustainable finance. These accolades include "Best Bank for Sustainable Finance Singapore 2023" and "Best Bank for Sustainable Finance Hong Kong and Malaysia 2024." Additionally, OCBC was honoured with the "Award for Innovation - Loan Structure" and secured more than 10 deals at The Asset Triple A Sustainable Finance Awards. Among these were "Best Green Financing Solution Singapore," "Green Deal of the Year (Hong Kong)," and "Syndicated Loan of the Year (Hong Kong) 2023." Furthermore, OCBC earned three awards from the Hong Kong Green and Sustainable Finance Awards 2023, underscoring its leadership and innovation in the field of sustainable finance.

OVERSEA-CHINESE BANKING CORPORATION LIMITED (OCBC)
65 Chulia Street | #10-00 OCBC Centre East | Singapore 049514
W: www.ocbc.com
T: +65 6363 3333 (Personal Banking); +65 6538 1111 (Business Banking)

TRADEFLOW CAPITAL

Empowering Global Commodities Trade

Founded in 2016, TradeFlow Capital Management (TradeFlow) is the world's leading and first Fintech-powered commodity trade fund manager, enabling the import/export of physical bulk commodity transactions for SME size firms. To date, TradeFlow has successfully invested in more than US$3.5 Bn of physical commodity trade through 3500+ transactions across 18+ countries and 35+ commodity types. In 2021 it received its first investment grade credit rating of BBB which was in 2023 upgraded to A-. Certifications and memberships with various organisations, including AIMA, BAFT, EuroCham Singapore, the South African Chamber of Commerce and Singapore FinTech Association underscore TradeFlow's commitment to excellence.

LEVERAGING FINTECH FOR SUSTAINABILITY

TradeFlow is one of the first players in the trade finance industry to offset carbon emissions through digitalisation and shipping.

By incorporating fintech solutions, TradeFlow streamlines operations, reduces paper usage, and improves efficiency, thus lowering the overall environmental footprint of its business activities. Digitalisation also enables better tracking and management of carbon emissions, facilitating more accurate reporting and monitoring.

TradeFlow's digitalisation efforts are extended in all feasible areas of operations, with an estimated savings of 4580 kgs of CO_2, 1950 kgs of wood and 47, 942 litres of water from the use of tools like DocuSign for the period January 2022 to June 2024.

ALIGNED WITH UN SUSTAINABLE DEVELOPMENT GOALS (SDGS)

TradeFlow is a member of professional bodies that support ESG Principles and the UN SDGs. Operationally, the company works with partners including Carbon exchanges (such as Air Carbon Exchange) and Carbon mitigation project managers to offset its carbon footprint.

TradeFlow leverages on its unique trade investment model to facilitate Environmental, Social and Corporate Governance (ESG) objectives that support the United Nations Sustainable Development Goals, particularly on Poverty Abatement, Abating Hunger and Decent Growth and Economic Development, Industry Innovation and combating climate change and its impacts.

CLIMATE IMPACT STRATEGY

Carbon Neutrality

As of December 2020, TradeFlow has committed to ensuring all shipping of its commodities is carbon-neutral.

It has a Partnership Agreement with Carbonfund.org Foundation for Verified Emission Reductions (VERs) validated and verified to the Verified Carbon Standard (VCS) and Climate, Community, and Biodiversity Standard (CCB), in support of TradeFlow's carbon-neutral shipping goals.

The projects funded by TradeFlow are verified by reputable standards, ensuring that the offsets are legitimate and effective. These projects often encompass activities such as reforestation, renewable energy development, and community-based initiatives that provide additional social and economic benefits. By choosing projects with multiple co-benefits, TradeFlow not only addresses carbon emissions but also supports sustainable development goals.

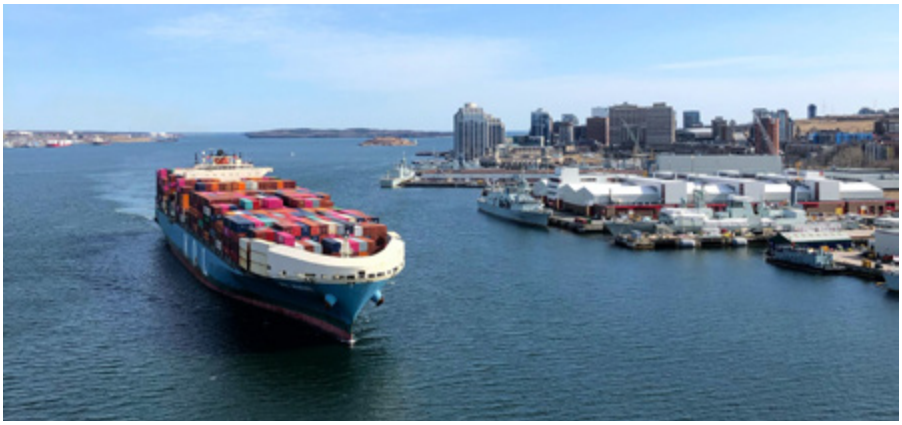
TradeFlow collaborated with H2O Venture Partners (H2O) to abate carbon emissions whilst achieving UN SDGs. TradeFlow worked directly with H2O, utilising established methodology and material evidence of carbon abatement. Simplicity and a focus on core relevant factors of the carbon-offset process avoids expensive onboarding and management fees, allowing fees to be more directly re-invested into scaling up offset operations.

To ensure the effectiveness and integrity of its carbon neutrality efforts, TradeFlow employs a comprehensive monitoring framework. This framework utilises cutting-edge technology to track progress meticulously, providing transparent and verifiable data on emission reductions. The use of advanced monitoring tools allows TradeFlow to assess the impact of their initiatives continuously and make data-driven decisions to enhance their sustainability practices.

FOSTERING BUSINESS RESPONSIBILITY

Empowering SMEs for Sustainable Global Trade

Supporting sustainable global trade, TradeFlow enables the availability of essential commodities by empowering underserved



Rumbuka hybrid maize seeds at different stages of production: in the ground; in drying sheds; bagged, coated' certified seed.

SMEs worldwide through its non-credit based business model. This collaborative endeavor focusses on supporting for-profit social enterprises in emerging economies. Notable collaborations include ventures like Rumbuka Seeds, Ingabo Plant Health, Sarura Commodities, and The FarmFresh Food Company, particularly highlighting positive social and environmental impact in Rwanda.

The FarmFresh Model

FarmFresh, a school-feeding project in Kigali, Rwanda, provides an example of how 182,294 kg of CO_2 equivalent emissions were averted from less firewood burned. Instead of each school cooking their own beans (the main source of daily protein to school children in Rwanda) over open fires and with long cooking times, FarmFresh prepares the beans in-factory using highly energy-efficient modern cooking facilities and packs them in lightweight recyclable laminate pouches (rather than large tins previously) for ease of distribution. This results in less food waste and a 97% reduction in the energy used per kg of cooked beans. Moreover, the process is regulated to the highest food safety standards resulting in improved quality and nutritional standards than achieved previously.

Empowering Local Communities

FarmFresh's model revolves around sourcing high-quality beans directly from smallholder growers, incentivising improved farming practices and bolstering household incomes. By introducing innovative packaging and distribution methods, FarmFresh not only delivers nutritious meals to Rwandan schools but also tackles environmental challenges, such as reducing carbon emissions associated with traditional cooking methods using open fires fuelled by firewood.

The implementation of the FarmFresh carbon credit scheme has not only fortified partnerships with HOSO but has also facilitated the expansion of impact through increased bean purchases by schools. This initiative has garnered recognition from the Rwandan Government and the Ministry of Education, paving the way for further funding and expansion opportunities to amplify our impact on a larger scale.

This initiative extends beyond mere environmental stewardship; it represents a novel approach to carbon offsetting. By working closely with local partners and leveraging industry-accepted methodologies, FarmFresh and its collaborators are democratising the use of carbon credits, making sustainable practices accessible to grassroots projects.

TRADEFLOW'S SUSTAINABLE GROWTH AND COLLABORATIVE SUCCESS

Since the inception of our Funds in 2018, TradeFlow has experienced significant growth in enabling SME trade volume with strong and stable returns, whilst being able to reduce traditional commodities trade risks to a minimum. While the specifics of our methodology remain confidential, our positive financial performance and tangible impacts on stakeholders continue to attract both customers and investors.

TradeFlow's transparent and proactive communications strategy aims to inspire others within the industry to embrace similar practices and to foster a collective pursuit of profit with purpose, seeking also to attract more collaborative opportunities for even greater impact-driven growth.

TradeFlow Capital Management
Transforming Risk, Enabling Trade

TRADEFLOW CAPITAL MANAGEMENT PTE LTD
10 Marina Blvd | #08-05 MBFC Tower 2 | Singapore 018983
W: www.tradeflow.capital
T: +65 3015 2063

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	**$8,000**	**$2,600**	**$1,300**
Exclusive access to private receptions and events with VIPs (e.g. Ministers, Commissioners, CEOs, Ambassadors)	✓		
Logo on all EuroCham on line platforms (website, business directory, e-newsletter, EuroCham 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	✓		
One-time feature with logo and company outline in EuroCham monthly E-Newsletter	✓	✓	✓
Privileged and discounted access to EuroCham events and partner events	✓	✓	✓
Access to a large networking pool	✓	✓	✓
Listing in EuroCham online directory	✓	✓	✓
Advertising and sponsoring opportunities	✓	✓	✓
Participation in EuroCham committees (limited access for associate memberships)	✓	✓	✓
AGM voting rights (not applicable for associate memberships)	✓	✓	✓

Terms and Conditions:
(*) Applies to any European company that is a member of a bilateral National Business Group, which is a strategic member of EuroCham.

Join us now! ✉ info@eurocham.org.sg

European Chamber of Commerce (Singapore)
138 Robinson Road
#11 - 04 Oxley Tower
Singapore 068906
W: www.eurocham.org.sg
T: +65 6836 6681

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ENGAGEMENT IN SUSTAINABILITY

NATIONAL BUSINESS GROUPS (NBGS)

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BELGIUM AND LUXEMBOURG, LEADERS IN SUSTAINABLE INNOVATION, LEVERAGING TECHNOLOGY TO ACHIEVE SUSTAINABLE DEVELOPMENT GOALS

NATIONAL EFFORTS: BELGIUM

Belgium's contribution to green technologies and energy efficiency, can be highlighted through the Belgian hydrogen council representing over 400 companies already meeting the 2025 EU target of 55%, to mention a few.

Belgium, during the first semester of 2024, held the presidency of the Council of the European Union and led the industry summit, working towards a green and sustainable industry in Belgium and the EU.

In Singapore, Belgian companies are supported by Belgian Trade Agencies: Flanders Investment and Trade (FIT), Walloon Export and Foreign Investment Agency (AWEX) and Brussels Agency for Business Support (Hub.brussels).

Notable Belgian companies operating in Singapore

Syensqo, offers products such as bio-based and biodegradable skin care and hair care cosmetics, extremely durable and safe materials used for EV batteries, composite materials used in airplanes & helicopters, sustainable alternatives to chemicals used for mining and oil & gas exploration and others.

Paleo is focussed on solving the flavour challenges in the meat alternatives sector. The company successfully recreated the authentic taste of beef, chicken, tuna and more by producing heme proteins as a functional ingredient through a precision fermentation process.

D-Carbonize empowers companies to measure and reduce their GHG emissions with its carbon accounting software. The Carbon Cockpit Scan is designed to make carbon accounting accessible for all, to measure CO_2 footprint and operate a carbon strategy, based on the international methods Bilan Carbone® and Greenhouse Gas Protocol.

NATIONAL EFFORTS: LUXEMBOURG

Companies in Luxembourg benefit from various programmes and initiatives to integrate sustainable practices. For example, the Fit 4 Sustainability programme, which is aimed at SMEs, helps them assess their environmental impact and adopt sustainability measures.

A cornerstone of this strategy is the Luxembourg Green Exchange (LGX). Established in 2016, LGX is the world's first platform dedicated exclusively to sustainable securities, including green bonds. This initiative supports the scaling up of climate finance, which utilises blended finance structures to attract investments in emerging economies across Asia and Africa. As of 31 January 2024, the Luxembourg Green Exchange (LGX) counts €1trn worth of global green, social, sustainability and sustainability-linked (GSSS) bonds on the platform.

Notable Luxembourgish companies operating in Singapore

Rotarex is a global company that designs and manufactures premium quality gas valves, pressure regulators and systems. In Singapore it equips green buses with high pressure valves.

Solarcleano develops innovative robotic solar panel cleaning solutions for a sustainable future, distributing in Singapore and all over Asia. One of their robots, the SolarCleano F1A has been named one of TIME's Best Inventions of 2022.

ArcelorMittal is the world's leading steel and mining company. In 2022, ArcelorMittal International was awarded in Singapore the highest rating in the Singapore Green Building Council's Leadership in Sustainability awards. The certificate acknowledges ArcelorMittal's HISTAR® high strength structural steels for their outstanding sustainable impact, due to usage of 100% scrap steel and EAF production route.

BLCC
BELGIAN LUXEMBOURG CHAMBER OF COMMERCE

BELGIUM-LUXEMBOURG CHAMBER OF COMMERCE
4 Battery Road I #25-01 Bank of China Building I Singapore 049908
W: www.blcc.org.sg
T: +65 9236 6558

CENTRAL AND EASTERN EUROPEAN CHAMBER OF COMMERCE (CEEC) SINGAPORE: PIONEERING SUSTAINABLE INNOVATIONS

The Central and Eastern European Chamber of Commerce (CEEC) in Singapore serves as a dynamic bridge between the vibrant economies of Central and Eastern Europe and the bustling trade and business hub of Singapore. Representing a diverse group of countries with rich histories, cutting-edge technologies, and a strong commitment to sustainability, CEEC fosters collaboration and innovation. The Chamber's mission is to support businesses from the region in their expansion into Asia while promoting sustainable development and practices that are increasingly critical in today's global economy. As the world moves towards greener solutions, CEEC members are at the forefront, driving change through innovative approaches to sustainability.

Greehill: Advancing Urban Sustainability

One of CEEC's distinguished members, Greehill, exemplifies the Chamber's commitment to sustainable innovation. Greehill was founded in Singapore, its first and flagship customer being the Singapore National Parks Board, and has its Research and Development based in Budapest, Hungary.

Greehill leverages advanced technologies to create smart, sustainable cities. Their platform uses high-resolution 3D mapping and artificial intelligence to monitor urban forests, providing cities with the data necessary to manage greenery more efficiently. By helping urban centres become more resilient and sustainable, Greehill plays a crucial role in the global shift towards greener cities. Their innovative solutions not only enhance urban planning and maintenance but also contribute to the fight against climate change by optimising the management of natural resources within urban environments.

Solargis: Empowering Solar Investments

Another key player within the CEEC network is Solargis, a data and software provider for bankable solar investments. Based in Slovakia, Solargis provides solar and meteo data, software, and consultancy services to solar stakeholders throughout the lifetime of their projects and portfolios. From pre-feasibility through planning, and securing project finance to daily operations and maintenance, Solargis helps solar stakeholders reduce risk and create transparency with the most accurate solar data on the market.

Their data and software platform helps the industry to simplify the process of energy assessment, maximise asset performance, and forecast long and short-term production and returns. Data and consultancy services have helped develop major solar assets worldwide and are also used for systematic monitoring and forecasting of solar power plants. Their work aligns with global efforts to reduce carbon footprints and transition to sustainable energy, underscoring CEEC's commitment to supporting members who drive positive environmental change.

CEEC SINGAPORE'S VISION

Looking ahead, CEEC Singapore remains committed to promoting sustainable innovations and fostering deeper collaborations between Central and Eastern European companies and their Asian counterparts. The Chamber is planning a series of initiatives that will further highlight the importance of sustainability in business, including seminars, networking events, and partnerships with local institutions. These efforts will not only enhance the visibility of CEEC members but also contribute to the broader goal of achieving a sustainable future. As the global focus on sustainability intensifies, CEEC is proud to be at the forefront, championing the innovations that will shape a greener, more sustainable world.

CEEC SINGAPORE

CENTRAL AND EASTERN EUROPEAN CHAMBER OF COMMERCE
138 Robinson Road I #11-04 Oxley Tower I Singapore 068906
T: +65 6836 6681
W: ceec.org.sg

INNOVATION: DENMARK'S GREEN GROWTH ENGINE

Denmark stands as a testament to the transformative power of innovation when it is leveraged for sustainability. The Nordic nation has not only embraced green initiatives; it has made them the cornerstone of its economic strategy. At the heart of this transformation is its knowledge-based workforce, an asset that has catalysed Denmark's journey towards a low-carbon future.

The Danish government's foresight in prioritising research and development has been instrumental. The nation's commitment to renewable energy is epitomised by its leadership in offshore wind. Danish companies have been at the forefront of developing advanced turbines, subsea foundations, and grid integration technologies. Also, the Danish Energy Agency's supportive policies, including feed-in tariffs and research grants, have fostered a thriving ecosystem for offshore wind, making the country a global epicentre for this clean energy source.

Copenhagen, Denmark's capital, offers a compelling case study in urban sustainability. The city's ambitious goal of becoming carbon-neutral by 2025 has driven innovative solutions across sectors. Its extensive cycling infrastructure, coupled with efficient public transportation, has significantly reduced carbon emissions from personal transport. Copenhagen has invested heavily in district heating systems, utilising waste heat from power plants and other industries to warm homes and buildings. This approach not only minimises energy consumption but also enhances energy efficiency.

Beyond energy, Denmark's innovation extends to circular economy principles. The country has pioneered waste management and recycling systems, transforming waste into valuable resources. Moreover, Danish design has gained global recognition for its focus on sustainability and functionality, encouraging consumers to opt for durable, long-lasting products.

Denmark's experience underscores that innovation is not only about technological breakthroughs; it's about a systemic approach that involves government, businesses, and citizens, and using it to accelerate sustainability. The nation's success in integrating sustainability into its economic fabric demonstrates that environmental responsibility can be a competitive advantage. By leveraging its skilled workforce and fostering a culture of innovation, Denmark has proven that a green future can be prosperous and equitable.

DANISH ASSOCIATION OF BUSINESSES IN SINGAPORE (DABS)

In Singapore, DABS works to leverage and promote Danish companies, through sharing experiences and best practices, hoping to inspire sustainability journeys that can draw inspiration from the Danish model, and recognising that innovation is the key to unlocking a cleaner, more resilient future for all.

DABS
DANISH BUSINESS ASSOCIATION SINGAPORE

DANISH BUSINESS ASSOCIATION OF SINGAPORE (DABS)
101 Thomson Road I #13-01/02 United Square I Singapore 307591
W: www.dabs-singapore.com

HARNESSING THE NETHERLANDS' EXPERTISE TO TRANSFORM AND SUSTAIN COASTLINES AND ENERGY LANDSCAPES

Singapore and The Netherlands are alike in many ways, especially when it comes to coastal resilience, resource management, and sustainable technology. Building on the pioneering efforts of Dr. Albert Winsemius and the Dutch Government in helping build the foundation for the modern-day Singapore, The Netherlands is proud that it continues to work closely together with the Singapore Government to make the world a more sustainable place.

WITTEVEEN+BOS: RE-CREATING LIVING REEFS OF SINGAPORE USING DISCARDED OYSTER SHELLS

Currently, about 70% of Singapore's coastline is guarded by hard structures that are costly and have little ecological value. With this, the Singapore government is actively exploring innovative nature-based solutions that balance human needs with nature's resilience.

Supported by a seed grant from the Ministry of Sustainability and the Environment of Singapore, Witteveen+Bos South-East Asia (WBSEA) took the initiative to explore the feasibility of oyster reefs in the local context. To create the 130-kg reef, discarded oyster shells were collected from hotels and restaurants around Singapore. The innovative reef provides substrate for oyster larvae to latch on and grow, and eventually utilise oysters' natural ability to filter water and stabilise shorelines. The reefs also improve biodiversity while helping repurpose food waste, which constitutes 12 % of total waste generated by the city-state. Reducing food waste aligns with Singapore's commitment in 2019 to become a Zero Waste Nation. Biodegradable-mesh bags contain the oyster shells so that no traces of foreign material is left behind in the environment.

To cultivate environmental stewardship, WBSEA engaged with volunteers from all walks of life. Students and parents from Rainbow Centre helped clean and pack oyster shells. Citizen scientists monitored the reefs monthly.

The reef was featured in the South China Morning Post and The Straits Times. In this way, WBSEA is proudly leading the movement towards more sustainable and effective nature-based solutions in Singapore.

WENERGY: PROPELLING THE ENERGY TRANSITION IN SOUTH-EAST ASIA

WEnergy Global Pte Ltd, with its Singapore-based HQ, is a leader in advancing a truly clean energy transition in South-East Asia through smart solutions tailored to this archipelagic, dynamic region's unique energy challenges. The company specialises in three innovative verticals namely:

- WEnergy Global is at the forefront of developing hybrid solar PV powered smart microgrids in off-grid areas, enhancing energy access and reliability for communities; by integrating solar energy with other energy sources, including wind power, energy storage and conventional sources, the microgrids provide 24/7-electricity to thousands of customers.
- Commercial and Industrial (C&I) solar PV rooftop systems, providing clean and cost-effective energy solutions for businesses. These systems attain institutional sustainability goals by reducing dependency on fossil fuels, significantly lowering greenhouse gas emissions, and providing maximum investment returns to institutional end-users.
- Decentralised renewable energy systems —Independent Power Producers (IPPs)— to further decentralise and decarbonise utilities and townships, and regional communities, aiding in the shift from imported fossil fuels to embedded clean energy.

WEnergy Global substantially contributes to reducing carbon emissions, fostering energy independence, making positive social, environmental and economic impact in the lives of households and small and large-scale businesses, and bolstering the resilience of the region's energy infrastructure.

The company's growing portfolio of strategic operations incorporate ESG-investments, cutting-edge technologies and active community engagement positions WEnergy Global as a pivotal force in South-East Asia's journey towards a sustainable and resilient energy future.

DutchCham SINGAPORE

DUTCH CHAMBER OF COMMERCE [SINGAPORE]
101 Telok Ayer | #04-01 | Singapore 068574
W: www.dutchcham.sg
T: +65 6536 7750

TOWARDS MORE SUSTAINABLE BUSINESS WITH THE FRENCH CHAMBER OF COMMERCE

Since 2020 the chamber is dedicated to advancing sustainability initiatives and fostering a community committed to responsible business practices.

It has significantly increased the number of events, dialogues and conferences focussed on sustainability, ensuring its members have access to valuable insights and information. The chamber also offers speaking opportunities to its members to share their initiatives and actions in accelerating their transition to more sustainable business practices.

With a dedicated Sustainable Business Committee and CSR Club, the chamber provides a platform for learning, networking, and collaboration among like-minded members.

The chamber's 2nd CEO Sustainability Series edition features insightful interviews with industry leaders, promoting sustainable practices and enhancing the reputation and competitiveness of member businesses in Singapore and in the region. The chamber also promotes these interviews on its communication and special media channels such as its website, newsletter, LinkedIn on a regular basis.

The French Chamber has organised several climate fresk workshops for its staff and members, and conducted workshops on topics such as the transition to a circular economy.

THE JOINT YEAR OF SUSTAINABILITY BETWEEN FRANCE AND SINGAPORE

Recently launched in partnership with the French Embassy, the Joint Year of Sustainability between France and Singapore (JYOS) includes a roadmap of events and actions to promote cooperation between the two countries. This initiative kicked off in Singapore during the Singapore Maritime Week (SMW April 2024) with a French delegation of companies accompanied by the French Chamber of Commerce in Singapore.

During this JYOS, the chamber will organise conferences and summits covering various topics such as circular economy, innovation for sustainable businesses, new energies, energy efficiency, and many more. The JYOS will end next May 2025 with the celebration of the 60 bilateral relations between France and Singapore.

AWARD-WINNING COMMITMENT: CELEBRATING 'TROPHY FOR BEST ESG/RSE'

We are proud to announce that we have been awarded the prestigious Trophy for Best ESG/RSE Initiative by CCI France International in June 2023! This recognition underscores our commitment to corporate social responsibility (CSR) and sustainability, making it an integral part of our mission to serve our members.

As the French Chamber of Commerce reflects on its achievements, it expresses gratitude for the continued support and commitment to sustainability from its members. The Chamber remains dedicated to driving positive change and contributing to a more sustainable future for all.

French Chamber Singapore | Towards Sustainable Business

FRENCH CHAMBER OF COMMERCE IN SINGAPORE (FCCS)
541 Orchard Road | #09-01 Liat Towers | Singapore 238881
W: www.fccsingapore.com

IRISH LEADERSHIP IN SUSTAINABLE INNOVATION

The Irish Chamber of Commerce Singapore is proud to have corporate members that have developed and implemented sustainability innovative action plans.

KERRY

Kerry's vision is to be their customers' most valued partner in creating 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 and 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

MAINSTREAM RENEWABLE POWER

Mainstream Renewable Power's wind and solar technologies and the renewable energy they generate help countries and businesses phase out fossil fuels and reduce greenhouse gas emissions, supporting their efforts to decarbonise. The company contributes towards the achievement of six United Nations Sustainable Development Goals, and invests in community initiatives enhancing employment, education, healthcare, the local environment and more.

The company has successfully delivered 6.6 GW of wind and solar generation and has a net global pipeline of 23.9 GW, with 1.0 GW in operation.

KINGSPAN

Kingspan is a leader in high-performance insulation and building envelope solutions. Their Planet Passionate programme is a 10-year initiative addressing climate change, circularity, and natural world protection which integrates sustainability into all operations, positively impacting society and the environment.

In 2023, Kingspan installed 25 solar PV systems and converted 42% of its forklift fleet to electric. Key Initiatives include reducing Scope 1 & 2 GHG emissions by 65% from 2020 levels. Kingspan's IKON Innovation Centre develops bio-based materials and low-carbon products, committing to zero-emission company cars

by 2025. In 2023, Kingspan introduced 475 electric vehicles and invested in EV charging infrastructure.

PM GROUP

PM Group, an employee-owned Irish company with 3,500 employees across 17 global offices, specialises in designing, constructing, and commissioning high-tech facilities for the pharmaceutical, food, and medtech industries. PM Group integrates cutting-edge solutions and sustainable practices into every project, highlighted by their efforts in optimising energy efficiency, reducing carbon footprints, and helping their clients achieve their sustainability goals while delivering technically complex projects. With over 30 certified sustainability experts and a TechTeam of 90 industry professionals, they collaborate closely with universities and industry bodies to pioneer innovative technologies.

UNIVERSITY COLLEGE DUBLIN (UCD)

UCD has developed a range of student experiences in Singapore with its offerings of the Bachelor of Business Studies programme and Master of Science (MSc) to expose students to the considerations around sustainability. Most recently for the MSc module 'Responsible Business and Sustainability' students partnered with Kerry Group in Singapore to complete an industry project on sustainable nutrition. Such university industry partnerships are critical for helping students develop real world skills and become leaders who think of the future.

IRISH CHAMBER OF COMMERCE SINGAPORE

IRISH CHAMBER OF COMMERCE (SINGAPORE)
Ireland House | 541 Orchard Road | #08-01 Liat Towers | Singapore 238881
W: www.irishchamber.com
T: +65 6235 8897

NORWAY PIONEERING SUSTAINABLE INNOVATION ACROSS SECTORS

Norway, known for its commitment to sustainability, leads in integrating sustainable practices across industries. With over 120 member companies in the Norwegian Business Association of Singapore (NBAS), 80% in maritime, offshore, and energy sectors, the focus on innovation and sustainability is strong.

Norway has launched a multi-year green maritime export campaign targeting Singapore and Southeast Asia. Spearheaded by Innovation Norway and supported by Team Norway in Singapore, the Singapore Green Maritime High Potential Opportunities (HPO) is designed to assist Norwegian companies in securing contracts exceeding 500 million kroner in export opportunities within green maritime technologies in the region.

LEADING MARITIME INNOVATIONS AND SUSTAINABILITY

Norwegian industry leaders in Singapore, such as KONGSBERG, DNV, DNB, Telenor, and Gard, use advanced technologies and promote green initiatives. These companies support various sectors with cutting-edge solutions and digital transformation. Similarly, leading maritime companies in Singapore, like Odfjell and Wilhelmsen, contribute to innovation and sustainability by using state-of-the-art technologies, fostering eco-friendly practices.

Gard, the world's largest marine insurer, promotes sustainability and innovation by partnering with the Global Centre for Maritime Decarbonisation in Singapore.

EXPANDING SUSTAINOVATION ACROSS DIVERSE SECTORS

Beyond these industry giants, other Norwegian companies also focus strongly on SUSTAINOVATION.

ECOSubsea, is revolutionising the industry with next-generation cleaning robots. These robots clean 10 times faster and more efficiently than traditional solutions.

Yinson Green Technologies is partnering with Eastern Pacific Shipping to trial electric vessels and promote decarbonisation. Projects like Hydroglyder and Hydromover aim to electrify Singapore's harbor crafts for cleaner, more efficient transportation.

Cambi innovates in water and waste treatment, reducing energy consumption, minimising waste, and recovering resources through technologies like thermal hydrolysis and biodigesters.

Kezzler uses advanced serialisation technology to improve product traceability, reduce counterfeiting, and minimise waste, ensuring efficient supply chains and promoting transparency and sustainability across various industries.

Tomra drives innovation and sustainability by using advanced sensor-based sorting technology to optimise resource recovery and reduce waste, enhancing recycling efficiency, supporting a circular economy, and minimising environmental impact.

StormGeo provides cutting-edge weather intelligence and decision support solutions, optimising maritime and energy operations, enhancing efficiency, reducing fuel consumption, and promoting sustainable practices across industries.

Yara Africa & Asia fosters innovation and sustainability through the Thryve Innovation Colab in Singapore, addressing food security by supporting over 70 million smallholder farmers with climate-neutral practices and regenerative agriculture.

COLLABORATIVE GROWTH AND FUTURE PROSPECTS

NBAS is continually attracting new companies across both traditional maritime, offshore, and energy sectors, as well as emerging industries.

The annual Singapore Norway Innovation Conference (SNIC) 2024, titled "Smarter Ships, Smarter Ports, Smarter Energy – Driving Innovation in the Maritime Industry," will be held on November 6-7 at Conrad Centennial, Singapore. Since 2020, NBAS, The Norwegian Embassy, and Innovation Norway have hosted SNIC, stimulating innovation within the green shift.

"A thousand words will not leave so deep an impression as one deed." – Henrik Ibsen, Norwegian mastermind, playwright, 1828-1906.

NBAS NORWEGIAN BUSINESS ASSOCIATION SINGAPORE

NORWEGIAN BUSINESS ASSOCIATION OF SINGAPORE (NBAS)
16 Raffles Quay | #44-01 Hong Leong Building | Singapore 048581
W: www.nbas.org.sg
T: +65 8451 1892

SINGAPOREAN-GERMAN CHAMBER AT THE FOREFRONT OF PROMOTING INNOVATIVE SOLUTIONS THAT SUPPORT BOTH THE ECONOMY AND ECOSYSTEMS

In a world where threats to our natural environment are increasingly urgent, the commitment to sustainability is more crucial than ever. As early as 2019, SGC pioneered the theme of sustainable innovation, organising 16 events in just one year. These events covered diverse topics such as digital sustainable transformation, sustainable fish farming, water management, or the future of finance (the transformation of the digital CFO). SGC has continuously supported the integration of innovation into sustainability efforts, acknowledging the newly created term "Sustainovation," which emphasises that innovation must be central to achieving sustainability goals.

DRIVING SUSTAINABLE INNOVATION AND COLLABORATIVE EFFORTS FOR A GREENER FUTURE

Innovation and sustainability embody the belief that innovative approaches are essential for addressing complex environmental challenges. Germany is at the forefront of sustainability, driven by government policies. By fostering bilateral trade and creating new partnerships, these collaborations exemplify the power of innovative cooperation in achieving sustainability goals. Therefore, one of SGC's primary objectives is to promote creativity and technological advancement, enabling businesses to develop novel solutions that not only tackle environmental issues but also enhance economic performance.

To leverage the strengths of both German and Singaporean businesses, SGC promotes the exchange of knowledge and technological expertise, creating a robust environment for sustainable innovation. For instance, in celebration of its 20th anniversary, SGC organised this year's German Week, which showcased advancements in manufacturing, telecommunications, and research and development, with a keen focus on sustainability.

Through larger initiatives like the 2023 German-Singaporean Bilateral Forum on Sustainability and Innovation, organised by SGC in partnership with the German Embassy and powered by GSBF Connect, over 130 participants engaged in thought-provoking presentations and panel sessions. The event focussed on sustainable practices and innovative solutions in alignment with the Singapore Green Plan 2030. This forum provided the perfect backdrop for SGC to sign a Memorandum of Understanding with the Hydrogen and Fuel Cell Association of Singapore to promote collaboration in hydrogen and fuel cell technology, further supported by a hydrogen business delegation to Germany in 2024.

THE ROAD AHEAD: SHAPING A SUSTAINABLE FUTURE THROUGH INNOVATION

SGC supports German companies entering the Singaporean market by organising delegations focussed on energy efficiency, smart grids, and hydrogen technologies. Our delegations contribute to optimising energy consumption and reducing environmental impact. Hydrogen technologies, as a clean energy source, promise to reduce CO_2 emissions, offering a sustainable alternative to fossil fuels. By promoting technological advancements, we harness economic opportunities, create new potentials, and contribute to the preservation of biodiversity.

Through further initiatives like the symposium on energy-efficient solutions and smart energy grid control systems in the second half of 2024, SGC fosters the exchange of knowledge and technologies between Germany and Singapore, making significant contributions to environmental protection. Stay informed and engaged by visiting our website at www.sgc.org.sg and following us on our social media channels for the latest updates on upcoming events.

SINGAPOREAN-GERMAN CHAMBER OF INDUSTRY AND COMMERCE (SGC)
25 International Business Park | #03-105 German Centre | Singapore 609916
W: www.sgc.org.sg
T: +65 6433 5330

SPANISH COMPANIES ARE ACTIVELY CONTRIBUTING TO SDG'S

Spain stands out notably in the areas of sustainability and innovation, which is reflected in various initiatives and policies at both national and international levels. This high level of participation highlights the commitment of the Spanish business community to sustainable development. The focus is not only on large corporations but also on small and medium-sized enterprises (SMEs), which constitute around 90% of Spain's business fabric.

NATIONAL SUSTAINABILITY STRATEGY

Spain's approach to sustainability is structured around its "Sustainable Development Strategy 2030," aiming to align with the UN's Sustainable Development Goals (SDGs). The Spanish Network of the Global Compact and the Secretary of State for the 2030 Agenda have been pivotal in consulting with the business sector to gauge and enhance the integration of the SDGs within corporate strategies.

SUSTAINABILITY LEADER SECTORS IN SPAIN

Spain has implemented an innovative water management plan that includes the treatment of wastewater and the reuse of gray and rainwater. Desalination plants play a crucial role, especially in regions severely affected by droughts.

Spain is among the world leaders in renewable energy, especially solar and wind power. This commitment to sustainable energy is reflected in its high performance in the Sustainable Development Goals (SDGs) related to affordable and clean energy (SDG 7) and clean water and sanitation (SDG 6). Spain is the fourth country in the world and the first in the European Union in terms of land dedicated to organic farming.

Spain offers a very favorable tax environment for research, development, and innovation (R&D&I). Tax deductions and financing programmes provided by the Centre for Industrial Technological Development (CDTI) and the National Innovation Company (ENISA) have attracted numerous multinational companies and SMEs to invest in technological projects.

Empresa Sostenible for SME's

The Spanish Chamber of Commerce has launched a new microsite, "Empresa Sostenible," dedicated to supporting SMEs in integrating sustainability into their operations. The Spanish Global Compact Network has launched a dedicated web space offering over 90 resources, including practical tools, training, and case studies.

EDP (ENERGIAS DE PORTUGAL): CASE STUDY

EDP has been recognised globally for its sustainability efforts, achieving the highest score in the S&P Dow Jones Sustainability Indices (DJSI) for electric utility companies. With an ambitious plan to reach net zero by 2040, EDP excels in climate strategy, innovation management, market opportunities, and business ethics. Their projects, such as the hybrid wind and solar project in the Iberian Peninsula, underscore their commitment to innovative and sustainable energy solutions.

COSENTINO: CASE STUDY

Cosentino Group, a Spanish multinational company, is renowned for its innovative surfaces and environmental responsibility. Their 2023 Sustainability Report details various initiatives, such as reducing carbon emissions and increasing the use of recycled materials. Their Almería facility exemplifies the zero-waste concept, making Cosentino a leader in integrating sustainability into manufacturing processes.

GRESPANIA: CASE STUDY

Grespania has pioneered environmental policies in the ceramics industry. Their approach includes reducing emissions, optimising water use, and incorporating recycled materials into their products. The company's commitment to the zero-waste concept at its manufacturing plants demonstrates its dedication to sustainable production.

Spanish Cham SINGAPORE

SPANISH-SINGAPOREAN CHAMBER OF COMMERCE
6A Shenton Way | #04-01 OUE Downtown Gallery | Singapore 068815
W: www.spanishchamsg.org
T: +65 6781 5030

THE SWEDISH GREEN MODEL EXEMPLIFIES THE INTEGRATION OF BUSINESS AND SUSTAINABILITY

Sweden, pioneering environmental stewardship since 1967 with the world's first environmental protection act, hosted the inaugural UN global environment conference in 1972. Since then, Sweden has continued on a path of sustainable growth, significantly increasing its economic output while concurrently lowering carbon emissions and curtailing pollution.

Approximately 60% of Sweden's national energy is sourced from renewables, bolstered by robust legislation aimed at further slashing greenhouse gas emissions. Consistently ranked in the top ten of the prestigious Environmental Performance Index by Columbia and Yale universities for over a decade, the Swedish green model exemplifies the integration of business and sustainability. Alongside its Nordic neighbors, Sweden champions the belief that green growth not only drives transition but also fosters technical innovation without posing risks.

SINGAPORE AND THE REGION

Sweden's diverse array of corporations, encompassing large enterprises, SMEs, scale-ups, and start-ups, have maintained a significant presence in Singapore for many years. Together, they are driving towards a more sustainable future both in Singapore and the broader region.

ANTICIMEX: CASE STUDY

Anticemix is a Swedish multinational founded in 1934, which now operates in 19 countries worldwide. Offering comprehensive prevention and treatment solutions for all kinds of pest management, Anticimex entered Singapore in 2016 and swiftly claimed the top market position within three years, displacing a longstanding leader since 1956. The company now employs over 600 people in Singapore and has established strong footholds in Malaysia, Cambodia, Australia, and New Zealand.

Swedish Company of the Year 2023

Anticimex's dedication to sustainability has proven integral to its success, evidenced by its recognition as the Swedish Company of the Year by the Swedish Chamber of Commerce Singapore in November 2023. At the heart of their sustainability strategy are three key environmental impact areas crucial to Anticimex's contribution to a more sustainable world: protecting biodiversity, preventing pest-borne diseases, and reducing property loss and food waste. Below follows a few examples:

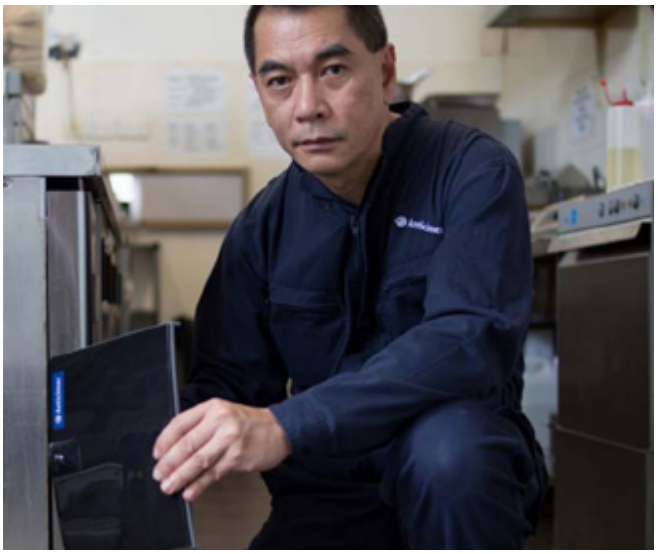
Non-Toxic Remedies by Using SMART- Enabled, Pest Control Methodology

Central to Anticimex' approach is the SMART-enabled, proactive pest control methodology, which shifts the industry from reactive to preventive measures. Anticimex SMART is more than a 'trap with an app'. The methodology estimates the root cause by using data. With constant monitoring, new infestations can be prevented. In Singapore, the company has implemented over 4,400 SMART devices, drastically reducing biocide usage while enabling 24/7 pest monitoring and swift, non-toxic remediation.

In partnership with The Sundowner, a local farm and apiary dedicated to bee conservation, Anticimex Singapore has rescued over 400,000 bees through initiatives like Wild Bee Nest Relocation Services, safeguarding biodiversity and supporting environmental sustainability efforts.

Anticimex's Singapore Fleet Transition to EV

Anticimex has committed to the Science-Based Targets Initiative since 2022. The company has made substantial progress in reducing CO_2 emissions, achieving a 70% decrease to date. Notably, its service fleet of over 300 vehicles in Singapore is currently 98% electric, with plans to complete the electrification by Nov 2024. These initiatives underscore Anticimex's proactive stance in mitigating climate impact through responsible route management and ongoing emission reduction efforts.



SWEDCHAM
Swedish Chamber of Commerce Singapore

SWEDISH CHAMBER OF COMMERCE (SINGAPORE)
260 Orchard Road | #07-01 The Heeren | Singapore 238855
W: www.swedcham.sg

SWISS GOVERNMENT PERSPECTIVE

The Swiss government believes that innovation is a driving force for developing new technologies and solutions to address pressing challenges of climate change. The Swiss Innovation Agency (Innosuisse) has funded projects that have developed new technologies for renewable energy, energy efficiency, water treatment, sustainable solutions for the built environment, and more. The Swiss National Science Foundation (SNSF) has supported research on climate change, biodiversity, and sustainable development. Additionally, the Swiss Federal Office for the Environment (FOEN) has developed policies and regulations that promote sustainable development.

RESEARCH AND DEVELOPMENT PROJECTS IN SOUTHEAST ASIA

The Singapore ETH Centre (SEC) is a collaborative effort between the Swiss Federal Institute of Technology in Zurich (ETH Zurich) and the National University of Singapore (NUS). It focusses on research and development in areas such as climate change, energy efficiency, and water treatment.

The University of St. Gallen offers a course on Social Entrepreneurship in Singapore and Southeast Asia. In collaboration with the Singapore Management University (SMU), the Asia Term allows students from both St. Gallen and SMU to work with local corporate partners on sustainability issues.

SWISS COMPANIES IN SINGAPORE

The Swiss Chamber of Commerce in Singapore offers a community for Swiss companies who contribute significantly to sustainability innovations. These include:

Manufacturing: Novartis, who have developed a greener manufacturing process, invested in renewable energy, and partnered with universities for sustainable technologies. Roche has created an early disease diagnostic tool, invested in research for chronic diseases, and collaborated with healthcare providers for better patient care. Additionally, Bühler and Givaudan have set up a new protein innovation centre in Singapore dedicated to plant-based foods.

Financial Institutions: Emerald Ventures offers sustainable and impact investing solutions tailored for institutional investors. UBS provides a range of sustainable investment products and services with a dedicated team in Singapore. SwissRe specialises in providing insurance and risk management solutions for sustainable businesses and projects.

Project Development and Accreditation: South Pole's newly established hub, the Asia Centre of Carbon Excellence, develops carbon projects, such as the early decommissioning of coal-fired power plants and the development of green shipping. SGS provides a blockchain-based platform for supply chain sustainability, a green building certification programme, environmental testing and certification services, and a circular economy roadmap with the Singapore government.

SME & STARTUPS

- **Swisspro** who support the hospitality industry in reducing plastic waste by installing self-serving water stations.
- **Katadyn Asia** offers compact, mobile seawater desalination for small, remote communities and disaster preparedness.
- **Be Wtr** has developed a water filtration system that removes microplastics from water and provides bottled water solutions for the F&B industry.
- **SG Protein** is collaborating with the Singapore Food Agency to develop sustainable protein sources.
- Simultaneously, **Huber Butchery** has become the first food outlet in the world to sell and serve cultivated meat.
- **SaladStop!** is very active to promote sustainability and has their carbon neutral outlet in CapitaSpring.
- The Swiss headquartered **Häring Group** is innovating new engineered timber solutions for the regional construction market with its Singapore office.

SWISSCHAM SINGAPORE

SWISS CHAMBER OF COMMERCE (SINGAPORE)
911 Bukit Timah Road | Level 2 | Singapore 589622
W: www.swisscham.sg
T: +65 6722 0799

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