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香港金融管理局

Adoption Practice Guide on Greentech in the Banking Sector

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Disclaimer:

The Adoption Practice Guide on Greentech in the Banking Sector is a publication published by the Hong Kong Monetary Authority (HKMA). It should be noted that the sole purpose of this publication is to provide Authorized Institutions (AIs) with information on the latest Green Fintech (Greentech) developments. The HKMA does not endorse any use cases, solutions and/or implementation guidance described in this adoption practice guide. If an AI intends to adopt a particular solution or implementation, it should undertake its own due diligence to ensure that the technology or approach is suitable for its circumstances.

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Introduction

Background

In August 2023, the Hong Kong Monetary Authority (HKMA) launched its new *Fintech Promotion Roadmap,*[1] identifying five key Fintech focus areas for the city: (1) Wealth / Investech, (2) Insurtech, (3) Greentech, (4) Artificial Intelligence (A.I.), and (5) Distributed Ledger Technology. Among these focus areas, Greentech, which represents Fintech solutions that can help Authorized Institutions (AIs) address environmental sustainability and climate-related challenges, has gained significant traction in Hong Kong's banking sector.

Various AIs in Hong Kong have become cornerstone members of the Alliance for Green Commercial Banks, a global initiative launched in November 2020 by the International Finance Corporation (IFC) and the HKMA. This alliance brings together financial institutions, industry associations, research organisations, and technology providers to drive financial innovation and co-finance infrastructure and technology solutions that enable seamless net zero transition for financial institutions.[2]

The HKMA recognises the importance of integrating climate-related risks into financial decision-making and aims to enhance the banking sector's resilience against climate change's impacts. By promoting sustainable banking and green finance initiatives, the HKMA, alongside industry participants, is committed to facilitating a smooth transition to a low-carbon economy, thereby promoting long-term stability and growth for the region.

The HKMA introduced its first set of key measures on sustainable banking and green finance in 2019, aligning its policies with international standards.[3] Since then, the HKMA has further developed its policies and supervisory requirements through the issuance of supervisory policy manuals (SPM) and good practices.

To coordinate the management of climate and environmental risks within the financial sector, accelerate the growth of green and sustainable finance in Hong Kong, and support the HKSAR Government's climate strategies, the HKMA and the Securities and Futures Commission (SFC) jointly co-initiated the Green and Sustainable Finance Cross-Agency Steering Group (CASG) in May 2020.[4] One of CASG's key activities is to promote climate-related information flow for risk management. In December 2024, the Government of the Hong Kong Special Administrative Region's (hereafter referred to as "the Government") launched a roadmap on sustainability disclosure, including Hong Kong's approach to require Publicly Accountable Entities to adopt the International Financial Reporting Standards - Sustainability Disclosure Standards (ISSB Standards).[5] The roadmap was developed with the support of CASG through a dedicated working group co-led by the Financial Services and the Treasury Bureau (FSTB) and the SFC.

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[1] HKMA. 2023. *HKMA Unveils New Roadmap to Promote Fintech Adoption.* (https://www.hkma.gov.hk/eng/news-and-media/press-releases/2023/08/20230825-3/).

[2] International Finance Corporation. 2020. *IFC and the Hong Kong Monetary Authority Launch New Alliance to Address Climate Change.* (https://www.ifc.org/en/pressroom/2020/ifc-and-the-hong-kong-monetary-authority-launch-new-alliance-to-address-climate-change).

[3] HKMA. 2019. *HKMA introduces key measures on sustainable banking and green finance.* (https://www.hkma.gov.hk/eng/news-and-media/press-releases/2019/05/20190507-4/).

[4] Other members include the Financial Services and the Treasury Bureau, the Environment and Ecology Bureau, Hong Kong Exchanges and Clearing Limited, the Insurance Authority, the Mandatory Provident Fund Schemes Authority, and the Accounting and Financial Reporting Council.
HKMA. 2024. *Centre for Green and Sustainable Finance.* (https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/green-and-sustainable-finance/centre-for-green-and-sustainable-finance/).

[5] The Government of the Hong Kong Special Administrative Region. 2024. *Government launches roadmap on sustainability disclosure in Hong Kong.* (https://www.info.gov.hk/gia/general/202412/10/P2024121000243.htm).

These efforts closely follow the ambition of Hong Kong to position itself as an international centre for green technology and finance.[6] Central to this vision, the HKMA introduced the Sustainable Finance Action Agenda in October 2024, setting out eight clear, actionable goals across four key focus areas. A key component of the agenda is the goal for banks to achieve net zero in their operations by 2030 and their financed emissions by 2050. The HKMA is actively driving the implementation of the agenda, which includes providing essential guidance and tools to support stakeholders throughout the process. Building on these resources and frameworks, the HKMA aims to solidify Hong Kong's position as a leading sustainable finance hub in the region, supporting the sustainable development of Asia and beyond.

Purpose

On the path to integrating sustainable banking and green finance principles into its operations, AIs face a range of challenges. For example, many AIs struggle to embed climate considerations into their external stakeholder management, often lacking the necessary tools to effectively and proactively connect with their customer base. Beyond unmet customer expectations around climate considerations, AIs also grapple with data management issues as climate risk data is often incomplete, fragmented, and/or lacks standardisation across sources, making it difficult to measure and act on sustainability practices.

To address these challenges, various Greentech solutions have emerged as key enablers, equipping AIs with tools to seamlessly integrate sustainable banking and green finance principles into their core strategies and operations. These solutions help streamline data management, enhance transparency, improve risk management, and strengthen customer communication around sustainability commitments. With these capabilities, AIs can confidently transition towards a low-carbon economy – not only by transforming their own operations but also by supporting their customers' net zero ambitions through tailored products and services.

This Guide aims to provide practical insights and actionable measures for AIs in Hong Kong to advance their net zero transition agenda by leveraging Greentech solutions, as well as a roadmap for integrating sustainability practices seamlessly into their operations.

This Guide follows the below outline:

1. **Illustrate the importance of integrating sustainable practices for AIs in Hong Kong from regulatory and supervisory, reputational, and business perspectives.**

2. **Provide an overview of how Greentech solutions can support the transition to green and sustainable banking.**

3. **Offer best practices for the net zero transition journey, supported by Greentech solutions:**

    a. Introduce the importance of defining a broader net zero transition agenda before deploying Greentech solutions;
    b. Provide practical steps to assess the current state of adoption and integrate sustainable banking and green finance into corporate strategies; and
    c. Outline supporting sustainable banking and green finance pillars.

4. **Feature cases on the adoption of Greentech solutions to drive the net zero transition agenda:**

    a. Describe real-world challenges faced by AIs and how Greentech solutions helped overcome them; and
    b. Outline key lessons learned from successful Greentech implementations, from both the AIs' and the Greentech solution providers' perspectives.

This Guide also highlights three notable Greentech adoption cases in Hong Kong, serving as a reference for AIs moving forward.

[6] The Chief Executive's 2024 Policy Address. (2024). *Enhance the Green Finance Ecosystem.* (https://www.policyaddress.gov.hk/2024/en/p45.html). The 2023-24 Budget. (2023). *International Financial Centre.* (https://www.budget.gov.hk/2023/eng/budget16.html).

1. Market Landscape

Climate change has been identified as one of the major global issues by the World Economic Forum in its Global Risk Reports over recent years.[7] Many countries face record-breaking extreme weather events, resulting in far-reaching societal and economic impacts. For AIs, these climate impacts translate into financial risks, such as the default risk of their loan portfolio. Given the shortfall of mitigation and adaptation measures, it becomes imperative for AIs to consider climate action in their business and risk operations, such as by managing climate risk and financing low-carbon industries.

1.1. Drivers

Driven by global regulatory developments, evolving consumer preferences, and changing stakeholder expectations regarding sustainable practices, sustainable banking and green finance principles have become an integral part of every AI's core proposition. In response to these market forces, AIs around the world are increasingly allocating resources towards their sustainable banking and green finance initiatives, with 71% of banks planning to boost their budgets in 2023 compared to the previous year,[8] demonstrating the industry's commitment to sustainability.

1. Regulatory and Supervisory Push

Climate and sustainability issues have gained much attention in the international community. For example, the Basel Committee on Banking Supervision (BCBS) has issued principles to help improve banks' management of and supervisors' practices on climate-related financial risks. The Central Banks and Supervisors Network for Greening the Financial System (NGFS) also shared best practices and guides on environmental and climate risk management in the financial sector. Meanwhile, the International Platform on Sustainable Finance (IPSF) was launched as a forum for dialogue between policymakers, with the aim of increasing the amount of private capital being channelled towards environmentally sustainable investments. In 2023, the International Sustainability Standards Board published its first set of sustainability disclosure standards as the global baseline for corporate disclosure of climate and sustainability-related information.

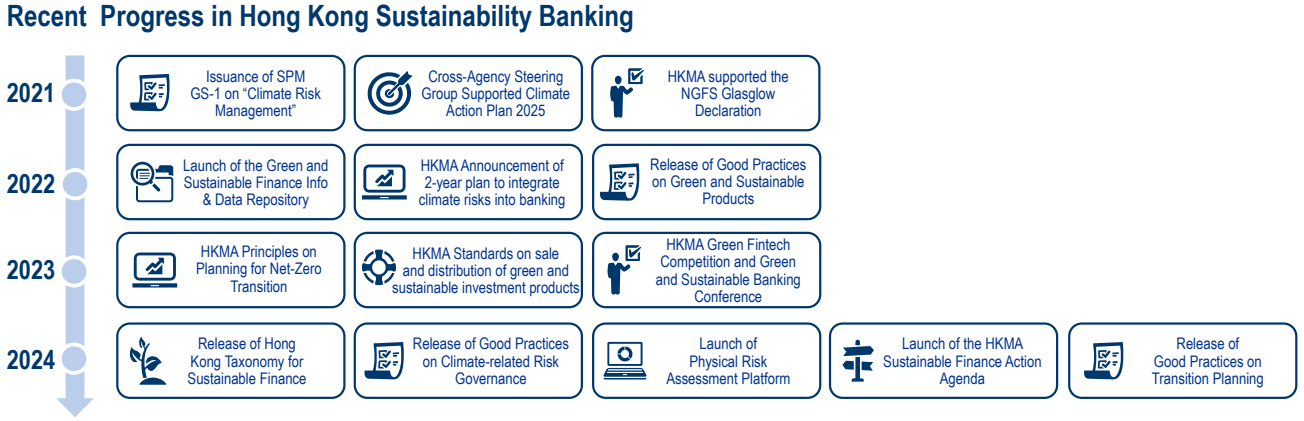
Consistent with such international developments, the HKMA has developed policies to enhance the resilience of the banking sector to climate risk. For example, in December 2021, the HKMA issued an SPM module GS-1 on "Climate Risk Management", which sets out the HKMA's supervisory expectations for AIs to incorporate climate risk considerations into their strategies and frameworks.[9] The HKMA also issued a set of high-level principles in August 2023 to assist AIs in maintaining safety and soundness in the net zero transition[10] and shared with the industry some good practices on transition planning in December 2024.[11] The HKMA has consulted the industry on a draft SPM module GS-2 on "Transition Planning" and aims to finalise it in 2025.

In 2022, the HKMA issued a circular on the two-year plan to integrate climate risk into its banking supervisory processes. This plan encompasses six key initiatives, including conducting thematic examinations on selected areas of climate risk

[7] World Economic Forum. 2024. *Global Risk Report.* (https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2024.pdf)
[8] KPMG. 2024. *ESG Risk Survey for Banks.* (https://assets.kpmg.com/content/dam/kpmg/be/pdf/2024/ESG-in-practice-result-from-a-global-bank-survey.pdf).
[9] HKMA. 2021. *Supervisory Policy Manual GS-1 Climate Risk Management.* (https://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/supervisory-policy-manual/GS-1.pdf).
[10] HKMA. 2023. *Planning for net-zero transition.* (https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2023/20230829e1.pdf).
[11] HKMA. 2024. *Good Practices on Transition Planning.* (https://www.hkma.gov.hk/media/gb_chi/doc/key-information/guidelines-and-circular/2024/20241216c1.pdf).
HKMA. 2024. *Good practices on transition planning (Annex).* (https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2024/20241216e1a1.pdf).

management and enhancing the "greenness" assessment framework. The assessment framework aims to reflect the latest developments in relation to sustainability issues, particularly in the management of climate risks and transition planning by banks. In December 2022 and August 2024, the HKMA further issued two circulars outlining key observations and industry best practices on the due diligence of green and sustainable products, as well as climate-related risk governance for AIs, covering climate strategy formulation and development, climate risk management, and the cultivation of an organisational climate risk culture (see Figure 1).

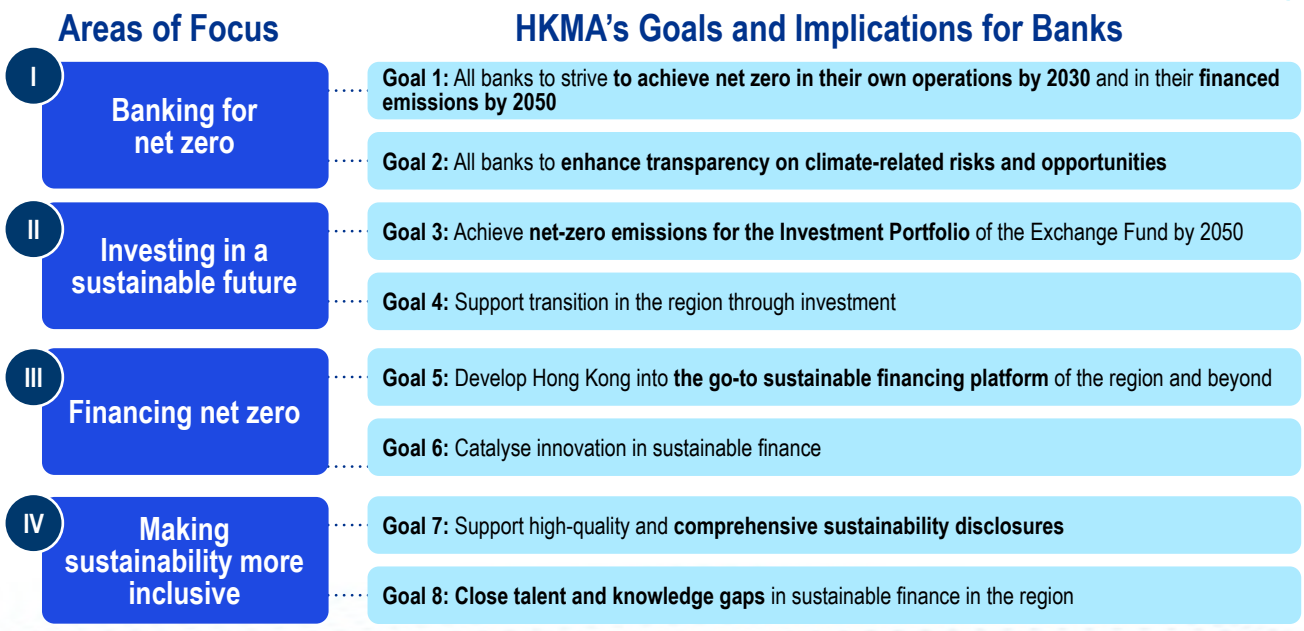
FIGURE 1: RECENT PROGRESS OF SUSTAINABILITY BANKING IN HONG KONG



Source: HKMA, KPMG / Quinlan & Associates analysis

To set out its vision to further consolidate Hong Kong's position as the sustainable finance hub in the region and support the sustainable development of Asia and beyond, the HKMA launched the Sustainable Finance Action Agenda in October 2024,[12] which established eight goals in four areas, including (1) Banking for Net Zero, (2) Investing in a Sustainable Future, (3) Financing Net Zero, and (4) Making Sustainability More Inclusive (see Figure 2).

FIGURE 2: SUSTAINABLE FINANCE ACTION AGENDA



Source: HKMA, KPMG / Quinlan & Associates analysis

[12] HKMA. 2024. *Sustainable Finance Action Agenda.* (https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2024/20241021e4a1.pdf).

2. Reputational Push

Beyond regulatory and supervisory push, sustainable banking and green finance are becoming a core part of many AIs' corporate strategies and value propositions.

Public perceptions of an AI's sustainable banking and green finance initiatives are often tied to the advocacy and support for the organisation, especially when these initiatives are effectively communicated to the public. Globally, 73% of banks are expected to introduce more sustainable banking propositions in the next five years in response to evolving public expectations.[13] While public awareness of climate risk in Hong Kong may be at its early stage, 79% of employed individuals in Hong Kong acknowledge the importance of sustainability practices in both their careers and the broader business landscape.[14] Furthermore, a study found that APAC employees' satisfaction significantly increases when companies enhance their Environmental, Social, and Governance (ESG) policies and practices, with employee retention willingness rising to 71%.[15] This emphasises the growing importance of sustainability considerations in attracting top talent and building public trust in AIs.

Research suggests that consumers' trust in a brand is likely to increase when they perceive a company as committed to ESG standards, which can positively affect brand equity.[16] Specifically within the financial sector, studies suggest a positive correlation between ESG scores and brand equity, highlighting the importance of integrating ESG practices into their operations.[17] This concept is further supported by research conducted by the HKMA in 2024, which revealed a positive ripple effect of ESG improvements across global value chains. According to its study, the HKMA found improvements in ESG practices within one part of the value chain have a cascading effect on others within the value chain, such as a customer to an AI and vice versa, with the strength and direction of influence varying based on market power and geographical locations.[18]

Additionally, AIs should be mindful of financed emissions to effectively manage their reputational risk. To align with the growing expectations of regulators, investors, and the public, AIs could measure, disclose, and mange the greenhouse gas emissions associated with their business activities. Strengthening transparency can potentially increase stakeholder confidence and trust.

3. Business Push

Over the years, we have witnessed increased demand and interest in green investment products. Take the green bonds issued by the Hong Kong Special Administrative Region (HKSAR) Government for example. Since 2019, the HKSAR Government has issued green bonds amounting around USD 28 billion equivalent, including institutional, retail, as well as tokenised issuances. When considering green investment products more broadly, over half of retail investors in Hong Kong who have not yet invested in sustainable finance products plan to do so within the next 12 months, underscoring the strong local interest in sustainable finance products.[19]

To promote the local development of green and sustainable finance, the HKSAR Government launched in 2021 the Green and Sustainable Finance Grant Scheme (GSFGS) to provide subsidies for eligible green and sustainable debt issuances in Hong Kong. The GSFGS has been well received by the industry, having subsidised around 500 green and sustainable debt instruments issued in Hong Kong by end-2024, with the underlying issuance volume totalling over USD 140 billion. Since 2024, GSFGS has been extended by three years to 2027, with an expanded scope of subsidy to cover transition finance instruments with a view to encouraging relevant industries in the region to make use of Hong Kong's transition financing platform as they move towards decarbonisation.

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[13] Temenos. 2023. *Byte-sized banking: Can banks create a true ecosystem with embedded finance?* (https://www.temenos.com/wp-content/uploads/2023/10/Temenos_Global_Report_Final_Oct3.pdf).

[14] ESG Business. 2023. *Most Hong Kong workers say ESG useful in their careers: survey.* (https://esgbusiness.com/news/most-hong-kong-workers-say-esg-useful-in-their-careers-survey).

[15] PwC. 2024. *PwC's Global Workforce ESG Preferences Study 2024.* (https://www.pwc.com/gx/en/issues/workforce/pwcs-global-workforce-sustainability-study.html).

[16] Suchart Tripopsakul and Wilert Puriwat. 2023. *Exploring the relationship between ESG, trust, brand reputation, and brand equity.* (https://www.researchgate.net/publication/374934278_Exploring_the_relationship_between_ESG_trust_brand_reputation_and_brand_equity).

[17] Ajour El Zein, Samer, Carolina Consolacion-Segura, and Ruben Huertas-Garcia. 2020. *The Role of Sustainability in Brand Equity Value in the Financial Sector.* (https://www.mdpi.com/2071-1050/12/1/254).

[18] HKMA. 2024. *Examining the Ripple Effect of Corporates' ESG Performance Along the Global Supply Chains.* (https://www.hkma.gov.hk/media/eng/publication-and-research/research/research-memorandums/2024/RM06-2024.pdf).

[19] Pictet. 2022. *Hong Kong retail investors show strong intent on ESG investment.* (https://www.pictet.com/mc/fr/actualites-et-publications/retail-investors-show-strong-intent-esg-investment).

There is also potential to further advance green bond market development with the promotion of tokenisation technology, and encouraging AIs and issuers to adopt such technologies in capital market transactions. Besides the two tokenised green bonds issued by the HKSAR Government in 2023 and 2024 respectively, the HKMA launched the Digital Bond Grant Scheme (DBGS) in November 2024. The DBGS aims to support digital bonds, including green, social, sustainability, sustainability-linked or transition bonds, provided they meet the relevant eligibility requirements. The HKMA believes tokenisation has the potential to help facilitate the issuance and trading of green bonds, improving efficiency, transparency, and accessibility, and ultimately increasing their appeal to both investors and issuers.

The early adopters of sustainable practices are expected to capitalise on a unique opportunity moving forward. By integrating sustainability practices into their operations, AIs can not only meet regulatory requirements but also build trust with key stakeholders who are increasingly prioritising green and sustainable practices. This forward-thinking approach enables AIs to stay ahead of the curve, differentiate themselves from competitors, and potentially unlock new growth opportunities by tapping into the growing demand for sustainable finance products and services.

1.2. Role of Greentech

Greentech solutions have emerged as key enablers of effective sustainable banking and green finance integration into AIs' operations and in supporting customers to achieve their net zero ambitions and objectives.

A classification developed by the FSTB, the SFC, InvestHK, and the University of Hong Kong (HKU) outlines five areas of Greentech solutions: (1) Green & Digital Finance and Investment, (2) ESG

FIGURE 3: GREEN FINTECH CLASSIFICATIONS

	Description	Use Cases
1	**Green & Digital Finance and Investment** Digital solutions and platforms that assist AIs in providing digital green and sustainable products, such as payments, loans, deposits, investments, and insurance	• ESG-integrated credit scoring • Green tokenised bonds • Green insurance products
2	**ESG Disclosure, Compliance & Regulatory Reporting** Digital solutions that primarily enable AIs in making ESG, climate, and nature-related disclosures, and meeting compliance and regulatory reporting requirements	• Listed company disclosure and compliance • Financial regulatory reporting
3	**Carbon Trading, Analytics and Technology** Digital solutions that primarily support the development and trading of carbon products, and assist AIs with collecting and analysing internal and external emissions data	• Carbon registry • Carbon accounting • Emissions tracking
4	**ESG Data, Intelligence and Analytics** Digital solutions that primarily offer ESG data and analytics, ESG ratings, and ESG indexing to support AIs in internal and external evaluations	• ESG data collection / aggregation • ESG rating for companies / funds • Supply chain modelling
5	**ESG / Climate Risk Modelling & Assessment** Digital solutions that primarily facilitate assessment and management of ESG and climate-related risks (including physical and transition risks)	• Bank climate modelling • Investment portfolio analysis • Climate analysis for underwriting

Source: FSTB, SFC, InvestHK, HKU, and Quinlan & Associates analysis

Disclosure, Compliance & Regulatory Reporting, (3) Carbon Trading, Analytics and Technology, (4) ESG Data, Intelligence and Analytics, and (5) ESG / Climate Risk Modelling & Assessment (see Figure 3).[20]

For the banking sector, Greentech underpins the three aspects of utility in sustainable finance, as outlined by the HKMA: (1) a supportive corporate strategy, (2) a robust risk management framework, and (3) proactive customer interactions.[21] Greentech also facilitates critical functions such as *'Carbon Trading, Analytics and Technology'*. These solutions enable AIs to enhance carbon credit management, monitor emissions more effectively, and stay on track to meet their net zero commitments.

A supportive corporate strategy, rooted in aligning business interests, is essential for driving an AI's sustainability efforts. Greentech solutions that support *'Green & Digital Finance and Investments'* are relevant in building a supporting corporate strategy, as they help AIs to issue and monitor sustainable finance products, such as green bonds and investment products. This enables AIs to maintain long-term profitability while navigating the net zero transition and to meet customer demand by offering sustainable finance products and services.

Furthermore, sustainable banking and green finance require aligning risk management practices with climate priorities. Greentech solutions that support *'ESG / Climate Risk Modelling & Assessment'* can streamline efforts to incorporate these elements into existing risk management frameworks. Solutions that enable AIs to identify, quantify, and mitigate climate-related risks are particularly valuable, as they proactively address potential vulnerabilities before they escalate, safeguarding the AI's assets and operations from climate risks.

The HKMA views proactive customer engagement from AIs as a key pillar in driving the transition towards a net zero economy. As the platform connecting corporations, customers, and the financial markets, AIs play a pivotal role in steering stakeholders in the right direction. In this context, together with *'Green & Digital Finance and Investment'*, Greentech solutions that support *'ESG Disclosure, Compliance & Regulatory Reporting'* are essential for enabling meaningful customer interactions. By providing transparent and relevant information on ESG compliance, climate risks, and regulatory obligations, complemented by sustainable finance products and services, AIs can position themselves as a leading force in advancing the net zero transition agenda.

Beyond these core areas, Greentech providers offer essential tools to facilitate the development and trading of carbon-related products across both primary and secondary markets. This includes enabling AIs to connect with projects that generate carbon credits and ensuring seamless integration into carbon markets. Advanced analytics also enable AIs to efficiently collect, analyse, and report emissions data through solutions such as carbon registries, carbon accounting systems, and emission tracking platforms. These technologies help AIs comply with requirements, enhance transparency, and identify carbon reduction opportunities that could be unlocked to achieve net zero goals in alignment with the HKMA's Sustainable Finance Action Agenda.

Underpinning these efforts is a foundation of robust data management. Accurate and comprehensive ESG and climate data enables AIs to monitor their own performance and that of their customers, assess risks, and identify opportunities for improvement. Greentech solutions that enhance access to *'ESG Data, Intelligence and Analytics'* empower AIs to develop more sustainable strategies while ensuring compliance with regulatory requirements.

[20] FSTB, SFC, InvestHK, and The University of Hong Kong. 2024. *Prototype Hong Kong Green Fintech Map 2024.* (https://www.sustainablefinance.org.hk/storage/uploads/155ca7d0-055f-4106-97ca-02f8ed9d43e8/HK-Green-Fintech-Map-Flyer-v14.pdf).

[21] HKMA. 2024. *Opening Remarks at FiNETech3 on "From Seed to Scale: How Fintech Can Accelerate the Transition to a Greener Economy".* (https://www.hkma.gov.hk/eng/news-and-media/speeches/2024/11/20241107-1/).

2. Implementation Guidance

Before implementing Greentech solutions, AIs need to understand the full picture of the net zero transition journey, which will help identify areas where the solutions may be deployed successfully and drive necessary change. This process involves assessing the current status quo and integrating sustainable banking and green finance principles into their corporate strategy, supported by data and technology, human resources, and measurement systems (see Figure 4).

FIGURE 4: IMPLEMENTATION FRAMEWORK

STATUS QUO ASSESSMENT

ISSUE & RISK IDENTIFICATION
What are the various climate risk issues that could materialise in the form of financial and non-financial risks?

IMPACT ASSESSMENT
How big is the impact of the identified climate-related issues and risks for an AI and the environment?

AGENDA PRIORITISATION
Who are an AI's key stakeholders (e.g., customers) and what is their stance on these identified issues?

GUIDE

STRATEGY INTEGRATION

CLIMATE VISION & NET ZERO AMBITION
What is the AI's climate vision and net zero ambition and how does it align with its core capabilities and stakeholders' priorities?

PROPOSITION DEVELOPMENT
What proposition can AIs look to develop to align with sustainability standards, and how can they integrate these principles into their offerings and operations?

RISK MANAGEMENT
What are the preventive and reactive control measures that could be adopted by an AI to mitigate the identified climate risks?

STAKEHOLDER COMMUNICATION
How should an AI communicate with internal and external stakeholders on the expected sustainability and climate-related deliverables?

GOVERNANCE STRUCTURE
How should an AI set up and seamlessly integrate sustainable banking and green finance into its existing governance structure?

SUPPORT

SUSTAINABLE BANKING AND GREEN FINANCE ENABLERS

DATA & TECHNOLOGY
What approaches / technologies should an AI explore to gather and manage climate risk data, enabling the organisation's transition towards net zero?

HUMAN RESOURCES
What competencies and skills should an AI acquire and/or train to effectively deliver on its net zero ambitions and objectives?

MEASUREMENT SYSTEM
What measurements / KPIs[1] should an AI consider to assess its sustainable banking and green finance maturity status and track its net zero transition efforts?

Note: 1. Key performance indicators

Source: KPMG / Quinlan & Associates analysis

AIs should start by assessing their current sustainable banking and green finance status quo, focusing on identifying the most pressing and relevant climate-related risks that could impact both their existing portfolio and future strategic direction. For example, they may evaluate how physical risks, such as extreme weather events, could affect the value of assets in climate-sensitive industries, or how transition risks, such as tightening regulations, could influence the profitability of current loan portfolios. This process involves quantifying their emissions footprint to understand their contribution to climate change and analysing stakeholder expectations to prioritise agendas. This foundational understanding is crucial for shaping a well-defined, targeted sustainable banking and green finance strategy that serves as a roadmap for governance, risk management, and stakeholder communications.

To support the successful integration of sustainable banking and green finance principles into their corporate strategy, AIs are advised to leverage Greentech solutions, invest in talent acquisition and/or upskilling, and implement measurement systems to continuously monitor progress. Simply deploying technology without addressing underlying processes, culture, and strategy may lead to fragmented outcomes that fall short of delivering the intended impact.

2.1. Status Quo Assessment

AIs can begin their net zero transition journey by evaluating the current sustainable banking and green finance landscape and their position within it through the following steps:

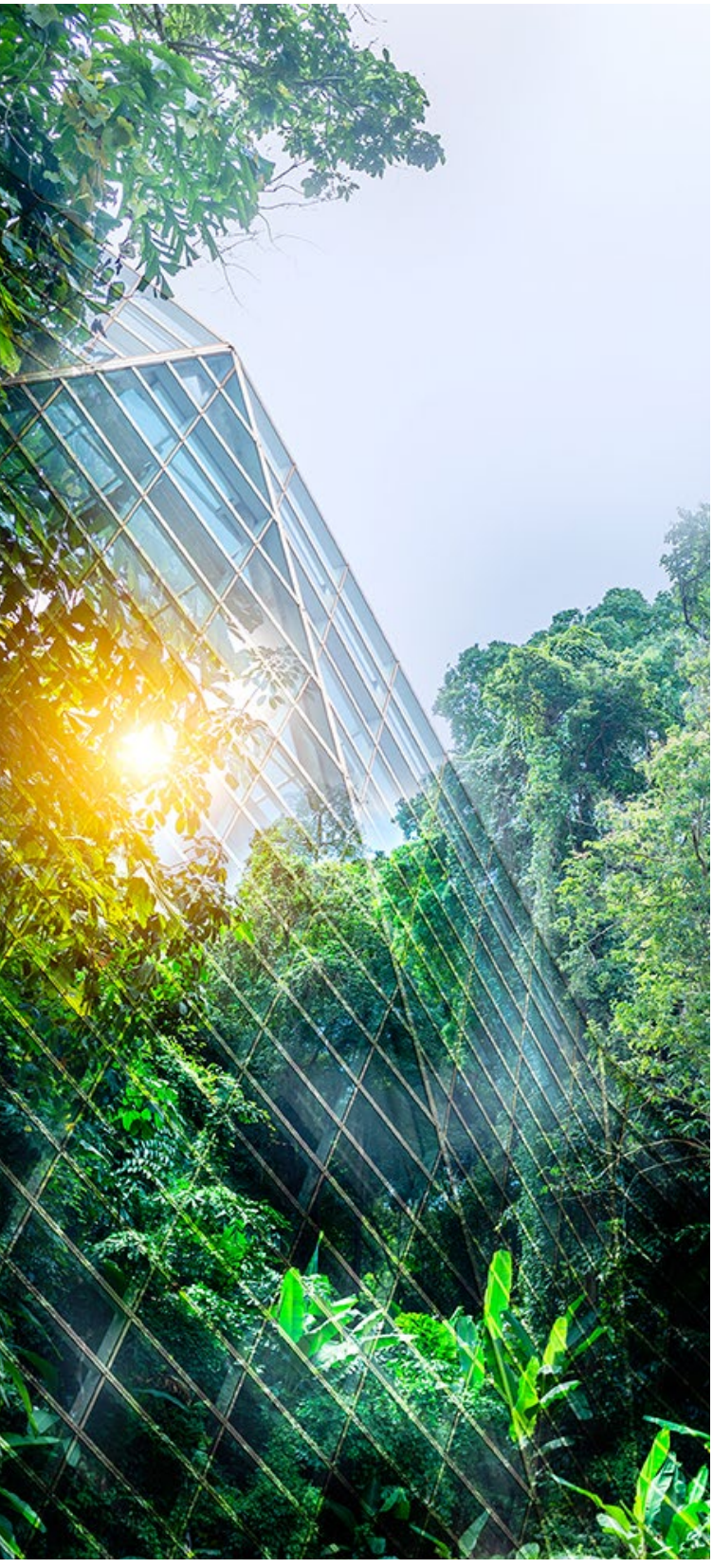
1. Identifying risk drivers;
2. Conducting impact assessments; and
3. Reviewing stakeholder perspectives and prioritising net zero transition agendas.

1. Identifying Risk Drivers

AIs face a range of climate risk drivers, ranging from physical risks, such as extreme weather events, to transition risks, such as changes in climate policies and consumer behaviour. These climate risk drivers, characterised by their unpredictable and uncontrollable nature, demand careful consideration when conducting assessments. Identifying and understanding these risk drivers is the first step towards realising key aspects for the AI to address (see Figure 5).

FIGURE 5: RISK DRIVERS, ASSOCIATED RISKS, AND BUSINESS IMPACTS

Source: KPMG / Quinlan & Associates analysis



To effectively manage climate risks, AIs need to not only identify their drivers but also understand how these drivers translate into financial and non-financial risks. The BCBS's report defines transmission channels as "the causal chains linking climate risk drivers to the financial risks faced by banks and the banking sector."[22]

For example, borrowers vulnerable to physical risks due to climate change, such as flooding, will incur costs related to repairs and downtime. These losses may impair their ability to repay loans, thereby increasing credit risk for AIs. Such borrowers are more likely to default, potentially leading to financial losses.

Beyond financial risks, climate risk drivers can also lead to non-financial risks, such as operational disruptions, legal liabilities, or reputational harm. These risks emphasise the need for AIs to adopt a proactive approach to assessing and managing climate risks holistically.

Greentech solutions are instrumental in helping AIs identify, measure, and monitor climate risks. These technologies enable them to deploy suitable methodologies, such as portfolio and sectoral exposure analysis and counterparty-based risk assessment.[23]

For counterparty-based assessments, AIs can refer to BCBS's report and evaluate a corporate customer's carbon footprint, climate adaptation strategies, adaptive capacity, and strategic alignment with sustainability goals before making financing decisions.[24] Such evaluations often combine qualitative and quantitative analyses to promote informed decision-making.

By employing Greentech solutions, AIs can access global climate models and comprehensive datasets to analyse the financial and non-financial risks posed by climate risk drivers. These tools enhance AIs' ability to monitor and assess both their operations and the emissions linked to their loan portfolios. With these insights, AIs can establish robust risk management frameworks and make more sustainable lending decisions.

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[22] BCBS. 2021. *Climate-related risk drivers and their transmission channels.* (https://www.bis.org/bcbs/publ/d517.pdf).
[23] BCBS. 2021. *Climate-related financial risks – measurement methodologies.* (https://www.bis.org/bcbs/publ/d518.pdf).
[24] BCBS. 2021. *Climate-related financial risks – measurement methodologies.* (https://www.bis.org/bcbs/publ/d518.pdf).

2. Conducting Impact Assessments

Upon mapping climate risks, AIs may consider adopting a structured and data-driven approach to assess the potential impact of these risks. In line with the ISSB's guidelines, AIs could evaluate how sustainability-related risks could materially impact their financial performance over the short, medium, and long term, otherwise referred to as financial materiality.[25]

To perform financial materiality assessments, AIs may adopt Greentech solutions to conduct scenario analysis, simulating and assessing the financial impact of their operations and offerings, such as loans. By modelling various climate risk scenarios and examining how climate change could impact borrowers' ability to repay (i.e., probability of default), AIs can assess the financial materiality of climate risks – understanding the extent to which it can influence the AI's financial performance and stability. For example, industries such as agriculture and energy may experience exposure to physical risks (e.g., extreme weather events, droughts, or floods) and transition risks (e.g. regulatory changes related to emissions reduction or energy transition). As climate risks intensify, borrowers in these sectors may face financial strain, which may, in turn, influence overall credit risk.

AIs may consider gradual transition financing to diversify loan portfolios across multiple industries. While this approach can help mitigate the impact of sector-specific climate risks, broader impact of climate change may still affect borrowers across various sectors.

Beyond credit risk exposures, it may be beneficial to model potential impacts on liquidity to capture a comprehensive view of climate-related risks.[26] Climate-related scenario analysis is typically longer-term in nature, as risks often take years or decades to materialise. As such, banks must make informed modelling assumptions and source diverse datasets for assessments over a longer time horizon, as outlined by BCBS.[27] These include internal customer data, routine data collections, ad-hoc data requests, and external data from commercial providers, rating agencies, non-governmental organisations, and public sources.

With respect to scenario analysis, Greentech solutions can help AIs refine their existing risk models, enabling parameter adjustments (e.g., credit risk exposure to carbon-intensive industries) and more precise stress testing to evaluate the AI's resiliency. While scenario analysis and stress testing remain the most common methodologies for measuring the impact of climate risks, AIs may also refer to other climate matrices to examine the relative urgency of climate-related risks based on their likelihood and severity, improving risk prioritisation. For instance, AIs may conduct sensitivity analysis, perform climate value-at-risk assessments, or adopt novel metrics such as the Implied Temperature Rise. Ultimately, AIs can decide on their preferred methods for assessing financial materiality, supported by Greentech solutions.

In turn, AIs could also assess how their operations and activities contribute to or mitigate climate issues. For instance, AIs can evaluate their impact on the environment via the Greenhouse Gas Protocol (GHG Protocol) Corporate Standard, which classifies a company's emissions into three scopes: Scope 1 emissions cover direct emissions from owned or controlled sources; Scope 2 emissions cover indirect emissions from purchased or acquired electricity, steam, heat, and cooling; and Scope 3 emissions include all indirect emissions (not included in Scope 2) that occur in the value chain of the company.[28] An AI's electricity usage, for example, contributes to its Scope 2 emissions due to the utility company's indirect vendor relationship with the AI, but without specific data, an AI may face challenges in quantifying its impact. While the availability of structured climate risk datasets and indices has improved, gaps remain in data coverage and quality. As such, AIs may rely on Greentech providers to source and synthesise risk driver data.

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[25] IFRS. 2024. *Sustainability-related risks and opportunities and the disclosure of material information.* (https://www.ifrs.org/content/dam/ifrs/supporting-implementation/issb-standards/issb-materiality-education-material.pdf).
[26] BCBS. 2021. *Climate-related financial risks – measurement methodologies.* (https://www.bis.org/bcbs/publ/d518.pdf).
[27] BCBS. 2021. *Climate-related financial risks – measurement methodologies.* (https://www.bis.org/bcbs/publ/d518.pdf).
[28] GHG Protocol. 2022. *FAQ.* (https://ghgprotocol.org/sites/default/files/2022-12/FAQ.pdf).
GHG Protocol. 2023. *Scope 2 Guidance.* (https://ghgprotocol.org/scope-2-guidance).

While the calculation of an AI's own Scope 1 and Scope 2 emissions is relatively intuitive, assessing Scope 3 emissions such as financed emissions, may be challenging. To address this, AIs may consider referring to standards like the Partnership for Carbon Accounting Financials (PCAF) standard,[29] which provides a uniform method for calculating and reporting Scope 3 Category 15 emissions (loans and investments). On top of referencing standards like the PCAF, AIs can also look to adopt Greentech solutions to improve the accuracy of financed emission calculations.

Many Greentech solution providers specialise in tracking emissions data by aggregating both estimated and disclosed data across a wide range of sources to feed into AIs' calculations. Some providers may assist in directly validating reported data, such as utilising remote sensing technology to measure direct client Scope 1 emissions, and others may use secondary sources, such as data feeds from utility providers, to foster better data accuracy. AIs can utilise these solutions to incorporate climate considerations into their KYC processes, thereby creating a more granular picture of their clients' GHG emissions. With adequate profiling, AIs can segment their clients and identify opportunities for climate risk-related growth.

For example, with clients' emission profiles, AIs can prioritise lending to customers that lower their overall climate risk, such as those in the low-emitting sectors, and assist clients in high-emitting industries to transition. Utilising Greentech solutions in this manner can allow AIs to systematically identify these opportunities and risks within their loan portfolio and optimise their lending activities within the assessment horizon.

By conducting impact assessments, AIs can gain a more thorough understanding of climate risks, supported by the tracking and assessment capabilities of various Greentech solutions. This approach will enable AIs to manage and mitigate emerging climate risks while also monitoring their contributions to climate-related issues.

[29] PCAF. 2024. *The Global GHG Accounting and Reporting Standard for the Financial Industry.* (https://carbonaccountingfinancials.com/en/standard#the-global-ghg-accounting-and-reporting-standard-for-the-financial-industry).

3. Reviewing Stakeholder Perspectives and Prioritising Net Zero Transition Agendas

After identifying the relevant climate risks and understanding their level of impact, AIs may start engaging internal and external stakeholders to converge on expectations and facilitate meaningful discussions. This involves considering all key stakeholder agendas and developing a clear approach to prioritise them, based on their overall level of sustainability interest and level of influence (see Figure 6).

FIGURE 6: STAKEHOLDER REVIEW FRAMEWORK

Climate stakeholders…

Market Regulators
Global regulators set net zero missions, objectives and guidelines, while local authorities, including the HKMA, establish and execute regulations

AIs
AIs with a net zero transition agenda, coupled with climate risk-compliant products and practices (e.g., reporting / disclosures) to comply with regulations

Customers
Companies that consider or have integrated climate risk and sustainability into their existing business models and operating processes

Others
Employees and investors, as well as the general public, expect AIs to integrate sustainability and green finance into their investment process to make positive impacts

…have different sustainability agendas…

Decarbonisation
Assessment of financed projects' ability to reduce borrowers' or other stakeholders' existing net carbon footprint

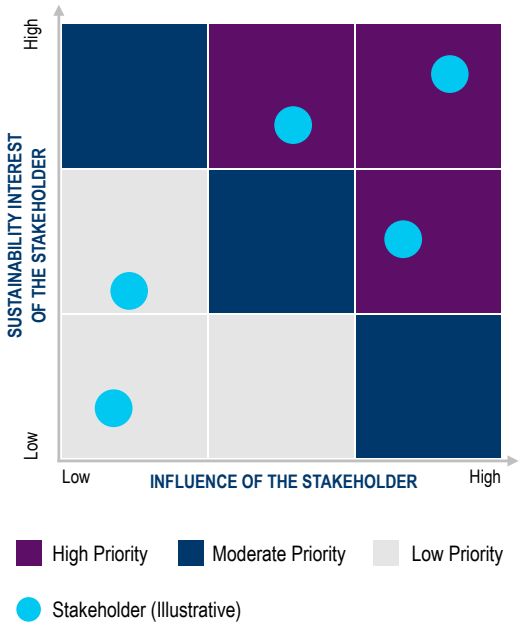
Waste & Pollution
Rating of the impact and amount of environmental waste (e.g., water, greenhouse gas emissions) generated from the borrower's production / operational processes

Resource Use
Analysis of the borrower's usage of local resources (e.g., water, indigenous land, lumber) and methods to mitigate their impact

Climate Resilience
Evaluation of strategies implemented by borrowers to adapt to climate change impacts (e.g., rising sea levels, extreme weather events)

Sustainability Reporting & Compliance
Examination of the borrower's disclosure of climate risks (e.g., physical and transition risks) and compliance with regulatory requirements

...that carry different weight for each AI



Source: KPMG / Quinlan & Associates analysis

This step is crucial as different stakeholders (e.g., regulators, AIs, customers, and the general public) will typically have diverging perspectives and priorities. Understanding these differences will allow AIs to develop and integrate a robust sustainable banking and green finance strategy that aligns with diverse expectations.

2.2. Corporate Strategy Integration

As a next step, AIs should look to apply key learnings from their status quo assessment to shape a forward-looking sustainable banking and green finance strategy, equipped with a clear vision and corresponding action items. AIs can reference the principles for effective management and supervision of climate-related financial risks published by the BCBS, which contain principles regarding corporate governance and risk management, and turn to the HKMA's SPM module GS-1 as the local supervisory guidance on climate-related risk management.[30] They can also look to leverage Greentech solutions in areas such as data management to implement these principles effectively.

1. Vision & Ambition

Establishing a clear vision and ambition is the first step in integrating net zero into an AI's corporate strategy. By conducting a thorough risk assessment and capability evaluation, AIs can define a tailored sustainable banking and green finance proposition that aligns with their unique objectives, values, and market context.

AIs can leverage the SMART framework (i.e., Specific, Measurable, Achievable, Relevant, and Time-bound) to ensure that the goals are well-defined, practical, and actionable (see Figure 7). This approach helps AIs set realistic, measurable targets and create a high-level roadmap for successfully embedding climate considerations into their strategic decisions and operations.

FIGURE 7: VISION & AMBITION

Climate Vision, Net Zero Ambitions, and Objectives

Vision & Ambition, Sustainability Proposition, and Tactical Initiatives

SMART Framework

Developing Climate Vision, Net Zero Ambitions, and Objectives

Specific to Sustainable Banking And Green Finance Pillars
covering sustainable banking and green finance proposition for both internal and external stakeholders

Measurable Results
based on international standards, initiatives, or principles for cross-comparability across regions

Actionable Initiatives
based on current and planned strategic and operational capabilities

Realistic Execution
without going against core needs and demands of key business stakeholders

Timeframe Establishment
set on tactical initiatives across climate goals to ensure they are achieved as promised

Note: 1. Management, 2. Opportunity

Source: KPMG / Quinlan & Associates analysis

[30] HKMA. 2021. *Supervisory Policy Manual GS-1 Climate Risk Management.* (https://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/supervisory-policy-manual/GS-1.pdf).

2. Proposition Development

After establishing their climate vision, net zero ambitions, and objectives, AIs can proceed to develop their sustainable banking and green finance proposition (see Figure 8). Two key factors to consider are risk management and revenue generation. Based on stakeholder expectations and priorities, AIs can determine their future positioning along a spectrum — from meeting minimum compliance by adhering to imminent regulatory requirements, to embedding sustainable banking and green finance as a core value proposition by applying its principles to their financial products, while adhering to the most stringent regulatory standards.

FIGURE 8: PROPOSITION DEVELOPMENT

Sustainable Banking and Green Finance Proposition

Expected Alignment with Global Standards vs. Purpose of Sustainable Banking and Green Finance Integration

1 **Core Value Proposition**
Sustainable banking and green finance represents the core DNA of an AI from both a compliance and revenue-generating perspective

2 **Strategic Proposition**
AIs operate with climate risk compliance requirements and provide sustainable banking and green finance products to address consumer demand

3 **Best Practice Compliance**
AIs deliver global best-practice climate risk compliance, but have yet to offer a full suite of sustainable banking and green finance products

4 **Moderate Compliance**
AIs comply with regional regulatory requirements but have not yet capitalised on sustainable banking and green finance opportunities

5 **Minimum Compliance**
AIs only comply with minimum requirements and have not yet capitalised on sustainable banking and green finance opportunities

Source: KPMG / Quinlan & Associates analysis

3. Risk Management

In AIs, both profit centres and cost centres need to actively manage climate risks to facilitate compliance, resilience, and alignment with sustainability goals. This shared responsibility is critical for integrating climate considerations into the AI's daily operations and for enhancing its positioning in sustainable finance.

Profit centres, such as credit departments, play a vital role in embedding climate considerations into the AI's offerings. This integration not only eases compliance with emerging regulations but also strengthens the AI's reputation in sustainable finance. Sustainable banking principles should be incorporated into product development, pricing, and sales processes, ensuring alignment with sustainability objectives at every stage of the value chain.

For example, AIs can incorporate green finance criteria into their lending activities. During the evaluation of loan applications, AIs can conduct comprehensive climate risk assessments, and make reference to taxonomies as a tool for identifying green and sustainable activities. Adopting a standardised framework for classifying loans can help address climate risks while accelerating the extension of financing for sustainable purposes. On taxonomy, the HKMA published the Hong Kong Taxonomy for Sustainable Finance in 2024. The Hong Kong Taxonomy sets clear criteria for defining what qualifies as "green", with a view to enabling informed decision-making on green and sustainable finance and facilitating relevant finance flows.[31] The first phase of the Hong Kong Taxonomy covers 12 economic activities across four key sectors, namely (1) power generation, (2) transportation, (3) construction, and (4) water and waste management.

[31] HKMA. 2024. *Hong Kong Taxonomy for Sustainable Finance.* (https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2024/20240503e1.pdf).

Once loans are classified and exclusions are set, Greentech tools can enhance the loan lifecycle by leveraging this data. These tools allow AIs to conduct regular, automated reviews throughout the loan lifecycle to identify changes in sustainability risks or opportunities. Such tools could flag applications that exceed predefined climate risk thresholds, such as financing for carbon-intensive industries, which would fall under established exclusions. At the same time, Greentech tools can streamline the process of providing working capital loans to clients that meet the specified sustainability criteria within the loan classification. This is achieved through automated classification based on aggregated data about the client, allowing for more efficient identification of opportunities in emerging low-carbon industries or carbon-intensive clients with projects focused on transitioning to net zero emissions. To this end, Greentech solutions can streamline the collection, storage, and management of climate data, and simplify the reporting process. Automating climate risk disclosure can also allow AIs to efficiently generate clear and consistent compliance reports for submission to regulators.

Beyond their core offerings and disclosures, AIs can look to evaluate their upstream climate risk from suppliers and vendors to promote climate risk resilience. This may include assessing suppliers for adherence to climate risk standards and collaborating on projects that support renewable energy and other decarbonisation efforts to mitigate spillover effects.

Cost centres, such as risk control, compliance, business continuity management (BCM), and internal audit, are also essential in operationalising sustainable banking strategies and ensuring consistent implementation across internal workflows.

Risk control departments need to focus on assessing and reporting climate risks comprehensively. By acquiring advanced climate risk data collection and analysis capabilities, AIs can identify emerging risks more effectively. Continuous monitoring of climate indicators can help address potential issues before they escalate.

Compliance functions need to align the AI's operations with climate risk-related regulatory requirements and voluntary commitments, such as net zero targets. Regular compliance reviews are critical to foster adherence to these standards and to address identified gaps proactively. In cases of non-compliance, corrective actions — including policy revisions, implementation of additional controls, or transparency with regulators — are necessary.

BCM teams need to integrate climate-related risks into continuity planning. For instance, scenario planning can address vulnerabilities associated with extreme weather events to bolster operational resilience. If such events occur, contingency plans must be activated to minimise disruptions and inform future planning efforts.

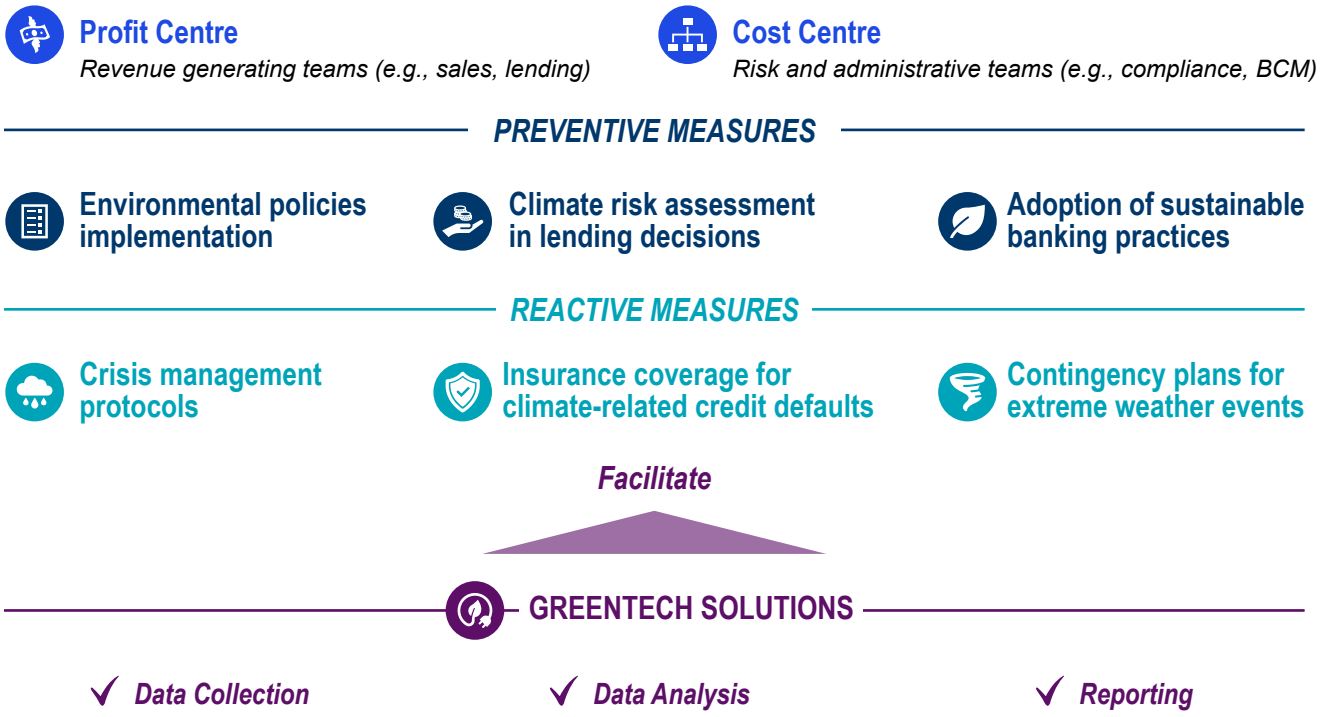
Internal audit teams should conduct regular reviews to verify that climate priorities are consistently embedded across key processes and functions. This assists the AI in meeting its net zero commitments while uncovering opportunities for operational efficiency and climate-related cost savings.

Climate risk management measures taken by both profit centres and cost centres can be categorised into (1) preventive and (2) reactive measures (see Figure 9).

1. Preventive measures involve proactive strategies designed to reduce the likelihood of climate risks materialising into impacts and/or escalating into issues, safeguarding the stability and reputation of the AI. Such measures could include the implementation of robust environmental policies, the integration of climate risk assessment into lending decisions, and the adoption of more sustainable banking practices. For instance, an AI may prioritise financing renewable energy projects and develop incentives that encourage customers to reduce their carbon emissions.

2. Not all risks can be fully prevented. For climate risks that have already materialised, AIs need to have established reactive measures and protocols that they can rely on to respond swiftly and mitigate impacts. These measures may include maintaining insurance coverage for climate-related credit defaults and developing contingency plans for operational disruptions due to extreme weather events. Factors like regulatory changes, market volatility and weather unpredictability may all contribute to the persistence of certain risks, thereby necessitating both types of measures to be embedded into internal controls.

FIGURE 9: RISK MANAGEMENT



Source: KPMG / Quinlan & Associates analysis

Greentech solutions play a pivotal role in supporting both profit and cost centres through advanced data collection, analysis, and reporting capabilities.

For profit centres, Greentech solutions can automate the identification of applications exceeding predefined climate risk thresholds, such as those involving carbon-intensive industries. These systems enable regular reviews throughout the loan lifecycle to monitor changes in sustainability risks or opportunities. Greentech can also support profit centres to transparently disclose issues to stakeholders, reassess loan portfolios, and adjust terms as needed.

For cost centres, Greentech solutions can streamline compliance efforts by automating the monitoring of regulatory updates and translating them into actionable implications. This supports the AI in remaining compliant with evolving climate risk and sustainability standards.

By implementing a structured risk management framework, AIs can manage climate risks more effectively and efficiently across teams and business lines. Greentech enables informed decision-making by providing advanced data aggregation, analysis, and reporting. This approach helps establish clear accountability and equips AIs with actionable measures to address climate risk challenges, fostering proactive and adaptive measures to address evolving risks.

4. Stakeholder Communication

As part of their sustainability practices, AIs should offer transparent and regular reports to communicate with stakeholders on their (1) climate vision, net zero ambitions, and objectives, (2) sustainability governance, policies, and guidelines, (3) sustainable banking and green finance integration and stewardship approaches through their products and services, and (4) climate impact measurements with relevant key performance indicators (KPIs) (see Figure 10).

FIGURE 10: SUSTAINABILITY REPORTING

A good sustainability report for an AI should include:

1 Climate Vision, Net Zero Ambitions, and Objectives

- Climate vision, net zero ambitions, and objectives
- Definition of responsible / sustainability practices
- How the AI's operations / offerings are sustainable banking and green finance-focused

2 Sustainability Governance, Policies, and Guidelines

- Sustainability governance structure with well-defined delegation and escalation processes
- Sustainability-related policies that are material to the AI's daily operations
- Responsible / green finance credit extension and management procedures

3 SBGF[2] Integration and Stewardship Approach

- Overview of sustainable banking and green finance integration approach into the AI's products
- How its green finance priorities in credit extension and other offerings are factored in
- Overview of its sustainability engagements
- How the AI's strategy is implemented to fulfil its duty to its customers
- How the AI leverages its resources to achieve its net zero ambitions and objectives

4 Climate Impact Performance and Impact Disclosure

- Positive impact of the AI's offerings with quantified impact metrics and/or case studies
- Climate impact performance report with relevant KPIs

Note: 1. Sustainable Banking and Green Finance
Source: KPMG / Quinlan & Associates analysis

AIs should ensure that their disclosures comply with local regulatory guidelines. The HKMA's SPM module GS-1 specifies that AIs are required to make climate-related disclosures.[32] Also, the recent Sustainable Finance Action Agenda sets out that, tentatively from 2030, banks should start making available their transition plans to the HKMA regularly on a 'comply or explain' basis (Goal #1) and that banks should align their disclosures with international frameworks and standards, including the ISSB standards and the BCBS Pillar 3 disclosure framework for climate-related financial risks (Goal #2).[33]

[32] HKMA. 2021. *Supervisory Policy Manual GS-1 Climate Risk Management.* (https://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/supervisory-policy-manual/GS-1.pdf).
[33] BCBS. 2023. *Disclosure of climate-related financial risks.* (https://www.bis.org/bcbs/publ/d560.htm).
International Financial Reporting Standards Foundation. 2024. *Introduction to ISSB and IFRS Sustainability Disclosure Standards.* (https://www.ifrs.org/sustainability/knowledge-hub/introduction-to-issb-and-ifrs-sustainability-disclosure-standards/).
HKMA. 2024. *Sustainable Finance Action Agenda.* (https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2024/20241021e4a1.pdf).

Additionally, AIs may refer to the ESG Reporting Guides for the main board and Growth Enterprise Market by the Hong Kong Exchanges and Clearing Limited (HKEX),[34] which states that disclosures should include board oversight statements, clear reporting principles, and a narrative explaining the reporting boundaries (i.e., limits or scope where the AI measures and reports its performance) and describing the identification process.

Banks can also reference the Principles for the Effective Management and Supervision of Climate-Related Financial Risks published by BCBS (Principle 7), stating that they should enhance their risk data aggregation capabilities to incorporate climate-related financial risks.[35] In turn, this practice will enable effective identification and reporting of risk exposures, concentrations, and emerging threats. Active engagement with customers and counterparties, combined with the collection of additional data, is essential to gaining deeper insights into their transition strategies and risk profiles. In terms of frequency, reporting should be timely and regularly updated to maintain relevance. In addition, AIs should develop and implement qualitative and quantitative measures or indicators to evaluate, track, and effectively convey climate-related financial risks.

Effective sustainability reporting and stakeholder communication are crucial for maintaining transparency and accountability in the banking sector, enabling investors, customers, regulators, and other stakeholders to assess an AI's sustainability performance, risk management practices, and progress towards climate goals.

Given the importance and challenges faced by AIs in meeting sustainability reporting requirements, AIs can look to incorporate a range of Greentech solutions to streamline and customise their disclosures in line with various stakeholder expectations. AIs can create tailored disclosures in different formats to cater to different stakeholders. Once a disclosure format is tailored for a specific stakeholder group (e.g., investors), it is crucial to maintain consistency by using standardised templates for all subsequent reports intended for that group. This ensures consistency in the presentation of data and KPIs making it easier for both the AIs and their stakeholders to track progress over time. AIs may also consider geographic-specific climate-related disclosures to provide a line of sight into their local operations.

At the same time, Greentech solutions can offer AIs the flexibility to present data in interactive formats, such as dashboards that allow customers to engage directly with the information. Customers can explore carbon emissions across various business lines, monitor the AI's progress towards sustainability goals, and even gain insights into their real-time climate impact from their spending habits. This way, Greentech solutions can enhance the interactivity and visual appeal of sustainability reporting, making it more intuitive and engaging for stakeholders. As new data becomes available or as new regulatory requirements emerge, systems can automatically adapt the reports, ensuring that stakeholders always have access to the most current information.

By integrating Greentech solutions, AIs can transform static sustainability reports into powerful, real-time tools for both regulatory compliance and stakeholder community engagement, ultimately driving greater trust in their sustainability efforts.

[34] The GEM is an HKEX-operated market for smaller, high-growth companies to raise capital and develop their businesses.
HKEX. 2023. *Appendix C2 Environmental, Social and Governance Reporting Guide (Main Board).* (https://en-rules.hkex.com.hk/rulebook/appendix-c2-environmental-social-and-governance-reporting-guide-0).
HKEX. 2023. *Appendix C2 Environmental, Social and Governance Reporting Guide (GEM).* (https://en-rules.hkex.com.hk/rulebook/appendix-c2-environmental-social-and-governance-reporting-guide?rbid=4476&element_id=1892).

[35] BCBS. 2022. *Principles for the effective management and supervision of climate-related financial risks.* (https://www.bis.org/bcbs/publ/d532.htm).

5. Governance Structure

AIs require robust governance structures to effectively manage climate-related risks and embed sustainable banking and green finance into their corporate strategy and operational processes, as these risks affect multiple aspects of their operations across profit and cost centres. A well-structured sustainability governance framework fosters systematic integration of climate considerations and net zero priorities into decision-making and execution.

As observed by the HKMA, some AIs establish dedicated sustainability and climate committees at the board and/or management levels with clear mandates.[36] These committees oversee the formulation, implementation, and ongoing review of sustainable banking and green finance strategies, enhancing governance structures and ensuring alignment with regulatory and stakeholder expectations.

To further enhance sustainability governance, AIs can look to appoint board members with specialised expertise, such as climate risk and sustainable finance. These experts can provide valuable guidance on addressing evolving regulations, identifying climate-driven market opportunities, and mitigating risks. Greentech solutions can supplement their expertise, empowering them to make well-informed decisions with advanced tools for data collection, analysis, and reporting, helping board members gain the latest insights into climate risks and impacts while supporting the AI's governance efforts. Climate-literate leadership is also crucial for ensuring that net zero objectives are both ambitious and realistic with regular reviews, while fostering accountability and long-term strategic alignment.

Establishing a centralised working group for climate management can also be advantageous. However, solely relying on this setup to drive net zero may not be sufficient to incentivise other functions to embed sustainable banking and green finance principles into their day-to-day operations. As such, cross-functional working groups of risk and business department leaders can help coordinate climate-related contributions, decentralising sustainability responsibilities across the organisation (see Figure 11). The sustainability working groups can also utilise Greentech solutions to effectively track the net zero transition progress and performance across different departments, ensuring continuous alignment with the AI's broader goals.

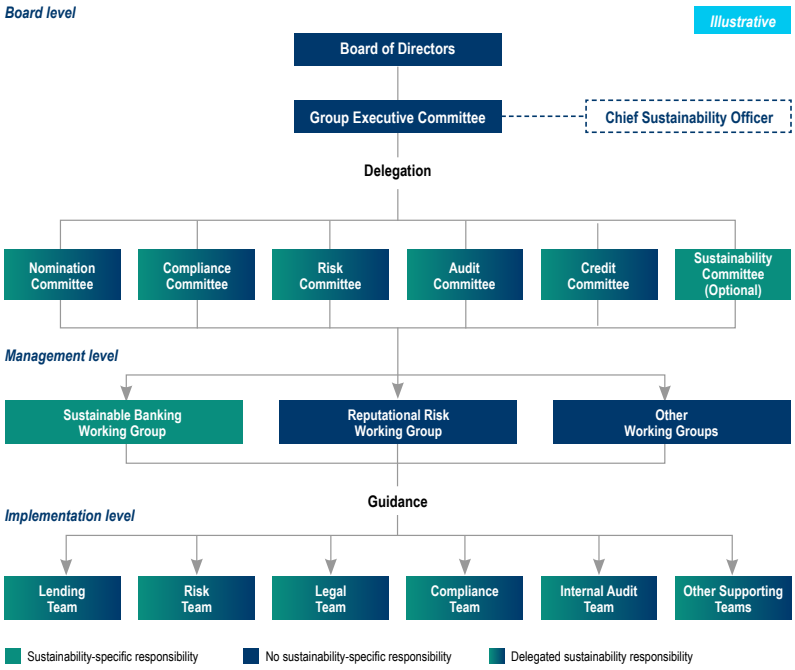
[36] HKMA. 2024. *Good practices on climate-related risk governance.* (https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2024/20240822e1.pdf).
HKMA. 2024. *Good practices on climate-related risk governance (Annex).* (https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2024/20240822e1a1.pdf).

In addition to establishing a robust governance structure, the HKMA outlines the importance of continuous review in light of the evolving climate-related policy landscape, shifting market dynamics, and changes in the AI's own climate-related strategies.[37] For example, AIs may need to establish additional committees or expand existing responsibilities to address emerging business needs, operational shifts, or regulatory requirements.

Across the board, management, and implementation levels, clear and consistent communication channels are critical to ensuring that climate-related matters are adequately discussed. This enables the board to communicate the AI's sustainable banking and green finance strategic direction clearly to all relevant teams, minimising the risk of misalignment between the board's vision and the implementation efforts of different business units.

A useful practice could be to make climate-related topics a standing agenda item for relevant committees, making these discussions a regular part of committee meetings. In addition, robust management information system (MIS) reports could be shared, detailing updates on regulations related to climate risks, developments in sustainable finance, and the AIs' progress towards achieving their net zero ambitions and objectives.

FIGURE 11: SUSTAINABILITY GOVERNANCE STRUCTURE



DECENTRALISED SUSTAINABILITY GOVERNANCE

A decentralised sustainability governance structure engages employees across the AI to monitor and implement sustainability responsibilities in their day-to-day operations. As opposed to in traditional sustainability governance, sustainability ownership and responsibilities are spread across the organisation, allowing for a more agile and thorough execution of sustainable banking and green finance responsibility and values

SUGGESTED APPROACH FOR A SHIFT

Delegate specific sustainability responsibilities across the organisation

Sustainability ownership in committees and at the working level allows for a thorough implementation of sustainable banking and green finance values throughout the AI. Each team should bear responsibility for implementing these concepts and should be able to provide the board with the relevant metrics when required to supplement the board's decision-making

Establish a proper sustainability reporting structure

A proper organisation reporting structure for all sustainability-related matters should be established within the firm for both committees and working-level teams. A proper chain of command will help raise accountability across teams throughout the firm. Additionally, employees should be able to escalate sustainability-related concerns to the relevant parties to prevent misconduct such as greenwashing

Establish a proper communication pipeline

The board should be able to effectively communicate the AI's sustainable banking and green finance strategic direction across teams through established communication pipelines. This helps prevent a disconnect between the board's strategic vision and the AI's implementation of sustainability. Inversely, employees should also be given the opportunity to voice their sustainability priorities and concerns to the board

Source: KPMG / Quinlan & Associates analysis

[37] HKMA. 2024. *Good practices on climate-related risk governance (Annex).* (https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2024/20240822e1a1.pdf).

2.3. Sustainable Banking and Green Finance Enablers

To drive their sustainable banking and green finance strategies, AIs should equip themselves with suitable, fit-for-purpose data, technology, and talent, backed by a robust measurement system to track progress over time and identify what is needed to achieve their net zero ambitions and objectives.

1. Data & Technology

The effective implementation of sustainable banking and green finance principles in AIs hinges on the availability of robust climate risk data and technology.

To assess the data to be collected and processed, AIs need to first identify their specific objectives. This requires evaluating the relevance, materiality, and quality of various data types — such as carbon emissions, climate impact assessments, and sectoral exposure metrics — while considering regulatory requirements and stakeholder expectations. AIs also need to determine whether qualitative or quantitative data will yield more actionable insights and ensure alignment with their strategic priorities. Collaborating with internal stakeholders across departments to understand their needs and concerns, as well as consulting external experts for sector-specific insights, can help AIs establish clear, well-aligned criteria for data selection.

AIs have several options for sourcing climate risk data, each offering unique advantages. One approach is to leverage in-house proprietary data, where AIs collect, process, and analyse climate risk information internally, leveraging bespoke evaluation metrics and benchmarks tailored to their objectives. Alternatively, AIs can collaborate with data aggregators, which provide access to climate risk data, ratings, and indices, facilitating benchmarking and informed decision-making. A third option involves partnering with alternative climate risk data providers that use innovative data sources, such as social media, and employ A.I.-driven analytics to generate unique insights.

Similarly, there are three main channels AIs can use to source Greentech solutions. The first is developing solutions in-house, which allows AIs to tailor the technology to their specific needs. However, this approach demands significant investment in specialised expertise and substantial time to develop critical capabilities, such as climate data analytics and carbon accounting methodologies. Another option is partnering with external vendors, such as Greentech solution providers or system integrators, to co-develop a customised solution. Finally, AIs can opt to purchase or subscribe to off-the-shelf Greentech solutions from established providers, enabling them to leverage mature, ready-to-use technologies.

When it comes to leveraging external solutions, AIs can explore the use of modular and scalable solutions that enable seamless integration with existing systems, as well as the use of application programming interfaces (APIs) to facilitate data sharing. This integration capability is particularly important since sustainability data typically resides in various external databases, ranging from company reports and regulatory filings to third-party ESG rating databases. Ensuring data reliability and quality becomes important, especially when such data feeds into risk models and compliance reporting mechanisms. AIs may therefore explore the implementation of data validation protocols, regular auditing of data sources, and comprehensive data governance frameworks to maintain data integrity throughout its lifecycle.

AIs should develop risk mitigation plans to address any third-party risk through a comprehensive approach that combines thorough due diligence, robust contract structuring, and continuous monitoring of technology vendor(s). This process should include evaluating the vendor's expertise in regulations, their ability to integrate with sustainability data sources, and their compliance with green taxonomy standards. AIs should establish clear service level agreements (SLAs), performance metrics, and exit strategies within contracts while implementing ongoing monitoring measures for tracking vendor performance and compliance.

Greentech solutions are continuously evolving to address complex sustainability challenges. These advancements include the deployment of sophisticated IoT sensor networks for real-time environmental monitoring, automated data aggregation systems that can handle diverse data sources, and advanced analytics powered by artificial intelligence. The integration of these technologies allows AIs to incorporate sustainability data that was previously difficult or impossible to obtain, providing deeper insights into their environmental impact and performance.

While the return on investment for Greentech solutions may not be immediately visible, such solutions hold significant long-term value through direct and indirect benefits. Direct benefits include substantial cost savings through reduced energy consumption and decreased waste management expenses. Indirect benefits, although harder to quantify, are equally tangible and include enhanced brand reputation and improved stakeholder relationships. Given this complex value proposition, sustained internal dialogue with management becomes crucial, supported by clear business cases to secure their support in the use of Greentech solutions to facilitate AIs' transition to net zero.

When developing data and technology capabilities, AIs should evaluate the trade-offs between different approaches and then select the option(s) that best align with their needs, resources, and strategic objectives. This includes ensuring their technology infrastructure can support advanced analytics and integrate seamlessly with existing systems to maximise efficiency and impact.

2. Human Resources

In addition to data and technology, employees play a pivotal role in the successful implementation of sustainable banking and green finance principles, given that they are responsible for upholding the organisation's vision and mission. Various areas of expertise are required across different corporate levels, and AIs should consider acquiring or upskilling key competencies to assist with their successful net zero transition (see Figure 12).

FIGURE 12: SUSTAINABILITY EXPERTISE

FUNCTION	RELEVANT EXPERTISE
Board and Committee (e.g., Board-level Sustainability Committee, ESG Steering Committee, etc.)	1. Overseeing abilities to manage the AI's climate vision, net zero ambitions, and objectives 2. Define suitable climate risk management approaches and strategies to evaluate and prioritise sustainability-related issues and risks 3. Capability to review the AI's progress towards net zero goals and targets 4. Ability to adjust the AI's governance structure to incorporate sustainability
Front Office (e.g., Relationship Managers, Credit Underwriting Team, etc.)	1. Ability to integrate sustainable banking and green finance as part of their product design and investment processes 2. Possess relevant communication skills to understand the sustainable banking and green finance needs of different customers, and recommend suitable products to meet those needs 3. Ability to interpret climate risk data and evaluate how it impacts product building and loan approval decisions
Middle Office (e.g., Risk Team, Compliance Team, Legal Team, etc.)	1. Ample knowledge regarding climate risk regulations of different jurisdictions and standards of different initiatives 2. Ability to conduct cost-benefit analysis 3. Possess a thorough understanding of different climate risk data and their sources (e.g., vendors) 4. Capability to collect and analyse internal and external climate risk data and convert these data into reporting metrics in an industry-consistent manner 5. Generate reports according to sustainability reporting standards
Back Office (e.g., Human Resources Team, Information Technology Team, etc.)	1. Ability to establish sustainable banking and green finance-related KPIs and create a compensation policy to encourage people to achieve them 2. Build up a mature sustainable banking and green finance technology architecture to smoothen the internal communication channel and climate risk data flow 3. Understand the required climate expertise of different positions within the organisation and develop related climate risk training materials 4. Capability to identify and source from external sustainability talent pools

Source: KPMG / Quinlan & Associates analysis

After identifying the knowledge and skills required for sustainable banking and green finance integration, AIs should assess the current capabilities of their employees to determine key competency gaps. This analysis will help clarify where improvements are needed and guide the next steps in bridging these gaps.

Once key gaps are identified, AIs have several options to address them: (1) recruit specialised sustainability talent to strengthen in-house capabilities, (2) outsource sustainability-related functions to external consultants or vendors with the required expertise, and/or (3) focus on developing in-house capabilities through targeted training programmes and/or certifications.

Training programmes and/or certifications should be comprehensive and reflect the needs of employees. A foundational module available to all staff can focus on understanding sustainable banking and green finance principles, including an introduction to green finance, the significance of sustainability in the banking sector, and the latest developments regarding global climate risk and sustainability standards and regulations. This will help employees grasp the broader context and importance of sustainable banking and green finance as it relates to the AI's mission and long-term strategy.

Further training can elaborate on how sustainable banking and green finance are integrated into the AI's corporate structure and processes. This includes understanding the AI's sustainability governance framework, decision-making structures, and the role of different departments (e.g., risk management, compliance, and operations) in implementing initiatives to transition to net zero. Employees should be made aware of their specific responsibilities in both preventive and reactive measures outlined in the risk management framework, and how their roles contribute to achieving the AI's net zero transition goals, whether through product development or customer communications.

More advanced training programmes can include a deep dive into climate risk data management, teaching employees how to analyse, interpret, and report climate risk data. Such programmes can cover the importance of accurate data collection, understanding sustainability reporting standards, and how to use data for risk assessment and decision-making. By helping employees navigate the complexities of climate risk data, AIs can promote more effective compliance with regulations and improve their sustainability reporting efforts.

As Greentech solutions play a crucial role in driving the implementation of net zero transition agendas, AIs may consider running training modules to help their employees learn about the features and functionalities of Greentech solutions and how to apply them in their day-to-day tasks. For example, training can cover the use of tools that help employees manage climate risk-related data, automate reporting, and track sustainability initiatives. Staff equipped with the skills to use these technologies can improve efficiency and accuracy in sustainability reporting, compliance, and performance tracking.

By developing robust sustainable banking and green finance training programmes, AIs can help their employees to be not only aware of sustainability principles but also prepare them to implement them in their daily work, driving the AI's commitment to sustainability and fostering a culture of climate responsibility across the entire organisation.

3. Measurement System

To drive effective sustainability activation, AIs need to establish a measurement system to periodically assess their current level of sustainable banking and green finance maturity, benchmark it against leading industry practices, and align it with their own goals (see Figure 13).

This system should be comprehensive, addressing key areas such as the AI's climate vision and proposition, governance structures, risk management, stakeholder communication, data and technology, and human resources. It must also be specific, incorporating measurable KPIs to track the progress of initiatives and ensure alignment with net zero ambitions and objectives. For example, AIs adopting Greentech solutions could set KPIs that they would like to achieve over a certain timeframe, such as achieving a targeted percentage of employees using the solution, incorporating sustainability data into at least two risk models, and identifying at least a proportion of climate-related risks at an early stage. By setting and continuously monitoring these KPIs, AIs can identify potential areas for improvement, optimise performance, and drive broader adoption of Greentech solutions across the institution to better meet organisational needs.

Additionally, the system should be practical and dynamic, capable of adapting to the AI's evolving needs while remaining aligned with shifting sustainability regulations and global trends. By implementing a measurement system as such, AIs can continually assess their sustainable banking and green finance progress and make informed adjustments to meet long-term sustainability goals.

FIGURE 13: MEASUREMENT SYSTEM

	Climate Vision & Proposition	Governance Structure	Risk Management	Stakeholder Communication	Data and Technology	Human Resources
KEY MEASUREMENTS	• The existence of a climate vision and how relevant it is to the AI's original strategic vision • The existence of SBGF[1] principles and how similar the established principles are to international frameworks • The establishment of the AI's proposition and the extent to which climate risk is incorporated for risk management / revenue generation	• The readiness of sustainability policies and climate issues reporting procedures • The establishment of an SBGF integration committee and its participation frequency (and accountability) on sustainability issues	• The existence of preventive internal controls and measures and the extent to which they are applied across departments / divisions • The existence of reactive internal controls and measures and the extent to which they are applied across departments / divisions • The frequency of reactive controls' implementation in response to arising climate risks	• The effectiveness of internal and external communication • The internal disclosure requirements and how these reference international standards / frameworks (e.g., Task Force on Climate-Related Financial Disclosures, etc.) • The variety of measures in place to avoid greenwashing risks during disclosure / reporting	• The utilisation of climate risk databases and digital analytics tools, and the sophistication (by available functions) of the analytics tools • The existence of internal and external climate risk data quality audit mechanisms and the frequency of audit practices • The development of internal Greentech solutions	• The promotion of a culture of sustainability throughout the organisation and to what extent the AI values these • The frequency of sustainability trainings provided to employees to raise their understanding of SBGF, including the quality of the training provided • The existence of incentive plans to promote climate performance
SAMPLE KPIs	• Number of principles referenced within international frameworks • Compliance rate to minimum requirements	• Number of sustainability experts sitting on the Board • Frequency of sustainability committee meetings and participation levels	• Number of high-risk audit findings • Response time to climate risk events	• Stakeholder satisfaction with sustainability communication • Percentage of disclosures referencing regulatory standards / frameworks	• Usage rate of Greentech solutions (over time and across divisions) • Percentage of climate risk data flagged for quality issues	• Training and qualification rate • Proportion of employees receiving incentives • Trainer approval / feedback rating

Note: 1. Sustainable Banking and Green Finance

Source: KPMG / Quinlan & Associates analysis

3. Greentech Use Cases

3.1. Use Case #1 – Strategic Alignment

Rationale

Traditional Sustainability-Linked Loans (SLLs) are often out of reach for businesses at their early stage of sustainability journeys, mainly due to insufficient resources for tracking and reporting ESG performance. This effect is particularly relevant for small and medium enterprises (SMEs), which contribute to around 50% of Hong Kong's GDP.[38] When looking for funding linked to sustainability outcomes, SMEs have limited means to measure and report their ESG performance themselves to qualify for SLLs. This gap hinders their ability to secure business opportunities and restricts their access to sustainable finance options, limiting their capacity to contribute to broader decarbonisation goals.

To address these challenges, a regional bank we interviewed partnered with a globally recognised Greentech solution platform specialising in ESG data, intelligence, and analytics, enabling SMEs to qualify for the bank's SLLs. This solution allows the bank to assess SMEs' ESG performance based on criteria tailored to their specific industry and geographical location. It does so by aggregating data from multiple sources, including company disclosures and media reports, to generate objective ESG ratings. Access to these ESG ratings effectively removes the need for SMEs to invest significant time and resources into evaluating and reporting their ESG performance on their own. By leveraging the Greentech solution provider's platform, the bank can structure sustainable financial products and offer interest rate incentives to SMEs that meet specified ESG targets.

From a strategic perspective, this initiative helps the bank expand its SME loan portfolio, directly supporting its financial goals. Simultaneously, it reinforces the bank's commitment to broader net-zero ambitions, particularly beyond hard-to-abate sectors, by encouraging SMEs to integrate ESG considerations into their loan structuring. Ultimately, the bank is building towards a more sustainable and climate-resilient future aligned with its commitment.

Approach

The regional bank implemented a four-step process to integrate the Greentech platform into its sustainable finance offerings:

1. **Needs Assessment:** The bank identified a critical gap in the SME sector, where limited resources prevented engagement in ESG practices, despite growing expectations of corporate clients. The lack of ESG practices prevented SMEs from acquiring loans to assist with their decarbonisation, especially in the manufacturing and trading sector. As such, the bank determined that a simplified, cost-effective solution for these SMEs was essential to bridge this gap and help them qualify for the bank's sustainable finance offerings.

[38] Quinlan & Associates. 2024. *Plugging Hong Kong's SME Credit Gap: Reinventing the SME Lending Proposition*. (https://www.quinlanandassociates.com/plugging-hong-kongs-sme-credit-gap-reinventing-the-sme-lending-proposition/).

2. **Solution Provider Selection:** The bank engaged a third-party solution provider rather than developing capabilities in-house to expedite the implementation process. Solution providers were assessed based on a set of criteria, including data credibility, rating methodologies, and industry track records. Ultimately, the bank selected a Greentech provider recognised for delivering ESG performance ratings on SMEs, powered by automated data collection and analysis, advanced data aggregation techniques, and a well-established, holistic scoring system. This scoring approach incorporates both qualitative and quantitative factors, including automated real-time monitoring of news that may influence SMEs' sustainability activities. In addition to tracking news, the ratings reflect concrete sustainability actions taken by SMEs, such as their water and energy consumption, as well as their waste management practices. Beyond the ratings, the provider also offers actionable insights by identifying key strengths and areas for improvement across various sustainability themes.

3. **Product Structuring and Provision:** Using the data from the solution provider, the bank designed SLLs tied directly to SMEs' ESG ratings. This way, the interest rate is effectively linked to SMEs' ability to meet predetermined ESG benchmarks. By working with the solution provider, the bank also effectively alleviated the burden of SMEs to hire external auditors or consultants for ESG assessment, facilitating greater SLL uptake and allowing them to capture business opportunities.

4. **Feedback and Iteration:** Although the initiative is still in its early stages, the bank plans to establish a formal feedback loop to capture insights from participating SMEs. It plans to assess the effectiveness of the partnership with the solution provider, with a focus on refining the program and extending the outreach to more SMEs.

Key Learnings

By aligning its SLL solution with its strategic objectives, the bank not only advanced its own goals but also delivered meaningful benefits to its corporate clients. SMEs gain greater visibility into their ESG performance and access to affordable capital to support their sustainability efforts. Meanwhile, the bank advances its sustainability agenda and enhances its brand perception. In particular, this initiative drives the bank's sustainability initiatives through financial materiality (i.e., enhancing its SLL capabilities and returns) and impact materiality (i.e., reducing its financed emissions). Several key factors contributed to the success of the project:

- **Accessibility for SMEs:** By providing a low-cost ESG certification method, the bank lowered the barriers for SMEs to engage in the ESG rating processes. This opportunity broadened the participation horizon in sustainable finance, driving greater awareness and adoption of ESG practices among SME clients and boosting sustainable finance transactions.

- **Credible Partnerships:** The Greentech solution provider's established reputation and international recognition provided assurance to both the bank and its clients, enhancing the credibility of the SLL offerings and their environmental impact.

- **Internal Alignment:** The initiative required extensive internal collaboration across risk, front-line, and product teams to ensure seamless integration with the bank's existing frameworks. Strong leadership support was critical in securing the necessary resources and prioritising sustainable finance initiatives.

- **Data and Compliance:** The bank conducted thorough due diligence to confirm the comprehensiveness of the Greentech solution provider's assessment and the alignment of its data handling practices with the bank's standards.

Through this initiative, the bank demonstrated the importance of strategic alignment in sustainable finance, positioning itself as a leader in the field. In particular, the bank showcased how strategic partnerships and innovative product structuring can drive ESG adoption among SMEs. This approach not only enhances the bank's reputation and balance sheet but also contributes to broader decarbonisation efforts by integrating SMEs into the sustainable finance ecosystem.

3.2. Use Case #2 – Risk Management

Rationale

With growing regulatory and societal expectations to address sustainability and climate-related risks, banks must adopt robust methodologies to effectively model and assess their climate positions. However, a global bank we interviewed identified a significant challenge: the lack of comprehensive, high-quality data required for precise climate risk modelling across various timeframes, spanning from short-term assessments to long-term forecasts.

To address this challenge, the bank needed to source a robust and diverse set of sustainability data for integration into their climate risk models. This included data associated with physical risks assessed at the country level using metrics such as exposure to perils like flooding, typhoon, and overall GHG emissions, as well as similar data on transition risks at the company level. However, differences in methodologies from various countries and data providers rendered these data sources incomparable, skewing the bank's analysis and making it difficult for the bank to build a holistic view of its climate exposure.

Recognising that effective risk management hinges not only on data quality but also on the breadth of the data captured, the bank partnered with multiple Greentech providers to source more comprehensive and comparable sustainability data. This included a range of climate-related metrics, such as carbon emissions and energy consumption, as well as physical risk factors such as exposure to flooding. A key part of this process was gaining a thorough understanding of the methodologies underlying these data sources themselves. In addition to acquiring data, the bank also utilised Greentech solutions to enhance its risk identification process to improve overall due diligence.

With a robust data foundation and understanding in place, the bank could perform more accurate scenario modelling, stress testing, and long-term planning at the organisational level, as well as more granular deep dives. This approach allowed the bank to better identify areas in which it was more exposed to climate risks, estimate potential impacts, and make informed, data-driven decisions to mitigate climate risk effects.

Approach

The bank adopted a systematic, collaborative, and iterative approach to implementing its risk management practices, leveraging Greentech solutions to enhance its climate risk capabilities.

1. **Pain Point Identification:** The bank identified a primary challenge: the limited availability of comprehensive, useful, and actionable sustainability data (e.g., exposure to water stress, GHG emission details of loan portfolio companies) necessary for risk assessment models (e.g., climate value-at-risk assessments and metrics such as the Implied Temperature Rise). This lack of data hindered the bank's ability to effectively identify and quantify the impacts of both physical and transition climate risks. Regulatory stress-testing requirements, such as the pilot Climate Risk Stress Tests by the HKMA, further underscored the need for robust tools to mitigate these risks.

2. **Vendor Evaluation:** Given its global footprint, the bank engaged multiple Greentech solution providers to access a broad spectrum of sustainability data, ranging from national-level data (e.g., climate change policies) to company-level data (e.g., exposure to flood, impact from sea-level rise), allowing them to evaluate their climate risks across its operating markets and international client base in detail. Prior to onboarding vendors, a rigorous assessment process was conducted, focusing heavily on evaluating potential vendors based on their data credibility, industry alignment, and integration capabilities.

3. **Proof of Concept (PoC):** The bank adopted a phased approach, starting with initial PoC trials designed to assess the ability of the solution to aggregate and analyse data across different jurisdictions and timeframes. The PoC results informed the next steps, where successful trials led to the subsequent scaling of the solution. The bank employed clear KPIs to measure the effectiveness of the solution, focusing on key areas such as enhancing the accuracy of risk assessments and optimising related processes. Specific metrics included the reduction in data processing time, the percentage of high-confidence data points collected, and the number of climate-related metrics integrated into the bank's risk models. Throughout the process, the bank applied agile project management principles to guide implementation and maintained regular communication with Greentech providers, as well as internal teams, to resolve any arising issues. The bank maintained a transparent approach by promptly relaying key issues — such as data limitations and integration challenges — to Greentech providers before they escalated. Subsequently, discussions were held to establish clear improvement plans with well-defined timelines.

4. **Continuous Evaluation:** The bank conducted periodic reviews of the engaged Greentech solution provider to evaluate their data consistency, granularity, quality, update frequency, and various other criteria.

Key Learnings

The bank's collaboration with multiple Greentech providers enhanced its climate risk management capabilities, providing greater visibility into its climate risk exposures. The following factors were considered by the bank to be critical in the journey of adopting Greentech solutions for risk management practices:

- **Data Source Verification and Transparency:** The bank emphasised the need for credible and consistent sustainability data in assessing the scale and impact of physical and transition risks. Inaccurate or incomplete data can greatly affect short-term as well as long-term risk assessments (e.g., to 2050) and undermine risk management efforts. Therefore, the bank adopted a rigorous vendor due diligence process. As part of this process, the bank engaged its in-house climate experts to evaluate the robustness of Greentech providers' data sources. Institutions should assess not only the quality and breadth of data but also the clarity and robustness of their methodologies to ensure the integrity of the climate risk models. The bank required Greentech providers to disclose their data collection methodologies, detailing how they aggregate information and methods employed for error detection. For example, Greentech providers were required to specify the source of base data, refresh frequency, and alignment with publicly available government data.

- **Agile Implementation:** Recognising the effort and cost of large-scale implementation projects, the bank adopted a phased PoC approach, allowing for incremental testing and validation of new Greentech solutions. The bank recognised that this approach allowed it to expand on its Greentech solution progressively, giving the bank the chance to build upon the learnings and feedback from earlier phases. In addition, the bank highlighted the importance of adopting an agile approach in its PoC, which helped to keep the project on track against the key milestones when unforeseen challenges arose.

- **Collaborative Model:** Given that most sustainability data reside in external databases, the bank recognised that leveraging sustainability data in its risk models required a working model that minimised friction with vendors. Instead of having to choose between relying solely on its in-house team capabilities or external providers, the bank sought to set up an environment where internal development teams and the vendor could closely cooperate and co-develop the solutions. This hybrid model supported greater alignment, reduced the risk of fragmentation, and ultimately minimised integration issues during Greentech solution deployment.

This initiative represents a significant advancement in building a resilient, data-driven approach to climate risk management. The bank achieved greater accuracy and precision in evaluating climate risk positions. Developing Greentech solutions in partnership with the providers allowed the bank to have a greater understanding of its short-, medium-, and long-term physical and transition risks impacts.

3.3. Use Case #3 – Customer Engagement

Rationale

Interest in sustainability among consumers is growing, yet translating this interest into sustainable living practices remains a challenge. One key obstacle is the lack of accessible, actionable information and practical guidance, particularly when it comes to financial activities. For example, traditional methods for assessing carbon footprints, such as self-reported surveys, are often limited to rough estimates at specific points in time. These assessments fail to track long-term behaviours or offer objective data, making it difficult for customers to understand their environmental impact and act on it.

To address this gap, a global bank we interviewed partnered with a Greentech service provider to integrate a carbon impact module into its mobile banking application. The module features three key components, including (1) smart spending, (2) low-carbon living, and (3) wealth management. Through these features, customers can set their environmental goals while the bank tracks and calculates carbon footprints based on debit and credit card transactions, offering users visualisations and sustainability tips. Additionally, the bank promotes sustainable financial products, such as green funds and eco-friendly loan options, by offering transparent information about their environmental benefits and impact.

By directly linking financial behaviour to environmental impact, this partnership between the bank and Greentech provider empowers customers to make more sustainable choices in their daily spending and investment decisions, making sustainability a natural part of customers' financial lives.

Approach

The bank undertook a comprehensive six-step process, from conceptualising to implementing its environmental impact tracking module, in partnership with the Greentech service provider. This process ensures the solution delivers services that are aligned with customer needs and expectations.

1. **Needs Identification:** The process began with extensive research, starting with user focus groups aimed at understanding customer attitudes and behaviours around sustainability. Alongside the focus groups, the bank also analysed customer interactions with existing carbon-tracking Greentech solutions both within the financial industry and beyond. These findings confirmed a strong demand for a tool that could integrate carbon tracking into everyday financial management.

2. **Design Considerations:** Once market demand was validated, the bank carefully weighed the option of developing an in-house solution vs. partnering with an external Greentech service provider. While the bank already had comprehensive transaction datasets, they recognised the need to augment necessary expertise in environmental data analytics. Hence, the bank decided to seek a partnership with a third-party Greentech provider, screened based on three key criteria: (1) proven expertise in carbon assessment, (2) demonstrated track record with financial institutions and (3) robust technical capabilities.

3. **PoC Testing:** While the criteria established in the previous step provided a preliminary screening of potential providers, the bank proceeded with PoC testing to assess the suitability of the providers' solution and project feasibility. This enabled the bank to test the integration of spending data with the partner's carbon footprint tracking technology, ensuring that customers would not need to manually submit data, thus improving accuracy and user experience. One provider stood out during the testing phase for its ability to easily integrate with the bank's existing infrastructure. The simplicity of the integration process, combined with robust data handling capabilities, led to the provider being shortlisted for the vendor selection process.

4. **Vendor Selection & Negotiation:** Following successful PoC testing, the bank proceeded with a robust vendor selection process and confirmed the choice of the Greentech service vendor. The bank then negotiated with the selected service provider to secure favourable pricing terms and implementation conditions to optimise product rollout efficiency and return on investments (ROI).

5. **Product Rollout:** After six months of planning, testing, and negotiation, the solution was successfully integrated into the mobile banking application, featuring engaging and intuitive visualisations, such as a "watering the plant" animation to represent environmentally friendly actions taken by consumers.

6. **Feedback Loop:** Since the launch of the module, the bank has been collecting user feedback to assess customer satisfaction levels and identify areas for improvement. To date, feedback has been positive, with users appreciating the automatic data processing, ease of use, and intuitive visualisations, such as a leaf-based system that shows their carbon footprint status. However, users have also expressed a need for more actionable guidance to help them take their sustainability efforts to the next level. This insight has led to the progression to the next phase of development, which will focus on delivering personalised recommendations based on carbon tracking outcomes to assist customers in adopting more sustainable lifestyle choices.

This systematic, collaborative, and customer-centric approach has enabled the bank to successfully implement a carbon impact tracking solution that supports customers' environmental goals alongside their financial objectives.

Key Learnings

The solution delivered value for both customers and the bank. Customers can now access more accurate and easily understandable environmental impact tracking to assist their decision-making in daily financial activities and form environmentally friendly spending habits. For the bank, this initiative has not only driven increased user engagement but also enhanced brand perception and strengthened its leadership position in sustainability. The success of the carbon impact module can be attributed to several key factors:

- **Data Management:** Data across various systems often varies in format, with some entries being incomplete. Recognising the importance of delivering accurate, historical carbon footprint data, the bank dedicated significant resources to clean, rectify, and standardise this data as a one-time effort, ensuring that all future data would be consistent and readily usable. Given the complexity and resource-intensive nature of this task, the bank engaged a vendor to assist with data cleansing and classification, enhancing the quality of the data that would feed into the carbon impact module.

- **System Integration:** Another challenge was ensuring compatibility between the bank's legacy systems and the Greentech service provider's modern technology stack. To address this, the bank worked with the provider's team on-site to swiftly resolve integration issues. The close cooperation between the two teams helped accelerate the implementation of the module, which was critical for the success of the project.

- **Leadership Support:** As the carbon impact tracking module was not designed to generate direct revenue, strong leadership support was essential for its implementation. Recognising this, the bank focused not only on assessing the initial and ongoing costs but also on evaluating the broader, long-term value it could create. Therefore, beyond traditional ROI metrics, the bank considered enhanced customer engagement, strengthened brand reputation, and long-term sustainability impact to justify its investment. Without the support and commitment from senior leadership, the module would not have gained the buy-in required for its implementation.

- **Regulatory Engagement:** Given the customer-facing nature of the module, regulatory compliance was a significant consideration. The bank sought to ensure that the solution adhered to internal compliance procedures and practices. In addition, the bank also presented solutions with major enhancements to regulators early in the process to facilitate compliance discussions, gaining a thorough understanding of the relevant regulations and guidance. This proactive approach ensured that the solution was fully compliant with regulatory requirements upon its launch.

This use case demonstrates how successful implementation of customer-facing Greentech solutions hinges on close collaboration with Greentech providers, strong support from senior management, and adherence to regulatory compliance requirements. As part of its broader vision, the bank aims to embed the Greentech solution throughout the entire customer journey in the future, creating a unified and intuitive experience.

4. Conclusion

The adoption of Greentech solutions in AIs requires close coordination across departments. A thorough assessment of the current sustainable banking and green finance landscape and the AI's positioning is essential to establish a strong foundation for the adoption process. Successful implementation needs to align with the AI's sustainable banking and green finance strategy, underpinned by a clear vision and actionable steps.

As global sustainability regulations, disclosure requirements, and customer expectations continue to evolve, AIs — particularly those with international operations — need to remain agile and responsive. While adopting Greentech solutions entails costs, time, and resource investment, their long-term benefits are not to be overlooked. These solutions can enhance operational efficiency, help AIs achieve their net zero goals, and better meet customer needs. Beyond ensuring regulatory compliance, they also foster a culture of innovation and can help position AIs as forward-looking organisations.

5. Appendix

5.1. Acknowledgements

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5.2. List of Abbreviations

- **A.I.:** Artificial Intelligence
- **AIs:** Authorized Institutions
- **BCBS:** The Basel Committee on Banking Supervision
- **BCM:** Business Continuity Management
- **BIS:** Bank for International Settlements
- **CASG:** Green and Sustainable Finance Cross-Agency Steering Group
- **DBGS:** Digital Bond Grant Scheme
- **ESG:** Environmental, Social, and Governance
- **FSTB:** The Financial Services and the Treasury Bureau
- **GHG:** Greenhouse Gas
- **GSFGS:** Green and Sustainable Finance Grant Scheme
- **HKEX:** The Hong Kong Exchanges and Clearing Limited
- **HKMA:** The Hong Kong Monetary Authority
- **HKSAR:** The Hong Kong Special Administrative Region
- **HKU:** The University of Hong Kong
- **IFRS:** International Financial Reporting Standards
- **ISSB:** International Sustainability Standards Board
- **KPIs:** Key performance indicators
- **NGFS:** Network for Greening the Financial System
- **PCAF:** Partnership for Carbon Accounting Financials
- **PoC:** Proof of Concept
- **ROI:** Return on Investment
- **SBGF:** Sustainable Banking and Green Finance
- **SFC:** Securities and Futures Commission
- **SLL:** Sustainability-Linked Loans
- **SME:** Small and Medium Enterprise
- **SPM:** Supervisory Policy Manual
- **UNFCCC:** The United Nations Framework Convention on Climate Change

5.3. Relevant Regulatory Requirements and/or Guidance

- **Hong Kong Monetary Authority:** Supervisory Policy Manual module GS-1 on “Climate Risk Management” (2021), Embedding climate risk in banking supervision (2022), Due Diligence Process for Green and Sustainable Products (2022), Hong Kong Fintech Promotion Roadmap (2023), Planning for net-zero transition (2023), Sale and Distribution of Green and Sustainable Investment Products (2023), Good practices on climate-related risk governance (2024), Good Practices on Transition Planning (2024), Sustainable Finance Action Agenda (2024), Hong Kong Taxonomy for Sustainable Finance (2024)

- **Financial Services and the Treasury Bureau, Securities and Futures Commission, InvestHK, and The University of Hong Kong:** Prototype Hong Kong Green Fintech Map 2024 (2024)
- **Hong Kong Exchanges and Clearing Limited:** Appendix C2 Environmental, Social and Governance Reporting Guide (GEM) (2024), Appendix C2 Environmental, Social and Governance Reporting Guide (Main Board) (2024)
- **United Nations Framework Convention on Climate Change:** The Paris Agreement (2015)
- **International Financial Reporting Standards Foundation:** Introduction to ISSB and IFRS Sustainability Disclosure Standards (2024)
- **Basel Committee on Banking Supervision:** Climate-related financial risks – measurement methodologies (2021), Climate-related risk drivers and their transmission channels (2021), Principles for the effective management and supervision of climate-related financial risks (2022), Frequently asked questions on climate-related financial risks (2022)
- **Partnership for Carbon Accounting Financials:** The Global GHG Accounting and Reporting Standard for the Financial Industry (2024)