

Tangible guidance for making ISSB
and TCFD climate-related disclosures
in emerging markets

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Part 1

Emerging Economies Climate Risks and Best Practices for Climate Risk Disclosure

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Authors

This report was compiled and written by members of UNEP FI's 2023 Climate Risk and Task Force on Climate-Related Financial Disclosures (TCFD) Programme:

- David Carlin
- Hiu Yan Cheng
- Lea Lorkowski

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List of abbreviations

BCB	Banco Central do Brasil
CBK	Central Bank of Kenya
CDSB	Climate Disclosure Standards Board
CSRD	The EU Corporate Sustainability Reporting Directive
CVM	The Brazilian Securities and Exchange Commission
EBA	European Banking Authority
ENSO	El Niño Southern Oscillation
ERP	ESG rating provider
ESRS	The European Sustainability Reporting Standards
EU	The European Union
FRC	Financial Reporting Council (of the United Kingdom)
FSB	Financial Stability Board
G20	The Group of Twenty
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GHG	Greenhouse gases
IEA	International Energy Agency
IFRS	International Financial Reporting Standards
IISD	International Institute for Sustainable Development
ILO	International Labour Organization
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commissions
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
ISSB	The International Sustainability Standards Board
MoU	Memorandum of Understanding
NDRC	National Development and Reform Commission (of China)
NGFS	Network for Greening the Financial System
NGX	The Nigerian Exchange Group
NOAA	National Oceanic and Atmospheric Administration (of United States of America)
NSE	Nigerian Stock Exchange
PRA	Prudential Regulation Authority
PwC	PricewaterhouseCoopers International Limited

RBI	Reserve Bank of India
SASB	Sustainability Accounting Standards Board
SDGs	The United Nations' Sustainable Development Goals
SFDR	The EU Sustainable Finance Disclosure Regulation
SSBJ	The Sustainability Standards Board of Japan
TCFD	Task Force on Climate-Related Financial Disclosures
United Kingdom	United Kingdom of Great Britain & Northern Ireland
UNEP FI	United Nations Environment Programme Finance Initiative
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	U.S. Dollar
WHO	World Health Organisation
WMO	World Meteorological Organisation



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Executive summary

The growing awareness of the profound impacts of climate change has prompted a worldwide focus on climate-related disclosures due to the urgent need to address the challenges posed by climate risks and opportunities. Climate change affects sectors, nations, regions, and financial systems, making it a critical consideration for businesses, investors, regulators, and policymakers.

The realisation of the wide-ranging consequences of climate change has led to an increased understanding of the importance of transparency and accountability in disclosing climate-related information. As a result, many countries have taken legislative action to enforce climate-related disclosures, leading to the development of various disclosure requirements and frameworks. This global attention on climate-related disclosures reflects the collective effort to foster sustainable finance practices and mitigate the adverse effects of climate change, making it an integral part of the broader sustainability agenda for organisations and economies worldwide.

The TCFD was established by the Group of Twenty (G20) Financial Stability Board in 2015 to address climate risk pricing and capital allocation for financial stability. Its 2017 final report provided voluntary disclosure recommendations to ensure consistent and comparable climate-related information in financial reports for investors, lenders, and insurers. In October 2021, the TCFD updated its implementation guidance, introducing transition plans and clarifying financial metrics and targets. The TCFD has gained over 2,700 global supporters, including corporates, investors, and governments. In July 2021, the G20 Finance Ministers and Central Bank Governors endorsed the TCFD, aiming for global coordination on reporting standards. The fifth status report from October 2022 revealed progress in disclosure but noted the need for further improvement.

The TCFD has made a major contribution to improving climate-related financial disclosures worldwide by serving as the foundation for many climate-related and sustainability disclosure or reporting frameworks and regulations. A notable achievement has been the recent finalisation of the IFRS Sustainability Disclosure Standards on General Requirements for Disclosure of Sustainability-related Financial Information (IFRS S1) and Climate-related Disclosures (IFRS S2), often referred to as ‘the ISSB standards’. The ISSB standards and, in particular, the IFRS S2 climate standard represent the successors to the TCFD, relying on its framework and four pillar structure.

In parallel, the ISSB was established in November 2021 to deliver a global baseline of sustainability-related disclosure for global capital markets. On 26 June 2023, the ISSB issued its inaugural standards – IFRS S1 and IFRS S2 – aimed at enabling companies to deliver decision-useful, consistent and comparable information to investors glob-

ally in a cost-effective and assurable way. IFRS S1 requires companies to disclose sustainability-related risks and opportunities, while IFRS S2 focuses on climate-related risks and opportunities. Both standards fully integrate the TCFD recommendations. Now issued, the ISSB will support adoption by collaborating with jurisdictions and companies, including creating a Transition Implementation Group and launching capacity-building initiatives. The ISSB will also continue working with jurisdictions and the Global Reporting Initiative (GRI) to facilitate efficient reporting when combining the standards with other frameworks.

This report, divided into three parts, offers comprehensive guidance for companies in emerging markets on each pillar of the TCFD recommendations, all of which have been incorporated into the IFRS S2 framework. The report references IFRS Sustainability Disclosure Standards, as well as recommendations and guidance issued by the TCFD where applicable. The aim is to assist companies in making climate-related financial disclosures. These resources address key questions, outline pathways for progress, and show practical case study examples to illustrate real-world disclosures. Together, these contributions aim to empower financial institutions with the knowledge and tools needed to effectively navigate climate-related financial disclosures and contribute to a more sustainable future.

Financial institutions in emerging economies play a critical role in shaping the future of sustainable development. It is essential for these organisations to embrace climate-related financial disclosures so as to proactively manage risks and seize opportunities. The TCFD and ISSB provide robust standards for organisations to assess and disclose climate-related risks and opportunities. By adopting and implementing IFRS S2, which incorporates the core recommendations or pillars of the TCFD framework, emerging economies can enhance their resilience, attract sustainable investments, and contribute to the global transition toward a low-carbon economy.

The report explores best practices and summarises industry knowledge for climate-related risks and opportunity disclosures. This report was designed both for financial users who are developing climate-related financial reports and for decision-makers within their organisation. By fostering a deeper understanding of climate-related implications, this resource aims to bolster sustainability efforts and facilitate more resilient decision-making for a better future.

As a result, this report aspires to be a resource for policymakers and financial institutions, as well as organisations just starting out on their climate journey and other stakeholders in emerging economies. By harnessing the insights presented in this report, participants can strengthen their climate risk management practices, facilitate informed decision-making, and ultimately contribute to the sustainable growth and development of their respective economies.

In summary, the objectives of this report are as follows:

1. Provide participants with a comprehensive overview of climate risks and opportunities in emerging economies, enabling them to develop a nuanced understanding of the challenges and potential responses to these challenges.
2. Highlight best practices for climate-related financial disclosure, offering participants practical guidance to effectively integrate climate-related financial considerations into their reporting processes.
3. Support policymakers and financial institutions in creating an enabling environment for climate risk management and sustainable finance in emerging economies.
4. Foster international collaboration and knowledge-sharing, facilitating the adoption of standardised approaches to climate-related financial disclosures in emerging economies.

With a focus on financial institutions in emerging economies, this report aims to empower participants to embrace climate resilience, seize opportunities for sustainable development, and contribute to the global efforts in combating climate change.



1. Introduction

The introductory chapter provides an overview of the evolving landscape of climate-related disclosures, highlighting the increasing global focus on addressing the impact of climate change. The chapter outlines the diverse disclosure frameworks and standards emerging in response to this challenge, including international initiatives such as the TCFD recommendations and the ISSB standards and several regional regulations. It also includes the implementation highlights of the TCFD recommendations and the ISSB standards, as well as an overview of how climate-related disclosures have been embedded in regulations or guidance amongst selected countries in the emerging economies.

1.1 Recent developments in disclosure

The realisation of the wide-ranging impacts of climate change on sectors, nations, regions, and financial systems has prompted an increased focus on climate-related disclosures. Many countries have taken legislative action to enforce such disclosures, although there are variations in the scope and requirements across different regions.

Disclosure frameworks are rapidly advancing in the footsteps of the TCFD. Subsequently, international initiatives like the ISSB, regional initiatives such as the European Union (EU) regulations (including the Corporate Sustainability Reporting Directive) (CSRD), Environmental and Social Reporting Standards (ESRS), and Sustainable Finance Disclosure Regulation (SFDR), and country-specific regulations have emerged.

While wide-spread support for climate-related financial disclosures is evident in both developed and emerging economies, unique challenges could stand in the way for many companies in the emerging economies to step-up their efforts in implementing these disclosures ([Goel et al., 2022](#)). Studies shows that developed economies have generally been more proactive in implementing comprehensive disclosure requirements. They have taken significant strides in mandating climate reporting, for example. Similarly, they have encouraged their financial institutions to develop analytical capabilities and skills necessary to produce these reports.

In contrast, companies in emerging markets face challenges in implementing climate risk practices. These challenges include limited resources, capacity constraints, and a lack of readiness to enforce similar disclosure standards as well as the related assurance ([IFAC, 2023](#)). The goal of this report is to provide guidance on how to address these obstacles and drive positive change in this regard.

Emerging economies require enhanced and targeted support and capacity-building efforts. Collaboration between international organisations, developed nations, and

emerging economies can facilitate knowledge-sharing, technical assistance, and resources to enable effective implementation of disclosure requirements. This inclusivity and cooperation are essential to drive sustainable finance practices globally and mitigate the adverse effects of climate change across all economies.

1.2 Task Force on Climate-Related Financial Disclosure

From the Financial Stability Board (FSB)'s latest progress report ([FSB, 2022](#)) on climate disclosure worldwide, an increasing number of jurisdictions from both the emerging and developed economies have set or plan to set requirements, guidance, or expectations for financial institutions and non-financial companies. Emerging and developed economies are both taking active steps to incorporate climate-related risks and opportunities into disclosures. The TCFD recommendations continue to be referenced as the common basis for such disclosures.

TCFD implementation highlights

While the TCFD framework of recommendations remains a voluntary initiative, it is gaining traction as governments and regulators worldwide increasingly require or encourage disclosures aligned with its recommendations. With over 3,900 supporters ([TCFD, 2022](#)), including regulators and governments, the adoption of TCFD principles is expanding rapidly.



Figure 1: Number and geographic distribution of TCFD supporters, ([TCFD, 2023](#)).

This section highlights some examples of how TCFD recommendations have been embedded in disclosure requirements or guidelines in both the emerging and developed economies. Please refer to 1.4 for a detailed summary of existing climate-related disclosure schemes in selected emerging economies.

- 1. The European Union:** On 5 January 2023, the CSRD entered into force ([European Commission, 2023a](#)) to modernise and strengthen rules concerning the disclosures around social and environmental information applicable for a range of companies. Companies subject to the CSRD, including banks, listed companies, insurance companies and other public-interest entities with over 500 employees, will have to report according to ESRS which the European Commission has adopted on 31 July 2023 ([2023b](#)). The first companies will have to apply the new rules for the first time in the 2024 financial year, for reports published in 2025 ([2023a](#)).

Additionally, the European Banking Authority (EBA) published the Implementing Technical Standards on prudential disclosures on ESG risks in January 2022 aligned with the TCFD recommendations ([EBA, 2022a](#); [2022b](#)). These standards form the basis of the subsequent EU regulation (EU) 2022/2453 ([EUR-Lex, 2022](#)) and require large financial institutions to disclose environmental, social, and governance (ESG) risks, including climate-related risks, mitigation actions, green asset ratio and banking book taxonomy alignment ratio ([EBA, 2023](#)).

- 2. Brazil:** Effective from 2023, the Brazilian Securities and Exchange Commission (CVM) require securities issuers to indicate: (i) whether they disclose ESG information in their annual reports; (ii) whether the report considers the TCFD recommendations; and (iii) an explanation if the securities issuers have not adopted the TCFD recommendations ([CVM, 2021](#)).
- 3. India:** In July 2022, the Reserve Bank of India (RBI) released a Discussion Paper on Climate Risk and Sustainable Finance to seek feedback on several topics, including climate-related financial disclosure ([RBI, 2022](#)). In the discussion paper, the RBI highlights the TCFD recommendations “as a desirable framework for regulated entities to rely upon, at least at the initial stage”.
- 4. Japan:** The Financial Services Agency and the Bank of Japan are actively promoting the adoption of TCFD recommendations. The Financial Services Agency encourages listed companies on the Prime Market to enhance their disclosure based on TCFD or equivalent frameworks. Meanwhile, the Bank of Japan is urging financial institutions to improve their qualitative and quantitative disclosures using the TCFD framework.

1.3 The International Sustainability Standards Board

On 26 June 2023, the ISSB (which is part of the IFRS Foundation) issued its inaugural sustainability disclosure standards; IFRS S1 and IFRS S2 ([IFRS, 2023a](#)). The new standards are effective for annual reporting periods beginning on or after 1 January 2024. However, they are available for use before to the extent that companies apply IFRS S1 ([IFRS, 2023g](#)) to support the application of IFRS S2 ([IFRS, 2023b](#)). These standards mark a significant step in improving trust and confidence in sustainability-related disclosures by companies. This, in turn, aids investment decision-making.

The final standards fully incorporate TCFD recommendations, as well as building and consolidating the Sustainability Accounting Standards Board (SASB) Standards, the framework by the Climate Disclosure Standards Board (CDSB, now part of the IFRS Foundation), and the Integrated Reporting Framework. In so doing, they provide a global baseline for disclosing the impact of climate-related risks and opportunities on firms. The ISSB will support the adoption of the standards, while also working with jurisdictions and organisations to ensure effective implementation.

A quick summary of the new standards is given below:

IFRS S1: General Requirements for Disclosure of Sustainability-related Financial Information

- Requires disclosure of material information about sustainability-related risks and opportunities with the financial statements, to meet investor information needs
- Applies TCFD architecture whenever providing information about sustainability
- Requires industry-specific disclosures
- For matters other than climate (IFRS S2), refers to sources to help companies identify sustainability-related risks and opportunities and disclosures
- Permits application in conjunction with any accounting requirements (GAAP)

IFRS S2: Climate-related Disclosure Standard

- Fully incorporates the TCFD recommendations
- Requires accordance with IFRS S1
- Requires disclosure of material information about climate-related risks and opportunities, including physical and transition risks
- Requires industry-specific disclosures that are supported by accompanying guidance built on the SASB Standards.

To facilitate the application of the ISSB standards by financial institutions, the ISSB has included requirements and guidance specific to financed emissions in paragraph B58–63, IFRS S2 ([IFRS, 2023b](#)) and recommendations specific to the commercial banking and insurance sectors in paragraph B62 and B63, IFRS S2 ([2023b](#)) respectively. In addition, industry-based guidance for IFRS S2 has also been published by the IFRS ([2023c](#)).

Despite the ISSB standards being built upon the TCFD recommendations, IFRS S2 within the ISSB standards also includes additional requirements for disclosures and more detailed information from reporting organisations. Table 1 provides a high-level overview of how the TCFD recommendations align with IFRS S2, please refer to Appendix A and Appendix B. for a more detailed comparison of the two frameworks.

Table 1: IFRS S2 based on TCFD recommendations, ([IFRS, 2023d](#)).

TCFD core elements	IFRS S2 summary comparison	
Governance	Broadly consistent	
Strategy	Broadly consistent	<ul style="list-style-type: none"> Requires that a company consider and refer to its Industry-based Guidance Requires additional information regarding resiliency Does not specify which climate-related scenarios to use Provides additional application guidance and reliefs
Risk management	Broadly consistent	<ul style="list-style-type: none"> Explicitly requires additional disclosures on the processes used to identify, assess, prioritise and monitor opportunities
Metrics and targets	Broadly consistent	<ul style="list-style-type: none"> Requires disclosure of industry-specific metrics Requires additional disclosures related to a company's greenhouse gases (GHG) emissions and planned use of carbon credits Provides additional application guidance and reliefs

ISSB implementation highlights

The Financial Stability Board concluded that the release of the ISSB standards on 26 June 2023 ([IFRS, 2023a](#)) would mark “the culmination of the work of the TCFD” and that monitoring responsibilities would be transferred to the ISSB from 2024 ([FSB, 2023](#)). The International Organization of Securities Commissions (IOSCO) has also endorsed the ISSB standards, and called on its 130 member jurisdictions, regulating over 95% of the world’s financial markets, to consider ways in which they might adopt, apply or otherwise be informed by the ISSB standards ([IOSCO, 2023](#)). In addition, the European Commission, the European Financial Reporting Advisory Group (EFRAG) and ISSB have confirmed ‘high degree of alignment’ in climate-related disclosure requirements on 31 July 2023 ([IFRS, 2023e](#)).

Despite the recent release of the ISSB standards, several jurisdictions have expressed support for the standards. This section highlights a few examples.

- 1. Australia:** In June 2023, the Australian Treasury published a consultation paper on the adoption of ISSB standards ([Treasury.gov.au, 2023](#)). The paper urges companies to review climate-related disclosure standards, to engage with key stakeholders to ensure rigorous and reliable disclosure, and to prepare for the imminent release of the ISSB standards.
- 2. Brazil:** Brazil has adopted the International Sustainability Standards Board’s (ISSB) IFRS Sustainability Disclosure Standards, with a phased approach from voluntary to mandatory use starting in 2024 and full implementation by January 1, 2026. This move, announced by the Brazilian Ministry of Finance and the Comissão de

Valores Mobiliários, aims to enhance transparency around sustainability-related risks and opportunities in Brazilian capital markets ([IFRS, 2023h](#)).

- 3. China:** The government of China supports the ISSB. Following a Memorandum of Understanding (MoU) that the Ministry of Finance of China has signed with the IFRS Foundation ([IFRS, 2022](#)), a new ISSB office was opened in Beijing in June 2023 ([IFRS, 2023f](#)).
- 4. Hong Kong SAR, China:** the Hong Kong Stock Exchange (HKEX) has consulted in April 2023 on introducing mandatory climate-related disclosures building on IFRS S2 for listed entities starting in 2024 ([HKEX, 2023](#)).
- 5. Japan:** The Sustainability Standards Board of Japan (SSBJ) has expressed support for the ISSB standards, aiming to develop internationally consistent sustainability-related financial information standards in Japan. In a statement released in June 2023 ([SSBJ, 2023](#)), the SSBJ ensures that the Japanese standards will be in line with the ISSB standards, thus increasing comparability and reliability in sustainability disclosure.
- 6. Nigeria:** A set of Sustainability Disclosure Standards incorporating ISSB's IFRS S1 and IFRS S2 was launched in July 2023 by the Financial Reporting Council of Nigeria ([2023](#)) and Nigerian Exchange Group Regulation Limited (NGX Reg Co).
- 7. Singapore:** The Accounting and Corporate Regulatory Authority (ACRA) and Singapore Exchange Regulation (SGX RegCo) have initiated a public consultation concerning the suggestions made by the Sustainability Reporting Advisory Committee (SRAC) for enhancing climate reporting in Singapore ([ACRA, 2023](#)). These suggestions call for Listed Issuers to take the lead in reporting climate-related disclosures aligned with the International Sustainability Standards Board (ISSB) and to commence this reporting from the financial year 2025 onward. Additionally, the authorities are considering extending the deadline for reporting Scope 3 greenhouse gas emissions by one or two year(s) ([ACRA, 2023](#)).
- 8. United Kingdom of Great Britain & Northern Ireland (United Kingdom):** The United Kingdom government has announced plans to introduce the ISSB-aligned Sustainability Disclosure Standards in the United Kingdom (UK SDS) by July 2024 ([GOV. UK, 2023](#)). The UK SDS, once approved, will be applicable to registered companies in the United Kingdom and limited liability partnerships. It will outline corporate disclosures on sustainability-related risks and opportunities, including those arising from climate change. The UK SDS will be published by the Department for Business and Trade and will be based on the IFRS Sustainability Disclosure Standards issued by the International Sustainability Standards Board (ISSB) and will serve as the foundation for potential future United Kingdom legislation or regulations mandating reporting on sustainability matters. It is noted that the United Kingdom SDS will only divert from the global baseline if absolutely necessary for United Kingdom-specific matters. In addition, the United Kingdom Sustainability Disclosure Technical Advisory Committee (TAC) is assessing the ISSB standards on a technical basis has launched a call for evidence on IFRS S1 and IFRS S2 ([FRC, 2023](#)) on the implications of the introduction of ISSB standards in the context of the country.

1.4 Case study overview of emerging economy climate disclosure regulation

This section discusses the progress of how climate-related disclosures have been embedded in regulations or guidance amongst selected countries in the emerging economies. These countries were selected to provide geographical and sectoral diversity.

Table 2: Non-exhaustive list of climate disclosure schemes in emerging economies, inspired by multiple sources and curated by UNEP FI for this report in 2023.

Countries	Climate-related Disclosure Schemes	Descriptions
Brazil	Banco Central do Brasil (BCB) Resolution No 139/2021; BCB Instruction No 153/2021 - Regulation on social, environmental, and climate-related risk disclosures	The disclosure rule applies to financial institutions allocated to Segment 1 (S1), Segment 2 (S2), Segment 3 (S3), and Segment 4 (S4), as defined in Resolution CMN 4.5531, of 30 January 2017. The rule is inspired by the recommendations of the TCFD but is not limited to a climate perspective. The scope was enlarged to include social and environmental issues, considering the importance of these topics for Brazil and its financial system.
	CVM Resolution No. 59/2021	The CVM requires securities issuers to disclose ESG performance in line with the United Nations Sustainable Development Goals (SDGs) and TCFD recommendations.
	Despacho 3034/2006	The Agência Nacional de Energia Elétrica introduced this scheme to encourage public electricity providers and other companies to adopt GHG reporting practices. The objective is to promote transparency and accountability in measuring and reporting GHG emissions within the energy sector and other relevant industries.
Chile	The Climate Act	In 2022, Chile published its Climate Change Framework Law. Entitled 'the Climate Act', it includes obligatory disclosure of climate risks and details how these are being addressed in the private sector. The Act aims to help lead the country to net zero by 2050.
	General Rule No. 461 (NCG 461) - ESG	The Chilean Financial Market Commission released the regulation to urge issues of publicly offered securities to incorporate sustainability and corporate governance issues in their annual reports.

Countries	Climate-related Disclosure Schemes	Descriptions
China	National Development and Reform Commission (NDRC) Regulation 2014	The objective of this initiative is to enhance transparency among prominent air pollutant emitters and enhance the country's infrastructure for measuring, reporting, and verifying carbon emissions. It entails mandatory reporting of GHG emissions in 10 designated industry sectors and is applicable to a total of 20,000 companies.
	Guidelines for Accounting and Reporting Greenhouse Gas Emissions from Enterprises (2016 Trial)	The NDRC has developed these guidelines to assist enterprises across different sectors, including Cement Production, Chemical Production, Civil Aviation, Electricity Generation, and Iron and Steel Production. The objectives of these guidelines are to: (i) facilitate the scientific calculation and standardised reporting of GHG emissions by enterprises; (ii) enable the formulation of GHG emissions control plans; (iii) encourage active participation in carbon trading; and (iv) promote the enhancement of social responsibilities by these enterprises.
Costa Rica	Aligning the Financial Flows of Costa Rican Financial Sector with the Climate Change Objectives of the Paris Agreement	In April 2023, the Task Force on Climate-Related Financial Disclosures was launched. This represents a joint initiative between the United Nations Environment Programme (UNEP), UNEP FI, and the European Commission, alongside the Central Bank of Costa Rica, the Costa Rican Ministry of Environment and Energy, the Costa Rican General Superintendency of Financial Entities, and the Costa Rican General Superintendency of Securities. The initiative will create a framework for financial institutions in the country to map, quantify, and disclose climate-related financial risks.
India	Business Responsibility and Sustainability Reporting (BRSR)	ESG disclosures mandated by the Securities and Exchange Board of India came into effect in the fiscal year of 2022–2023. The rule is applicable to the country's top 1,000 listed financial institutions and companies in terms of market capitalisation, as well as ESG Rating Providers (ERPs).
Kenya	Guidance on Climate-related Risk Management - Section 33(4) of the Banking Act, Cap 488	Under guidance developed by the Central Bank of Kenya (CBK), financial institutions licensed under the Banking Act must adhere to specific requirements concerning climate-related financial risk management. This includes the formulation and execution of strategies, policies, procedures, and guidelines. Additionally, they are expected to establish minimum standards for their operations. Following these guidelines, each institution is mandated to submit a quarterly report to CBK that details the progress made in implementing their climate-related risk management plans. The first reports were due in October 2022, followed by reports for each subsequent calendar quarter thereafter.

Countries	Climate-related Disclosure Schemes	Descriptions
Nigeria	Climate Disclosure Guidelines	The Nigerian Exchange Regulation Limited (NGX Reg Co), which is part of the Nigerian Exchange Group (NGX), is working with the Nigerian Stock Exchange (NSE) to create Climate Disclosure Guidelines that will complement the NGX Sustainability Disclosure Guidelines. The rules, which are aligned with TCFD recommendations, are in the early stages and will be published for public feedback soon.
	Sustainability Disclosure Guidelines	This set of guidelines was published by the NSE for the Nigerian market.
Philippines	The Philippines Sustainable Finance Guiding Principles	In 2022, the Department of Finance in the Philippines released a set of guiding principles to foster sustainable finance in the country. The principles are primarily targeted at financial regulators, financial institutions, investors, issuers of sustainability-related financial products, policymakers, and corporates. The principles include climate disclosures adhering to the TCFD recommendations and the assessment of economic activities in terms of climate change mitigation and adaptation, as well as facilitating the transition to a low-carbon economy. In addition, the principles include disclosures, impact assessment, and the management of other sustainability aspects, including nature-related risks.
	Sustainability Reporting Guidelines for Publicly listed Companies	In 2019, the Securities and Exchange Commission in the Philippines issued a set of guidelines for publicly listed companies in the country regarding sustainability reporting, which includes climate disclosures.
Tunisia	Votre guide du reporting Environmental, Social, et de Gouvernance - ESG	The Tunis Stock Exchange launched the country's ESG disclosure guidelines to help issuing companies approach ESG disclosures, which include climate-related reporting.

2. Climate-related risks and opportunities in emerging economies

Climate change presents an urgent global concern, with the potential for devastating and irreversible consequences that transcend borders. The significant rise in global temperatures since the Industrial Revolution already exceed 1.1°C (IPCC, 2021). This rise serves as clear evidence of the extent of the changes that have already been experienced. However, the situation is poised to become even more alarming, as projections indicate a potential surpassing of the critical 1.5°C threshold. This tipping point could trigger far-reaching ecological and socio-economic disruptions, demanding immediate attention and comprehensive understanding of the climate-related risks that the world faces.

Following the definition by the TCFD (2017) and ISSB (Appendix A in IFRS, 2023b), climate-related risks can be broadly categorised into physical and transition risks. Physical risks are risks related to the physical impacts of climate change, whereas transition risks are those related to the transition to a low-carbon economy. As shown in Figure 2, these climate-related risks can be transmitted into financial risks, which access both macroeconomic and microeconomic channels. This poses major potential threats to entire financial and economic systems.

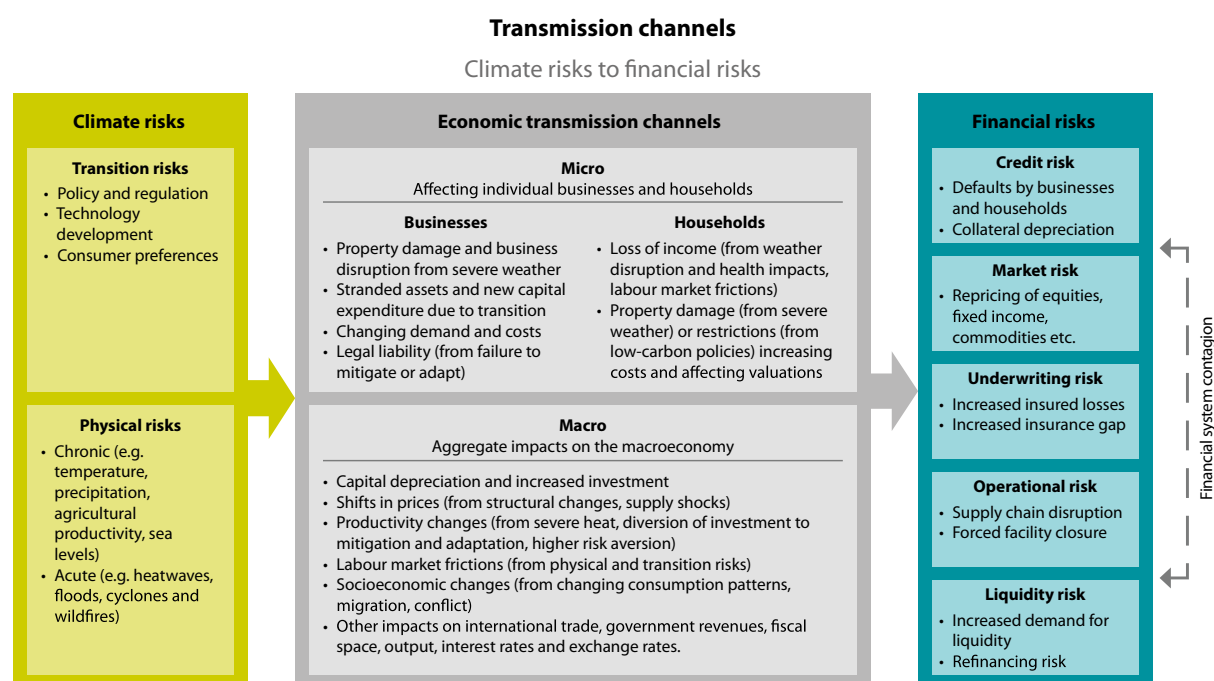


Figure 2: Overview of climate-related risks and transmission channels, (NGFS, 2022).

This chapter explores the different types of physical and transition risks affecting selected countries in the emerging economies and their impacts.

2.1 Physical risks

Climate change is set to intensify the severity and frequency of natural disasters already experienced by developing nations and bring about new environmental changes that will impact people’s lives. While the specific physical changes may vary across developing countries, the overall impact of climate change will be significant and far-reaching. Although examples from only a few developing nations are explicitly mentioned in this report, the insights arising from these are applicable to all emerging economies. This section will discuss the most prominent physical hazards and their effects, highlighting specific examples and examining the broader physical and economic implications on developing countries. Gaining a comprehensive understanding of the diverse physical risks that nations may encounter due to climate change enables the exploration of opportunities for emerging economies at national, regional, and sectoral levels. In addition, the imperative need for substantial capital investment to aid these emerging economies in mitigating the ramifications of climate change must also be actively considered.

The discussion in this section follows the two subtypes of physical risks defined by the TCFD (2017) and ISSB (Appendix A, IFRS, 2023g), namely, the event-driven acute physical risks, including increased severity of extreme weather events, such as floods and wildfires; and the chronic physical risks associated with longer-term shifts in climate patterns, such as rising sea levels and sustained higher temperature. Figure 3 provides some examples from the TCFD.

Type	Climate-Related Risks ¹³³	Potential Financial Impacts
Physical Risks	Acute	<ul style="list-style-type: none"> – Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions) – Reduced revenue and higher costs from negative impacts on workforce (e.g., health, safety, absenteeism)
	Chronic	<ul style="list-style-type: none"> – Write-offs and early retirement of existing assets (e.g., damage to property and assets in “high-risk” locations) – Increased operating costs (e.g., inadequate water supply for hydroelectric plants or to cool nuclear and fossil fuel plants) – Increased capital costs (e.g., damage to facilities) – Reduced revenues from lower sales/output – Increased insurance premiums and potential for reduced availability of insurance on assets in “high-risk” locations
	<ul style="list-style-type: none"> – Increased severity of extreme weather events such as cyclones and floods – Changes in precipitation patterns and extreme variability in weather patterns – Rising mean temperatures – Rising sea levels 	

Figure 3: Examples of physical risks and potential impacts, (TCFD, 2021).

2.1.1 Chronic physical hazards

Sea level rise

Climate change is causing the global mean sea level to rise, with the projected rates of 10–20 millimetres per year under the IPCC's Representative Concentration Pathway 8.5 (IPCC, 2019a). Coastal and low-lying areas in both developed and developing nations face numerous risks associated with sea level rise. Rising sea levels can alter the human geography of unprepared nations and cause significant damage to agricultural and urban infrastructure. Developing nations are particularly vulnerable, with studies showing that they will experience twice the land loss compared to developed nations (Berwyn, 2023). Forced migration resulting from sea level rise can also spill over into neighbouring and landlocked nations (World Bank, 2007).

The Philippines, a country highly susceptible to the impacts of sea level rise due to its geographic location and island geography, is estimated to experience a sea level rise of around half a metre by 2100 (USAID, 2017). This will have detrimental effects on agriculture, leading to the loss of arable land, reduced soil and crop productivity, and a decline in agricultural output. These effects will hit low-income farmers hard across the nation. Coastal ecosystems will be disrupted, resulting in shifts in aqua reproduction cycles and a decline in fish populations. Water infrastructure will face threats from salt-water intrusion, compromising the availability of drinkable water for the local population. Meanwhile, urban infrastructure will be damaged by storm surges and coastal inundation, forcing people to migrate from high-risk areas. Furthermore, fisheries generate 1.6 million jobs and provide protein for more than half of Filipino families. As such, the loss of natural habitats supporting fisheries will have devastating effects on many families (World Bank, 2023a).

Glacial melt

As temperatures rise globally due to human activity, glaciers worldwide have been rapidly melting. This has a variety of detrimental effects worldwide. Glaciers and winter snowfalls are crucial to freshwater supply in various regions. Mass ice losses result in negative impacts on hydropower production, agricultural output, water scarcity, ecosystem productivity, food security, water pollution, and human health (Rasul & Molden, 2019). Glacial melting not only changes the behaviour of snowmelt and runoff, but can affect entire water infrastructure systems and reservoirs (World Bank, 2021c) as well as contribute to rising sea levels (Box et al, 2022).

Worldwide, glacial melt from the Himalayas to African glaciers on Kilimanjaro, the Rwenzori, and Mt. Kenya threatens vulnerable populations with glacial flooding and drought (Cocks, 2021; Patel, 2023).

In Chile, the loss of ice mass due to the melting glaciers in the Andes mountains has threatened local water supply, power generation, and agricultural yields (WMO, 2020). On the other hand, glacial outburst floods, which can occur when a large amount of water is suddenly released due to ice melt, are also becoming an increasing risk for communities and infrastructure located in the likely path of such floods (Fariás-Barahona, et al., 2020).

Water stress

Changing water supply patterns are a chronic issue that affect people's health and output by slowly changing the environment around them ([UNFCCC, 2020a](#); [OECD, 2003](#)).

Statistics show that the global freshwater demand is projected to outstrip supply by 40% by 2030 ([Global Commission on the Economics of Water, 2023](#)). As part of the impacts from climate change, modifications in precipitation patterns and increases in flood and drought risks could exacerbate the predicament.

India provides a notable example. Despite holding 18% of the world's population, India only has adequate water resources for 4% of its people, hence making it the world's most water-stressed country ([World Bank, 2023b](#)). Historically, it has depended on the monsoon season to meet its water demand. As climate change impacts the monsoon and alters the frequency and intensity of floods and droughts, India's water stress levels are set to worsen.

In Kenya, meanwhile, highly variable and intense rainfall is projected to contribute to water stress while also leading to negative economic impacts and increased disease risks. On the one hand, climate change effects such as glacial melt and changing rainfall patterns are straining the Tana River, putting many people at risk of water and food scarcity ([Mongabay, 2017](#)). On the other hand, the very real prospect of the glaciers of Mount Kenya disappearing by the 2040s poses a threat to the lives and livelihoods of low-income individuals, as well as to the national economy as a whole ([Cocks, 2021](#)). It also promises to increase the risk of vector- and water-borne diseases. Lastly, ecosystems may shift and degrade, especially along the coast ([USAID, 2018](#)).

Ocean Acidification

Ocean surface temperatures are warming due to GHG emissions from human activities. This warming effect causes ocean acidification ([IPCC, 2019b](#)). The acidification of the world's oceans contributes to reducing the stability of mineral forms of calcium carbonate, which leads to phenomenon such as coral bleaching and erosion in coral reef structure. It also reduces calcareous species and causes habitats to become dominated by algae, thus leading to loss of ecosystem biodiversity and complexity ([2019b](#)). These negative effects on the natural environment could lead to economic losses as algal proliferation could be expected ([2019b](#)), while flood risks could also increase due to the loss of coastal protection from coral reefs ([Beck et al., 2018](#)). Emerging economies, especially those with high economic dependence on aquacultural sectors, could be at the forefront of these negative impacts. An example is the Philippines, which saw its fish yields reduce by up to 80% in 2019 due to algae boom ([Diliman Information Office, 2019](#)).

Drought stress

Droughts, one of the most dangerous natural hazards, are expected to increase in intensity, frequency, and duration due to climate change (World Weather Attribution, 2022). It is estimated that by 2030, as many as 700 million people may be displaced and impacted by drought-related adversities such as increased disease risk, malnutrition, and death ([WHO, 2018](#)).

In Nigeria, agriculture is the main source of income, representing over 22% of the country's Gross Domestic Product (GDP) and employing 36% of the country's labour force ([PwC, 2020](#)). As climate change sets to increase drought risks, especially in the southern parts of the country ([World Bank, 2021a](#)), it is anticipated that harvest yields will be negatively impacted (mainly through shortened growing seasons) ([2021a](#)).

Drought also poses adverse implications on water and food insecurity, heat stress, malnutrition, and disease transmission risks. These effects disproportionately affect Nigeria's most vulnerable populations: children and the elderly ([World Bank, 2021a](#)).

Heat stress

Rising temperatures comprise a signature impact of climate change. This warming phenomenon is predicted to amplify the severity of heatwaves, endanger human health, strain infrastructure, and threaten food security for billions of people. Urban areas may be disproportionately affected by high temperatures due to the concrete and buildings amplifying the heat's effects. Rural areas are far from exempt, however. They are extremely vulnerable to drought and other temperature-related effects, the impacts of which are often exacerbated by their lack of robust infrastructure, ([Hill et al., 2021](#)). While the rate of temperature rise may vary across nations, the global trend of increasing temperatures due to climate change remains consistent ([Moseman & Eltahir, 2023](#)).

In India, a recent report ([Debnath et al., 2023](#)) shows that extreme heat has caused more than 24,000 deaths since 1992, while also contributing to air pollution and accelerated glacial melt. Additionally, the excessive heat in India has also resulted in significant productivity loss across various sectors. The scorching temperatures have adverse effects on agricultural activities, labour productivity, and overall economic output, posing a substantial challenge to the nation's development and well-being.

In Tunisia, the temperature increased by 1.4°C between 2000 and 2018, and the situation is projected to worsen with an anticipated temperature rise from 1.9°C to 3.8°C by 2050 ([World Bank, 2021b](#)). This heat stress has led to negative economic impacts, including decreased crop yields ([Amara & Perrett, 2022](#)) and lower livestock reproductivity ([Salem & Bouraoui, 2010](#)). It has also threatened the survival of humans and biodiversity ([USAID, 2018](#)). In addition, heat stress and drought also increase the risk of agricultural losses in many regions worldwide, leading to adverse impacts on crop yields and livestock productivity. Addressing these impacts on agriculture becomes imperative for ensuring food security and sustainable development in the face of climate change.

To make matters worse, scientists are warning that the world has entered an El Niño phase ([NOAA, 2023](#)). This comprises part of the El Niño-Southern Oscillation (ENSO), a recurring weather pattern that changes water temperatures. As a result, heat stress will likely further worsen as global temperatures are likely to rise to record levels ([Stallard & Poynting, 2023](#)). This may result in a rise in ocean surface temperature ([UNOCHA, 2018](#)), which will then worsen to potential sea level rise due to thermal expansion.

Deforestation

Deforestation is usually thought of as a driver of climate change; forests are carbon sinks, and deforestation can lead to increased levels of carbon dioxide released into the atmosphere ([Nunez, 2022](#)).

However, not only is deforestation worsening the impacts of climate change, but climate change is also amplifying the adverse effects of deforestation. Deforestation can lead to desertification, as well as soil erosion and degradation. These, in turn, could contribute to the release of soil organic carbon ([IPCC, 2019b](#)) and to an increase in flood risks ([Bradshaw et al., 2007](#)).

In the case of the Amazon Rainforest, which is the largest forest in the world, climate change is speeding up the pace of forest loss and degradation, leading to a potential tipping point where irreversible ecosystems disruptions could occur ([WWF, 2023](#)). Deforestation of the Amazon contributes to the forest's vulnerability to fire, drought, and landslides. This puts the Amazon at risk of drying out and of damaging habitats and indigenous peoples homes, while also further exacerbating climate change ([Roy, 2022](#)). As the country where a majority of the Amazon Rainforest is located, Brazil plans on prioritising deforestation reduction efforts through a variety of measures, including increased use of intelligence, economic incentives, and stronger laws ([Paraguassu, 2023](#)). The initial results look positive. After a new pledge to eliminate deforestation of the Amazon by 2030 Brazil's rate of deforestation fell drastically in the first half of 2023 as compared to the year before ([Pulice & Spring, 2023](#)).

2.1.2 Acute Physical Hazards

Flooding

Climate change and associated extreme weather events increase the likelihood of severe floods worldwide, leading to destruction of infrastructure, agricultural land, and entire communities ([UNEP, 2020a](#)). Deadly floods with the capacity to displace millions of people are driven by unusually heavy rainfall and exacerbated by poor infrastructure ([Hersher, 2022](#)). Aside from loss of life and property, flooding can cause the separation and displacement of families and children, can overwhelm healthcare facilities, and can lead to a lack of safe water ([Muslim Aid, 2022](#)). In addition, flood risks threaten energy supply. Worryingly, by 2050, one in five of the world's hydroelectric dams will be located in a high-risk flood zone ([Opperman et al., 2022](#)).

In China, more than half of the territory and over 450 million people live under the threat of flooding. This is due to a rise in the population density within floodplains and an increase in the proportion of people living in flood zones deeper than two meters ([GFDRR, 2020](#); [Fang, 2018](#); [World Bank, 2021d](#)). As flood events are expected to increase in China, risks to its inhabitants and economy are also expected to rise ([World Bank, 2021d](#)). In 2021 alone, economic costs of flood in China amounted to USD 18 billion, the highest total ever ([WMO, 2022](#)). A large contributing factor to these economic losses stems from lost agricultural yields and damaged supply chain infrastructure ([He, 2020](#); [Patton, 2021](#)).

Hurricanes and typhoons

Due to the increased capacity of warm environments to hold water volume, warm ocean temperatures that come with climate change can increase the intensity of hurricanes, resulting in increased rainfall during storms ([Childs, 2023](#)). These extreme weather events are affecting countries worldwide.

Hurricane Fiona, which caused landfall in the Caribbean in 2022, resulted in over USD 2.5 billion of damages in Puerto Rico before hitting Nova Scotia for around USD 600 million in damages, ([Pasch et al., 2023](#)). In 2020, typhoon Goni passed over the Philippines, causing nearly USD 200 million in damages ([Nhundu et al., 2021](#), [Deiparine, 2020](#)). In 2019, Cyclones Idai and Kenneth hit Southeastern Africa six weeks apart, causing immense economic losses in Mozambique, Zimbabwe, and Malawi ([Norton et al., 2020](#)). Aside from the physical havoc that hurricanes can cause, they can also pose many indirect human health impacts, exacerbating chronic and infectious diseases ([Dresser et al., 2022](#)).

Due to its geographic location, the Caribbean coast of Costa Rica is vulnerable to tropical cyclones ([World Bank, 2021e](#)). Extreme weather events such as hurricanes and cyclones will risk Costa Rica's agricultural yield as well as its water and sanitation systems, which is further aggravated by urban sprawl and poor urban infrastructure ([World Bank, 2021e](#)). Hurricane Nate, which struck Costa Rica in October of 2017, damaged agricultural and transportation infrastructure, destroyed thousands of homes. It caused 13 deaths in Costa Rica and 44 in Central America. The Instituto Meteorológico Nacional of Costa Rica reported over USD 550 million in damages ([Beven II & Berg, 2018](#)). As the effects of climate change progress, events like Hurricane Nate may become increasingly common, risking Costa Rica's tourism, agriculture, and industry sectors.

Wildfires

With its higher temperatures and drier conditions, climate change contributes to increased wildfires risks ([UNEP, 2022](#)). Wildfires have devastating consequences that can damage ecosystems, property, and economies. Additionally, wildfires release significant amounts of carbon, further contributing to climate change ([Abnett, 2022](#)). In emerging economies specifically, wildfires can also impose significant detrimental impacts on multiple different SDGs, including poverty, hunger, health, equality, and industry ([UNEP, 2020b](#)).

Deforestation, combined with drier and hotter conditions, has resulted in an increase in forest fires in the Amazon ([Escobar, 2019](#)). In August 2022, more than 30,000 fires burned in the Amazon alone, often started by humans illegally to clear land for cattle and crops or for illegal logging. Large forest fires in the Amazon affect the planet's climate, as the Amazon is a major carbon sink. Locally and regionally, the smoke from wildfires pollutes the air and introduces health risks from smoke inhalation. As the example of Brazil demonstrates, this affects communities far from the forest as well as those within it. ([Greenberg, 2022](#)).

Landslides

Climate change-induced factors such as increased rainfall, wildfires, cyclones, and land-use changes contribute to a higher likelihood of landslides ([Pierre-Louis, 2022](#)). With increased landslide risks, devastating impacts can result.

Research shows that the economic losses from landslides have increased by 147% in the past 20 years ([WMO, 2022](#)). Beyond economic impacts, landslides pose threats to essential public infrastructure as well as to communities. Unfortunately, developing countries are suffering disproportionately worse negative impacts than the developed economies ([West, 2018](#)), mainly due to a lack of infrastructure resilience ([Gnyawali et al., 2023](#)).

Amongst developing countries, India is one of the most exposed nations to landslides ([Anand et al., 2022](#)). While landslides can occur in any steep terrain, extreme precipitation is expected to increase landslide occurrences by 30% to 70%, specifically within India's Himalayan mountain range bordering China and Nepal ([Kirschbaum et al., 2020](#)).

2.2 Transition risks

Emerging economies will face unique energy transition challenges in the decades to come. High levels of economic growth, urbanisation, and globalisation indicate that, despite growing energy production, energy demand will continue to increase rapidly and at higher rates than developed economies. It is essential to mention that emerging markets are responsible for two-thirds of global emissions, and these emissions are continuously increasing. This means that not only do we require more energy to meet their growing demands, but we also face the significant challenge of decarbonising these emissions to address the pressing issue of climate change. To tackle these challenges effectively, it is imperative that we recognize the need for significant capital investment in emerging economies to develop the sustainable economies required for the future.

As transitioning to a net-zero economy becomes increasingly necessary and more nations commit to net-zero targets, globalising emerging economies must confront several transition risks as the world transforms to a low-carbon world ([IEA, 2021](#); [GIZ, 2023](#)).

The discussion in this section follows the subtypes of transition risks defined by the TCFD ([2017](#)) and ISSB (Appendix A in [IFRS, 2023b](#)) – namely: policy and legal transition risks; technology transition risks; market transition risks; and reputation transition risks (see examples of these risk subtypes from TCFD in Figure 4).

Type	Climate-Related Risks ¹³³	Potential Financial Impacts
Transition Risks	Policy and Legal	
	<ul style="list-style-type: none"> – Increased pricing of GHG emissions – Enhanced emissions-reporting obligations – Mandates on and regulation of existing products and services – Exposure to litigation 	<ul style="list-style-type: none"> – Increased operating costs (e.g., higher compliance costs, increased insurance premiums) – Write-offs, asset impairment, and early retirement of existing assets due to policy changes – Increased costs and/or reduced demand for products and services resulting from fines and judgments
	Technology	
	<ul style="list-style-type: none"> – Substitution of existing products and services with lower emissions options – Unsuccessful investment in new technologies – Costs to transition to lower emissions technology 	<ul style="list-style-type: none"> – Write-offs and early retirement of existing assets – Reduced demand for products and services – Research and development (R&D) expenditures in new and alternative technologies – Capital investments in technology development – Costs to adopt/deploy new practices and processes
Market		
<ul style="list-style-type: none"> – Changing customer behavior – Uncertainty in market signals – Increased cost of raw materials 	<ul style="list-style-type: none"> – Reduced demand for goods and services due to shift in consumer preferences – Increased production costs due to changing input prices (e.g., energy, water) and output requirements (e.g., waste treatment) – Abrupt and unexpected shifts in energy costs – Change in revenue mix and sources, resulting in decreased revenues – Re-pricing of assets (e.g., fossil fuel reserves, land valuations, securities valuations) 	
Reputation		
<ul style="list-style-type: none"> – Shifts in consumer preferences – Stigmatization of sector – Increased stakeholder concern or negative stakeholder feedback 	<ul style="list-style-type: none"> – Reduced revenue from decreased demand for goods/services – Reduced revenue from decreased production capacity (e.g., delayed planning approvals, supply chain interruptions) – Reduced revenue from negative impacts on workforce management and planning (e.g., employee attraction and retention) – Reduction in capital availability 	

Figure 4: Examples of transition risks and potential impacts, ([TCFD, 2021](#)).

2.2.1 Policy and legal transition risks

Policy risks refer to the introduction of climate policies. Examples include the implementation of climate-related disclosure schemes, the introduction of carbon taxes, and the mandated closures of high-emitting facilities. Legal risks, meanwhile, stem from exposure to litigations from people and businesses seeking compensation for losses ([PRA, 2021](#)). This sub-section highlights some notable examples of both these risks from emerging economies. (See Table 2 for a breakdown of climate disclosure schemes in selected countries.)

In Costa Rica, regulatory efforts to ban fossil fuel exploration already began in 2002. In 2021, the country was among other jurisdictions from the developed economies as the world's first movers to phase out oil and gas productions ([Abnett & Nasralla, 2022](#)) with a bill aimed at permanently banning fossil fuel exploration and extraction ([Garrison, 2021](#)).

On the other hand, carbon pricing and credits policies such as those of India ([Singh, 2023](#)) could result in heavy additional costs for emission-intensive industries, leading to stranded assets¹ in these sectors and in portfolios that finance these industries. Additionally, policies that raise energy efficiency standards in emerging economies may result in higher operating costs that would be necessary to bring inefficient assets up to the new standards ([GIZ, 2023](#)).

Although these policies would propel the levels of decarbonisation necessary for curbing global warming, they could also lead to stranded assets. This is particularly due to the premature write-downs of fossil fuel facilities, the potential devaluations of the remaining fossil fuel reserves, and the possible conversion of these assets to liabilities. The resulting consequences, which include a spike in credit and liquidity risks ([Beyne et al., 2022](#)), could affect financial institutions and investors with significant holdings of such assets.

2.2.2 Technology transition risks

Technology transition risks refer to the risks that could result from the substitution of existing products and services with lower emissions options, costs to transition to lower-emissions technologies, and unsuccessful investment in these technologies. In order to fuel the transition to a low-carbon economy, the development of technologies such as renewables and energy-efficient production systems is often required. As these greener technologies mature and their use becomes more cost-efficient, outdated, or obsolete operating or production technologies will become stranded owing to their lack of economic competitiveness.

In the case of renewables, decreasing production and usage costs have made them more cost-competitive against fossil fuels ([IRENA, 2022](#)). This is resulting in the stranding of fossil fuel-related assets. Emerging economies will likely suffer negative economic and financial outcomes due to such a shift to renewable technologies. This is especially true for those countries that have higher dependence on fossil fuels, such as Brazil, China and India ([IISD, 2022](#)). Among the other emerging economies studied in this report, China is projected to be one of the worst hits, with potential losses in government revenues of up to USD 151.7 billion losses. Next are India and Brazil, with potential losses of USD 92.9 billion and USD 51.3 billion, respectively ([IISD, 2022](#)).

1 Stranded assets have been defined as "assets that have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities". (Caldecott & McDaniels, 2014, ii)

2.2.3 Market transition risks

Market transition risks are associated with the changes in demand and supply of products and services, and the subsequent impact on the pricing of these offerings.

Given rising market demand for, and investment incentives in, renewables (IEA, 2023), coupled with a growing emphasis on electrifying transport systems, there is a booming demand for lithium-ion batteries (which are seen as a potential solution to the intermittency issues often associated with renewables) (Figure 5). This presents opportunities for emerging-economy countries that operate lithium mines, such as China, Brazil, and Chile (Chew, 2023). However, fossil-fuel dependent countries that are also often emerging economies (IISD, 2022) face rising pressures from shifting shareholder perceptions of fossil-fuel assets and asset stranding in the sector.

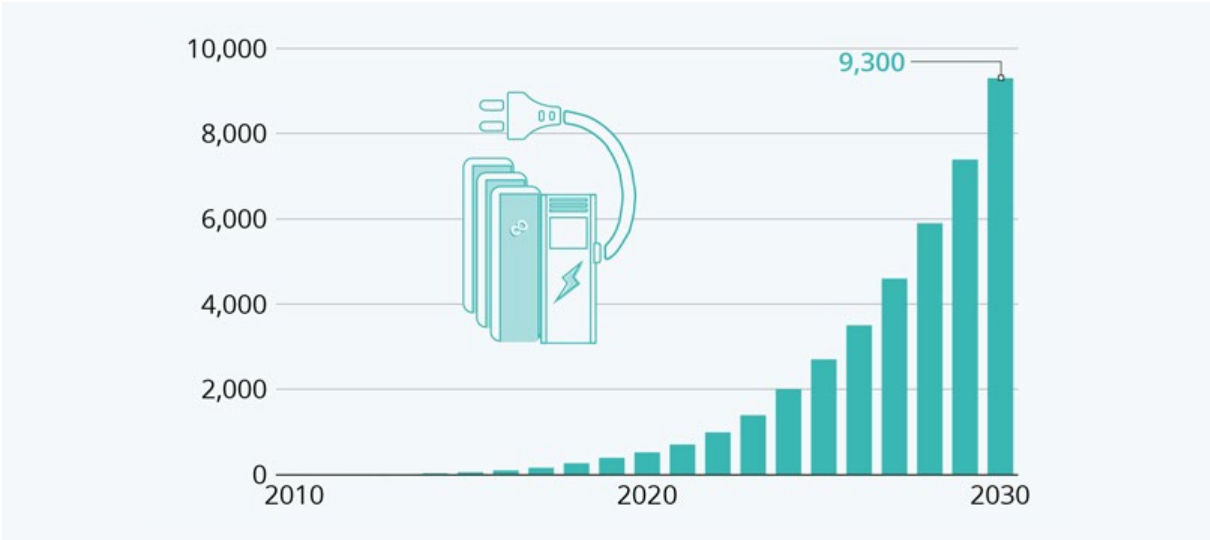


Figure 5: Growing demand for lithium-ion batteries, (Statista, 2020).

2.2.4 Reputation transition risks

Reputational transition risks can have significant implications for emerging economies. As global awareness about climate change continues to rise, increasing scrutiny is focused on the environmental practices and commitments of countries and companies.

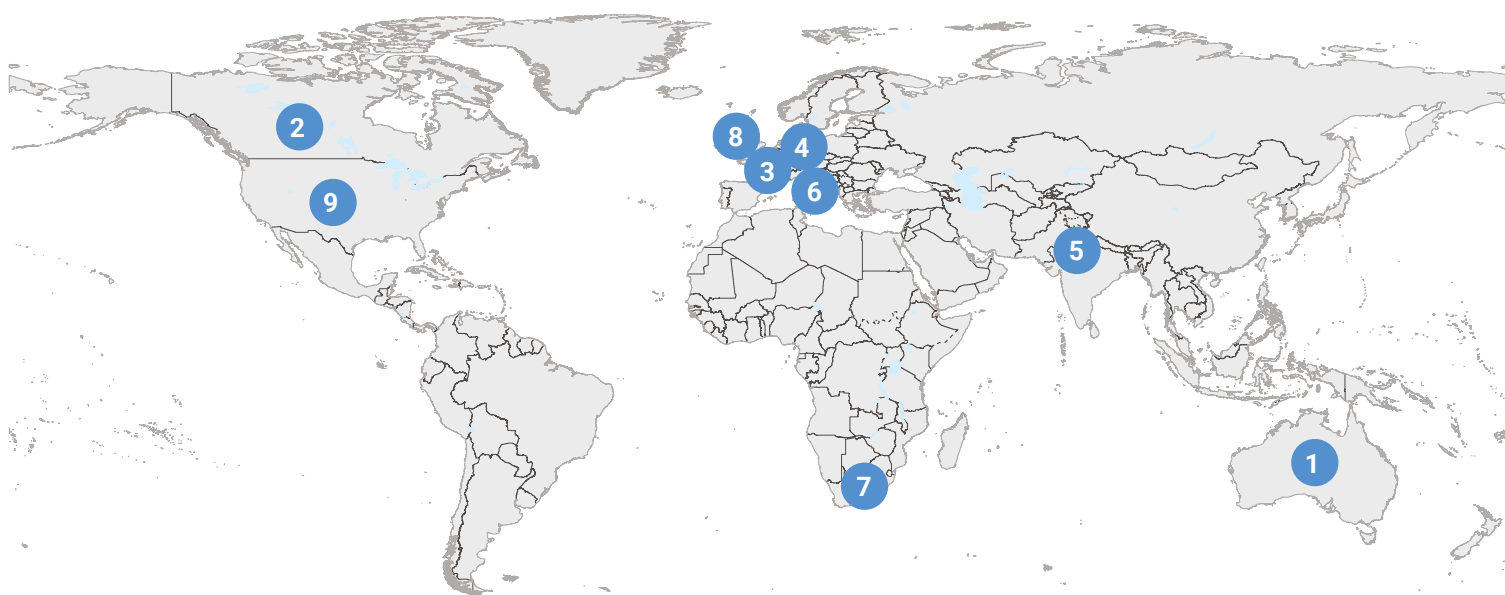
Countries, including emerging economies, that are heavily reliant on industries such as fossil fuels may face reputational challenges if they are perceived as lagging in the adoption of sustainable practices (Bolton & Kacperczyk, 2021; Ferrazzi et al., 2021). This can lead to reduced investor confidence, declining foreign direct investment, and limited access to international markets. Additionally, reputational risks can affect tourism and trade, as consumers and trading partners may prioritise environmentally responsible destinations and partners (Deloitte, 2021). Consequently, emerging economies must proactively address transition climate risks and embrace sustainable development, while also effectively communicating their efforts to maintain and enhance their reputation on the global stage.

2.3 Economic opportunities and additional considerations

The exploration of climate-related risks in the preceding chapters has laid a foundation for understanding the profound implications that climate change holds for global economies. As the world increasingly embraces the concept of a just transition, there is a growing recognition of the need to promote transparency and accountability in climate-related reporting by financial institutions and companies. This becomes particularly evident as the just transition gains prominence on the agenda of a growing number of actors in the global financial market (Figure 6). The chapter on transition and physical risks has set the stage for our examination of Economic Impacts and Opportunities, unveiling the intricate web of challenges and potential pathways for growth and resilience in the face of climate change.

This section delves into how climate change is affecting industries, businesses, and communities through the reshaping of economic landscapes worldwide, while simultaneously opening new avenues for innovation and sustainable development. By examining the economic consequences of climate change, a clearer picture emerges of opportunities to forge a just and sustainable future – one that aligns with the principles of a low-carbon economy and ensures prosperity for all.

By incorporating the social dimension into climate disclosure, businesses are expected to provide comprehensive information on their efforts to ensure that workers and communities dependent on carbon-intensive activities are not left behind. This extension of disclosure enables investors to assess the social implications of companies' transition strategies, ensuring that adequate training and opportunities are provided to those affected, and fostering a fair and inclusive pathway towards a sustainable economy.



1. **Australia**
Australia's Investor Group on Climate Change has reviewed the social issues facing investors in coal
2. **Canada**
Canada's government launched a task force in 2018 to make the phase-out of coal a fair one. Canada's Fonds de Solidarité FTQ is investing in an energy transition respectful of Quebec's workers
3. **France**
French pension fund Ircantec is incorporating the just transition into engagement priorities
4. **Germany**
German-based asset manager DWS is the first investor to publish analysis of physical climate risk in equity portfolios
5. **India**
India has received support from the UK's development finance institution CDC to train women in the solar sector
6. **Italy**
Italian energy utility Enel has committed to decarbonise by 2050 and insurer Generali is including stakeholder dialogue in its climate change policy
7. **South Africa**
South Africa incorporated the just transition into its Nationally Determined Contribution in 2015
8. **United Kingdom**
The United Kingdom's Environment Agency Pension Fund is integrating the just transition into climate policy and Friends Provident Foundation is building resilience to the transition through engagement and local energy generation
9. **United States of America**
The United States of America's Just Transition Fund is supporting innovation in sustainable development in coal communities in Appalachia

Figure 6: Financial sector taking actions to assist a just transition, ([PRI, 2018](#)).

The world will likely suffer irremediable negative consequences of climate change if its existing and potential impacts are not adequately addressed. However, research shows that emerging economies could suffer worse impacts compared to their peers in developed economies ([World Economic Forum, 2023](#); [The Economist Intelligence Unit, 2023](#); [Abbass et al., 2022](#); [Georgieva et al., 2022](#)). These differences in possible climate change-induced negative economic consequences between the higher- and lower-income countries are seen in current projections. As Figure 7 shows, GDP losses are projected to be worse for low and lower-middle income countries than their high and upper-middle income counterparts. They are also set to be worse than the global average.

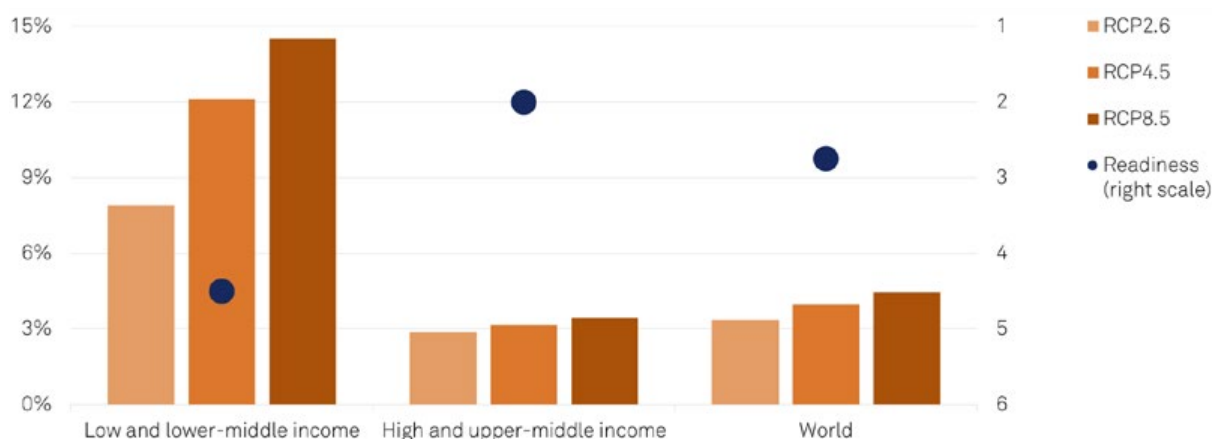


Figure 7: Combined GDP at risk (%) and readiness score, ([S&P Global Ratings, S&P Global Sustainable1, 2022](#)).

Approximately half of the world’s GDP and approximately 1.2 billion jobs depend on nature and the sustainable management of climate and environmental impacts ([ILO, 2018](#)). If the observed and projected impact of climate change ([IPCC, 2022](#)) is under-mitigated or unmitigated, devastating yet irreversible changes to the natural environment could result that affect entire financial and economic systems. This calls for a shift towards a low-carbon economy across borders.

However, the phasing-out of emissions-intensive practices and other decarbonisation initiatives linked to the low-carbon transition can present risks of a social, economic, and financial nature. Moreover, people living in poverty, including women and indigenous communities, are particularly vulnerable. This is because they are often disproportionately dependent on the kind of natural resources and ecosystems ([ILO, 2023b](#)) that will be negatively impacted by climate change. Examples of such impacts include the aggravation of water scarcity, lowering crop yields, and poor livestock and aquaculture productivity. Many of the communities already in need are likely to experience worse impacts than their counterparts in developed economies.

2.3.1 Challenges concerning employment and economies of a just transition

In light of the fact that communities are predicted to be unequally affected by the negative impacts of the transition toward a low-carbon economy (which often stem from stranded assets), discussions around a ‘just transition’ have risen up the agenda of international organisations. Beyond their impact on emissions-intensive industries, stranded assets also have repercussions for human capital. This pertains to the skills and expertise of workers whose livelihoods are tied to these operations. When such operations become stranded, it can result in the depletion of both financial and human capital value.

This a particularly salient issue for developing countries that are often more exposed to higher risks and expenditures for the transition ([ILO, 2015](#); [UNFCCC, 2020b](#); [ILO, 2023a](#); [McKinsey, 2022](#)). Hence, it is necessary to ensure that the transition is ‘just,’ addressing not only emission reductions but also widening inequalities and the need to rebuild ecosystem services and natural resources in both emerging and developed economies.

The United Nations Framework Convention on Climate Change (UNFCCC), the International Labour Organization (ILO), and the World Bank have published reports on how a just transition towards environmentally sustainable economies and societies can be achieved ([ILO, 2015, 2023](#); [UNFCCC, 2020b](#); [World Bank, 2022](#)). These discussions often revolve around how transformations in economic sectors can impact countries' economic growth and the workforce. Of particular concern is the creation of decent work and quality jobs in the context of the impact of response measures necessary to enable the transition to a low-carbon economy.

In addition, the distributional challenges arising from stranded assets, where the costs and benefits of transitioning could be unevenly distributed amongst and within nations, could potentially lead to political and economic frictions within and between countries. Stranded assets can occur across various sectors such as energy (upstream, midstream, and downstream) due to net-zero transitions, as well as forests affected by logging concessions. Both active and passive groups can be impacted. Asset owners and businesses operating stranded assets are among the most obvious of these groups, but others include communities hosting these assets and policymakers relying on tax revenues generated from them.

When discussing the challenges associated with a just transition, it is important to consider that the speed of decarbonisation directly correlates with the likelihood of stranded assets in different sectors and the potential magnitude of economic, social, and political consequences. This highlights the need for a just transition to effectively manage these challenges. Failure to address distributional concerns related to stranded assets can destabilise low-carbon transitions and hinder the achievement of climate objectives. Therefore, considering and addressing the distributional impacts of stranded assets is vital to ensuring a smooth and equitable transition to a sustainable future.

2.3.2 Opportunities from achieving a just transition of the workforce, and the creation of decent work and quality jobs

Facilitating a just transition requires supporting the people that could suffer the most from stranded assets. Several key factors help facilitate a just transition towards a low-carbon economy. These factors aim to ensure fairness, equity, and support for those affected by climate change and related policies.

Here are some essential elements that can contribute to a just transition:

1. **Relocating resources:** One aspect of a just transition involves redistributing resources to address inequalities. This includes ensuring that those who are over-consuming are willing to consume less, allowing those who are under-consuming to secure sufficient resources and opportunities.
2. **Compensation for affected sectors:** A just transition recognises that certain sectors may experience adverse impacts during the shift to a low-carbon future. Providing adequate support and compensation to these sectors helps alleviate the challenges they face and ensures a fair transition process.

3. **Creating new employment opportunities:** A crucial aspect of a just transition is the generation of new job opportunities in low-carbon sectors. Investing in renewable energy, energy-efficient technologies, sustainable infrastructure, and other green industries can stimulate employment growth and ensure a smooth transition for workers in carbon-intensive sectors.
4. **Leveraging nature-based solutions:** Nature-based solutions² can contribute to a just transition by creating quality and decent jobs in the shift to a low-carbon economy. Nature-based solutions, which protect and restore ecosystems, offer multiple benefits, including climate change mitigation, biodiversity conservation, and improved well-being. These solutions generate employment opportunities in sectors such as restoration, conservation, and sustainable agriculture, particularly in rural areas. Nature-based solutions projects that prioritise social inclusion, fair wages, and safe working conditions can help ensure a just and equitable transition. Additionally, these solutions could provide co-benefits like enhanced resilience and cultural preservation. By integrating nature-based solutions into climate strategies, green jobs and foster social equity can be created, which, in turn, helps promote a sustainable future.

Table 3: Examples of nature-based solutions, ([OECD, 2020](#)).

Types of Nature-based Solutions	Examples
Drought risk mitigation	<ul style="list-style-type: none"> ▪ Wetland conservation and restoration ▪ Forest management to increase water yield
Urban water and storm water management	<ul style="list-style-type: none"> ▪ Green roofs ▪ Greenspace and urban parks
River/ inland flood risk mitigation	<ul style="list-style-type: none"> ▪ Reforestation ▪ Floodplains restoration
Agricultural productivity	<ul style="list-style-type: none"> ▪ Degraded grassland/cropland restoration
Coastal protection	<ul style="list-style-type: none"> ▪ Coastal wetland restoration, i.e. via preserving natural mangroves

These elements can work together to foster a more equitable transition in which the burdens and benefits of climate change mitigation efforts are shared fairly among various stakeholders. By addressing the needs of affected communities, workers, and sectors, a just transition not only supports individuals but also contributes to social cohesion and sustainable development.

Efforts to facilitate a just transition require collaboration among policymakers, businesses, labour unions, and civil society. By actively engaging stakeholders and promoting inclusive decision-making processes, the transition to a low-carbon economy can be more inclusive, equitable, and sustainable.

² Nature-based solutions are defined as “actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits” ([Cohen-shacham et al., 2016](#)).

Appendix A

Governance		Strategy	
TCFD	IFRS S2	TCFD	IFRS S2
Descriptions of Recommended Disclosures			
Disclose the organization's governance around climate-related risks and opportunities.	Understand the governance processes, controls and procedures used to monitor, manage and oversee climate-related risks and opportunities.	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.	Understand a company's strategy for managing climate-related risks and opportunities.
Comparing TCFD Recommended Disclosures & IFRS S2 Climate-related Disclosures			
Recommended Disclosure a) Describe the board's oversight of climate-related risks and opportunities.	Requires more detailed information , i.e. how the governance body(s) or individual(s)' responsibilities for climate-related risks and opportunities are reflected in the terms of reference, mandates, role descriptions and other related policies applicable to that body(s) or individual(s)	Recommended Disclosure a) Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term.	Requires reference to and considerations of the applicability of industry-based disclosure topics in the industry-based guidance in identifying climate-related risks and opportunities Requires disclosure of more detailed information around where in the company's business model and value chain risks and opportunities are concentrated.
Recommended Disclosure b) Describe management's role in assessing and managing climate-related risks and opportunities.	Broadly consistent with TCFD Recommended Disclosure b)	Recommended Disclosure b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning. Recommended Disclosure c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	Requires more detailed information in describing climate-related risks and opportunities, i.e. how a company has responded to, and plans to respond to, the identified risks and opportunities, including any transition plans to achieve the company's climate-related targets. Sets out criteria for when quantitative and qualitative information is required , in providing disclosures about the current and anticipated effects of the risks and opportunities on a company's cash flows, financial position and performance. Disclosure of only qualitative information is permitted under some circumstances , i.e. when a company cannot separately identify the effects of the risk or opportunity / when the level of measurement uncertainty is too high. Requires a company to use all reasonable and supportable information that is available at the reporting date without undue cost or effort and requires the use of an approach that is commensurate with the company's circumstances . Does not specify particular scenarios to be used for climate-related scenario analysis Requires additional information regarding resiliency on: • significant areas of uncertainty considered by the company in its assessment; • a company's capacity to adjust and adapt its strategy and business model over time; and • details on how and when the climate-related scenario analysis was carried out. In using climate-related scenario analysis, IFRS S2 requires the use of an approach that is commensurate with the company's circumstances and a consideration of all reasonable and supportable information that is available at the reporting date without undue cost or effort .

Appendix B

Risk Management		Metrics & Targets	
TCFD	IFRS S2	TCFD	IFRS S2
Descriptions of Recommended Disclosures			
Disclose how the organization identifies, assesses and manages climate-related risks.	Understand the processes to identify, assess, prioritise and monitor climate-related risks and opportunities , including, whether and how those processes are integrated into and inform the company's overall risk management process.	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	Understand a company's performance in relation to its climate-related risks and opportunities, including progress towards any climate-related targets it has set, and any targets it is required to meet by law or regulation.
Comparing TCFD Recommended Disclosures & IFRS S2 Climate-related Disclosures			
Recommended Disclosure a) Describe the organization's processes for identifying and assessing climate-related risks	Requires disclosure of more detailed information , i.e.: • the input parameters it uses to identify risks (for example, data sources, the scope of operations covered and the detail used in assumptions); • whether and how the company uses climate-related scenario analysis to inform its identification of risks; and • whether it has changed the processes used to identify, assess, prioritise and monitor risks compared to the prior reporting period. Explicitly requires additional disclosures on the processes used to identify, assess, prioritise and monitor opportunities.	Recommended Disclosure a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	Requires the same categories of cross-industry metrics as does the TCFD guidance. Additionally requires disclosure of industry-based metrics relevant to a company's business model and activities.
Recommended Disclosure b) Describe the organization's processes for managing climate-related risks.	Focuses on providing information about the processes used to identify, assess, prioritise and monitor climate-related risks and opportunities .	Recommended Disclosure b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	Requires additional disclosures related to a company's GHG emissions, including: • a separate disclosure of Scope 1 and Scope 2 GHG emissions for (1) the consolidated accounting group, and (2) associates, joint ventures, unconsolidated subsidiaries or affiliates not included in the consolidated accounting group; • Scope 2 GHG emissions using a location-based approach and information about any contractual instruments that is necessary to inform users' understanding; • Scope 3 GHG emissions disclosures, including additional information about the company's financed emissions if the company has activities in asset management, commercial banking or insurance; and • information about measurement approach, inputs and assumptions used in measuring Scope 3 GHG emissions. In addition, IFRS S2 sets out a Scope 3 measurement framework to provide guidance for preparing Scope 3 GHG emissions disclosures. While IFRS S2 does not explicitly require a company to disaggregate its GHG emissions disclosures by the constituent gases, IFRS S1 includes requirements on disaggregation that would result in the disclosure of the constituent gases being required if such disaggregation provides material information.
Recommended Disclosure c) Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management.	Requires additional disclosures on the extent to which, and how, the processes used to identify, assess, prioritise and monitor opportunities are integrated into and inform the company's overall risk management process.	Recommended Disclosure c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	Differs from the TCFD guidance in, for example, requiring disclosures about how the latest international agreement on climate change has informed the target and whether the target has been validated by a third party . Requires disclosure of more detailed information on GHG emissions targets , including additional information about the planned use of carbon credits to achieve a company's net GHG emissions targets. Additional requirements to disclose information about the approach to setting and reviewing each target, and how it monitors progress against each target , including whether the target was derived using a sectoral decarbonisation approach .

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