

Reporting on TCFD recommendations

Guidance on Climate Disclosures



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Introduction

Background

In 2015, a landmark international accord called the “Paris Agreement” was adopted by nearly every nation with a global agreement to substantially reduce global greenhouse gas (GHG) emissions in an effort to limit the global temperature increase in this century to 1.5°C.

This ambitious agreement signed in Paris highlighted the urgency of the climate-related context, and in the same year the Financial Stability Board responded to this urgency with the launch of its Task Force on Climate-Related Financial Disclosures (TCFD). TCFD’s remit was to provide companies, investors and insurance underwriters with the guidance needed to promote “informed investment, credit [or lending], and insurance underwriting decisions,” and in doing so to help companies take action to tackle climate change, effectively manage both opportunities and risks related to climate change, and to facilitate a smooth transition to a more sustainable, lower-carbon economy.

TCFD recommendations

In 2017, the TCFD released its recommendations on climate-related financial disclosures. These recommendations are structured around four thematic areas that represent core elements of how companies operate:

- **Governance** – the company’s governance around climate-related risks and opportunities
- **Strategy** – the actual and potential impacts of climate-related risks and opportunities on the company’s businesses, strategy, and financial planning where such information is material
- **Risk Management** – how the company identifies, assesses, and manages climate-related risks
- **Metrics and Targets** – the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material

International developments

On 30 September 2020, (i) the International Financial Reporting Standards (IFRS) Foundation Trustees published a [consultation paper](#) to consult the market on the establishment of a new International Sustainability Standards Board (ISSB) to develop a single set of globally accepted sustainability standards; and (ii) the Alliance¹ published a joint [Statement of Intent](#) to present a shared vision of elements necessary for more comprehensive corporate reporting. These publications kick-started the process in harmonising existing sustainability reporting frameworks and standards.

Based on broad support received, the IFRS Foundation announced the formation of the new ISSB on 3 November 2021, for the development of global sustainability reporting standards. Due to the urgent need for better information about climate-related matters, the ISSB would initially focus its efforts on climate-related reporting, building upon the existing reporting initiatives, including the TCFD recommendations.

¹ An alliance comprising five framework- and standard-setting institutions of international significance, namely, the CDP, the Climate Disclosure Standards Board, the Global Reporting Initiative, the International Integrated Reporting Council and the Sustainability Accounting Standards Board.

Developments in Hong Kong

In December 2020, the Green and Sustainable Finance Cross-Agency Steering Group announced that climate-related disclosures aligned with the TCFD recommendations will be mandatory across relevant sectors no later than 2025. In July 2021, the Steering Group also indicated its support towards adopting the standard to be developed by the ISSB. Hong Kong Exchanges and Clearing Limited (**HKEX**) is reviewing its Environmental, Social and Governance (**ESG**) reporting framework in order to further align with the TCFD recommendations, and will collaborate with the Securities and Futures Commission (**SFC**) and other regulators to work on a roadmap to evaluate and potentially adopt the new standard.

Purpose of this Guide

With effect from July 2020, HKEX's [ESG Reporting Guide](#) has been amended to incorporate elements of the TCFD recommendations such as requiring board's oversight of ESG matters, targets for certain environmental KPIs and disclosure of impact of significant climate-related issues. In light of the direction towards mandatory TCFD-aligned climate-related disclosures by 2025, we encourage our listed issuers to commence reporting in accordance with the TCFD recommendations the soonest.

The purpose of the Guidance on Climate Disclosures (the **Guide**)² is to provide practical guidance to facilitate listed companies in complying with the TCFD recommendations.³ This Guide is targeted at companies that are yet to develop substantive in-house expertise on climate-related issues, and seeks to mitigate the many challenges currently faced by most companies in TCFD reporting, including:

- Lack of understanding of concepts relating to climate change issues
- Insufficient resources (e.g. lack of access to sustainability experts and lack of data)
- Unclear roles and responsibilities
- Lack of awareness from different corporate departments⁴

2 Carbon Care Asia Limited was engaged to prepare this guide, including the research and development of consolidated climate scenarios, methodologies for climate-related business impacts, action planning, financial impact assessment, and integrated business strategies.

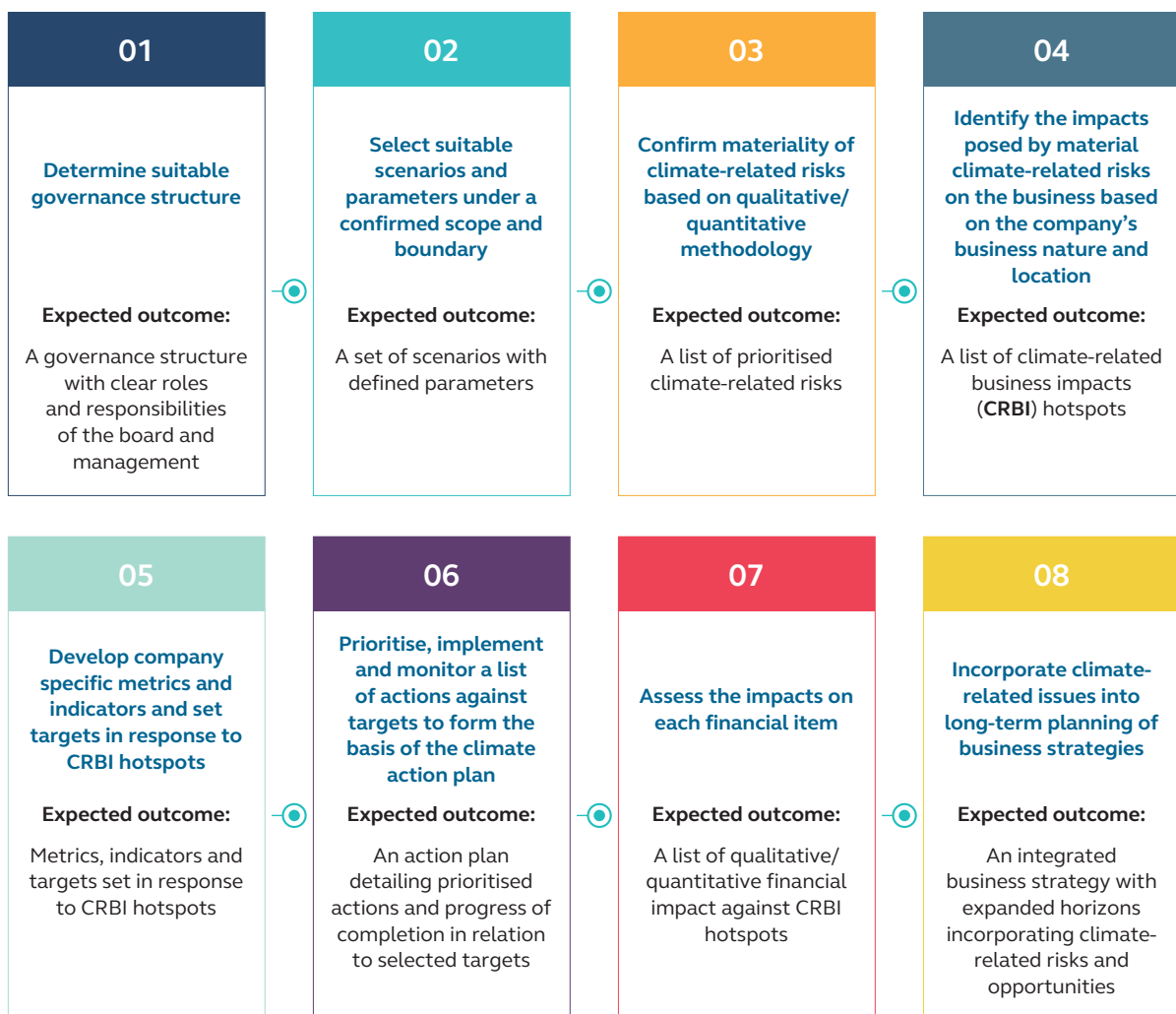
3 This Guide does not contain discussions of climate-related opportunities.

4 For example, human resources, finance, legal, operational units.

Work process to this Guide

Companies tend to undertake some common steps when developing, monitoring and disclosing climate-related metrics and targets, financial impacts and strategies. In this Guide, the implementation journey has been broken down into eight steps, with one chapter dedicated to each step. The flowchart below sets out the key tasks and expected outcome of each chapter. Companies should note that this is an iterative process with each step providing a feedback loop to the others.

Companies are also reminded that this is only a suggested approach to adopt and comply with the TCFD recommendations. The precise order in which these steps are taken will differ by industry and company.



The table below maps the TCFD recommendations with chapters of this Guide:

TCFD recommendations	Chapters of this Guide							
	1	2	3	4	5	6	7	8
Governance								
Disclose the organization’s governance around climate-related risks and opportunities.	●							
a) Describe the board’s oversight of climate-related risks and opportunities.	●							
b) Describe management’s role in assessing and managing climate-related risks and opportunities.	●							
Strategy								
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.		●	●	●			●	●
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.			●	●				
b) Describe the impact of climate-related risks and opportunities on the organization’s businesses, strategy, and financial planning.			●	●			●	
c) Describe the resilience of the organization’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.		●						●
Risk Management								
Disclose how the organization identifies, assesses, and manages climate-related risks.			●		●	●	●	●
a) Describe the organization’s processes for identifying and assessing climate-related risks.			●				●	
b) Describe the organization’s processes for managing climate-related risks.					●	●		
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization’s overall risk management.								●
Metrics and Targets								
Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.			●		●	●		●
a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.					●			●
b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas emissions, and the related risks.			●		●			
c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.					●	●		



The Guide will set out disclosures of a hypothetical company, HyCo, throughout the eight chapters for illustrative purposes only. HyCo is a conglomerate headquartered in Hong Kong, principally engaged in manufacturing and real estate, including property development, construction and property management businesses, with operations in both Guangzhou and Hong Kong.

Reference materials

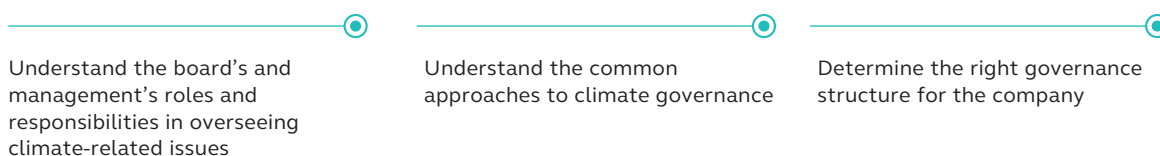
- Users wishing to equip themselves with the concepts, principles, drivers and theories behind climate-related issues (including climate-related opportunities) should refer to the resources available at the [TCFD Knowledge Hub](#).
- The section titled “Possible enhancements” at the end of each chapter recommends further areas of improvement or reference materials for companies desiring a deeper dive into the specific topic.

1. Governance Structure

Objectives

In this chapter, we will discuss the board's and management's roles and responsibilities in overseeing climate-related issues, factors to be considered when establishing a suitable governance structure, and key elements of governance structure disclosures.

Workflow



Roles and responsibilities of the board and management

The board and the management play different roles in overseeing a company's climate-related issues. The board's role is on the approval and monitoring of policies and mechanisms to manage climate-related issues and ensuring adequacy of resources, while the management's role is the actual implementation of such policies and mechanisms in an efficient and effective manner.

Table 1.1 Responsibilities of the board and management in overseeing climate-related issues

Board's responsibilities:	Management's responsibilities:
<ul style="list-style-type: none"> • Develop the company's climate strategy and oversee the management of climate-related issues (e.g. incorporate climate-related considerations into strategic planning, business models and other decision-making processes) • Establish mechanisms to be informed of climate-related issues (e.g. process/form/frequency) • Monitor and review the effectiveness of the management approach, which envisages a review of metrics, targets and action plan • Designate responsible individual(s)/committee(s) (e.g. include climate-related issues in the mandate of existing board committees, establish a standalone committee or appoint senior management) for the day-to-day assessment and management of climate-related issues 	<ul style="list-style-type: none"> • Assess, manage and monitor climate-related issues to provide analyses, recommendations and updates for board or board committees' discussion to ensure board's oversight • Maintain effective management systems for data, including environmental and financial data • Determine and manage the cost and resources (e.g. staff, technology) that will be allocated for the identification, mitigation, management and monitoring of climate-related issues • Coordinate different departments to facilitate their effective cooperation

While there may be division of labour among directors, it is important to make climate-related issues the responsibility of the entire board.

Despite having different roles, it is essential for both the board and the management to have sufficient knowledge of climate-related risks and appreciate the impacts of such risks on the company’s business and operations. Regular training on climate-related issues should be provided to ensure both the board and management are aware of the latest developments.

Reference materials

Please refer to HKEX’s [Leadership Role and Accountability in ESG](#) for details of the leadership role of the board in managing ESG issues.

Common governance structures

There are two common governance structures: (A) the integrated approach and (B) the dedicated approach.

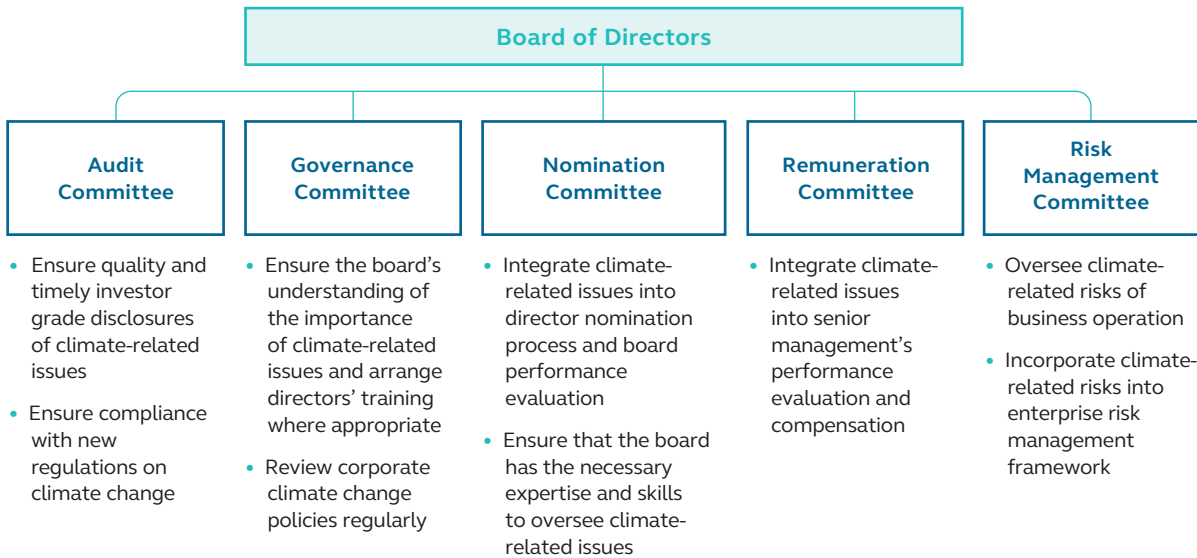
Table 1.2 Characteristics of the integrated approach and the dedicated approach

	Integrated approach	Dedicated approach
Structure	<ul style="list-style-type: none"> The management of climate-related issues is integrated into existing standing board committees (e.g. audit, governance, nomination, remuneration and risk committees) 	<ul style="list-style-type: none"> Establish a standalone committee⁵ comprising senior management and staff who have sufficient knowledge about climate change that reports to the board for climate-related issues A C-suite or board member is advised to chair the committee for the sake of strong leadership (optional) Establish working group(s) comprising heads of different departments⁶ under the committee to effectively plan and implement different mitigation and adaptation measures regarding climate-related issues
Board’s responsibilities	<ul style="list-style-type: none"> Climate-related issues are institutionalised into smaller issues and considerations and integrated into the mandates of existing standing committees responsible for traditional business functions 	<ul style="list-style-type: none"> The committee will support the integration of climate-related issues into daily operations through clear descriptions of roles and responsibilities
Management’s responsibilities	<ul style="list-style-type: none"> Management involved in the standing committees should maintain active communication to ensure alignment between different committees 	<ul style="list-style-type: none"> Management involved in the dedicated committee should coordinate different departments to implement actions necessary for climate disclosures, including data collection, and action execution

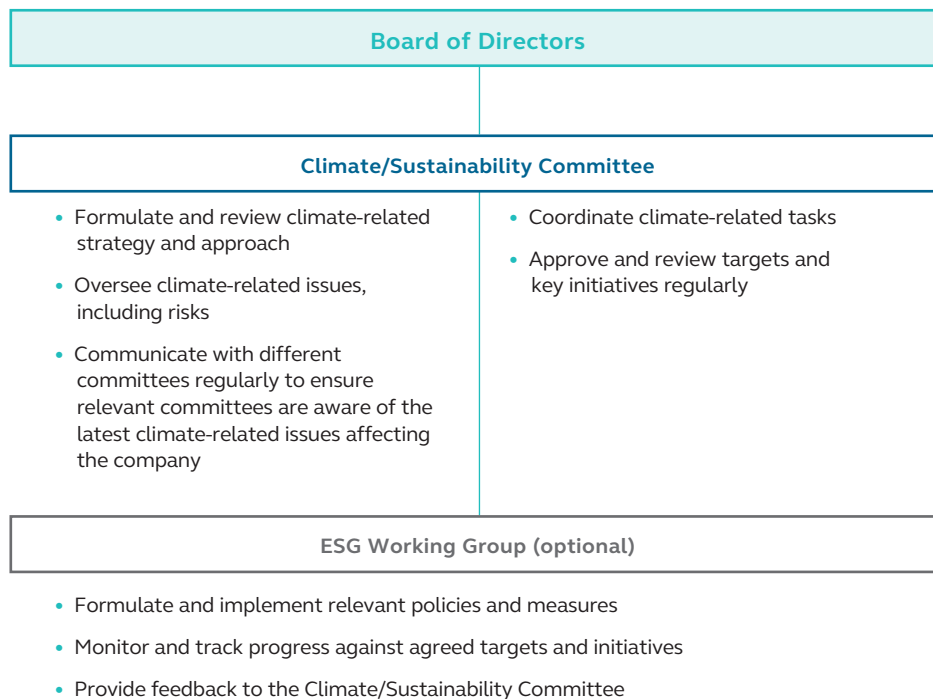
⁵ Which may be named along the line of a Climate Leadership Committee, or under the mandate of a Sustainability Committee.

⁶ For example, human resources, finance, legal, operational units.

Illustrative example of an integrated approach



Illustrative example of a dedicated approach



Note: There should be clear terms of reference setting out the roles, responsibilities and authority of the committee/working group.

Determining the suitable governance structure for a company

As all companies differ in terms of size, location of operations, and most importantly, corporate culture and management style, there is no “one-size-fits-all” or “best” governance structure, only one that is most suitable for the company.

Table 1.3 Comparison of benefits and drawbacks

	Integrated approach	Dedicated approach
Benefits	<ul style="list-style-type: none"> Existing scope of activities of each standing committee already covers climate-related issues 	<ul style="list-style-type: none"> Enables a more holistic view of how climate change affects a company’s business and operations Facilitates devoted and in-depth discussion of climate-related issues on a regular basis
Drawbacks	<ul style="list-style-type: none"> Deters in-depth conversations on climate-related issues, as the climate change agenda may easily be overwhelmed by more immediate or short-term issues 	<ul style="list-style-type: none"> Risk of separating climate-related issues from dialogues on traditional business functions

The following may be considered when designing a suitable governance structure for a company:

Culture	Whether the culture and management style of the company is more conducive to a collaborative or specialised approach
Commitment	Whether existing standing committees have the capacity and commitment to expand their scope of work into climate-related efforts, in particular, in terms of leadership, time and resources
Competence	Whether existing standing committees have the requisite expertise to scrutinise climate-related risks and provide effective oversight within the committees’ scope

A dedicated climate/sustainability committee, if established, is encouraged to tap on other standing committees’ expertise and/or collaborate with other standing committees. This ensures that the climate/sustainability committee maintains a dialogue with traditional business functions, and prevents climate policies from being formulated in isolation.



Prepare the disclosure

Disclosures should cover the following key elements in order to illustrate the board’s and management’s oversight, roles and responsibilities and readiness in managing climate-related issues:

Key elements

Board’s roles and responsibilities 1.A

- Leadership in the management process of climate-related issues
- Process and frequency of evaluation and management of climate-related risks
- Integration of climate-related issues into long-term business strategy
- Monitoring long-term climate-related metrics and targets, e.g. GHG reduction targets

Management’s roles and responsibilities 1.B

- Leadership on operation and execution level
- Providing support to enable board’s oversight
- Coordinating different departments to manage climate-related issues

Board’s oversight 1.C

- Governance structure in overseeing climate-related issues

Readiness of the board and management 1.D

- Their knowledge of the impacts on climate-related risks
- Their accountability for climate-related issues

Below is HyCo's disclosure on governance:

Sample disclosure

Supported by our Sustainability Committee and other standing committees, our Board oversees climate-related issues and risks biannually during board meetings and ensures that they are incorporated into our strategy. **1.A1**

Our Sustainability Committee is appointed by our Board and chaired by an Independent Non-Executive Director (INED). **1.C2** It comprises senior management from different business functions and is responsible for monitoring our policies, programmes, and performances relating to climate change. **1.B3** In accordance with the Climate Policy, our Sustainability Committee meets quarterly to identify, assess, monitor, and report on climate-related issues.

Our Sustainability Committee also sets climate-related performance targets at the management level in order to assist our Board in evaluating the effectiveness of its climate strategy and measures. **1.A4** More details on the climate-related goals and targets can be found in the "Metrics and Targets" chapter in our sustainability report.

To ensure that climate-related issues are integrated into our strategy, the scope of work of our standing committees are broadened to include climate-related issues, as reflected in the updated terms of reference. **1.A5** For instance, our Risk Committee regularly monitors climate-related risks, whereas our Audit Committee reviews our approach to climate change in the context of public disclosure and ensures that it reaches investor grade.

To ensure our Board keeps up with the latest trend of climate-related issues, climate competence training is provided to ensure it has the necessary expertise and skills to oversee the management of climate-related issues. Our Board also seeks professional advice from external experts when necessary to better support the decision-making process. **1.D6**

Commentaries

1.A1 HyCo stated how its board oversees climate-related issues and disclosed the frequency of reviewing relevant issues.

1.C2 A board member of HyCo chairs the dedicated committee in managing climate-related issues. Clear responsibilities are set out for the committee.

1.B3 HyCo's senior management also takes part in managing climate-related issues.

1.A4 Climate-related performance targets are set at the management level, and monitored by the board.

1.A5 HyCo ensured that climate-related issues are integrated into its business strategy by requiring standing committees to consider climate-related issues in their areas of expertise. Standing committees also share the responsibility in ensuring that climate-related issues are appropriately addressed, and measures are effectively implemented.

1.D6 HyCo engaged external experts and provided training to the board to ensure its competence in making appropriate strategic decisions.

Further recommendation

Companies adopting an integrated governance structure may need to state explicitly how ESG issues are being allocated and considered by each existing standing committee.

Key:

1.A Board's roles and responsibilities

1.B Management's roles and responsibilities

1.C Board's oversight

1.D Readiness of the board and management



Possible enhancements

Companies that would like to enhance their climate governance structure may also consider:

- Engaging climate experts for advice.
- Including climate-related performance indicators in the board's/management's remuneration review.
- Appointing C-suite management to be responsible for the management of climate-related issues (e.g. Chief Sustainability Officer/Chief ESG Officer).
- Appointing external parties to evaluate the effectiveness of the board/dedicated committee(s).

Further readings:

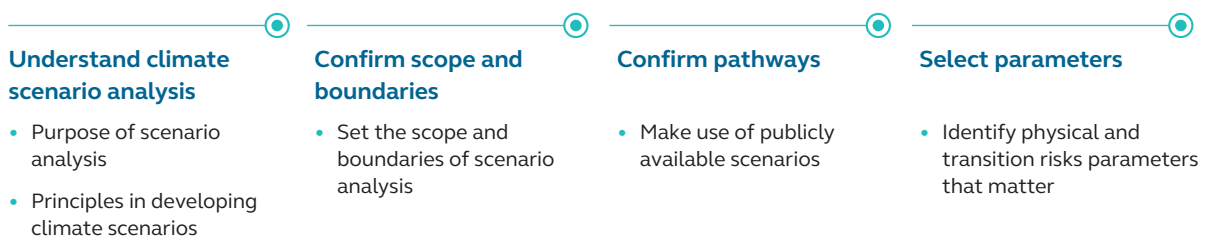
- [How to Set Up Effective Climate Governance on Corporate Boards: Guiding Principles and Questions](#) (World Economic Forum 2019)
- [View from the Top: How Corporate Boards can Engage on Sustainability Performance](#) (Ceres, 2015)
- [Getting Climate Smart: A Primer for Corporate Directors in a Changing Environment](#) (Ceres, 2018)
- [Chapter Zero: Board toolkit](#) (Chapter Zero, 2020)

2. Formulate Climate Scenarios

Objectives

In this chapter, we will discuss the purpose of conducting a climate scenario analysis, principles underlying the choice of a climate scenario and factors to consider when selecting parameters to be included in a climate scenario.

Workflow



Purpose of scenario analysis

Scenario analysis is an exercise recommended by TCFD to help companies effectively identify and assess the potential implications of climate-related risks on business performance from a range of plausible future conditions. Scenarios are hypothetical pathways of development that consider how the future might look if certain trends continue or certain conditions are met. Scenario analysis can be qualitative, quantitative or a combination of both, where description or data is used to illustrate the relationships and trends between the business and climate-related issues.

Implications of climate change on companies vary over time in severity and conditions. Scenario analysis is not an exercise in forecasts, predictions or sensitivity analyses. It is an important and useful tool for companies to understand and develop flexible and robust strategic plans that are resilient to climate change.

While the initial process of developing a scenario analysis may be cumbersome, it pays dividends in the years ahead. After the initial analysis, adjustments are expected on a regular basis, and revisiting the whole process will only be necessary where there are significant changes to the company's business model, or the circumstances which it operates in. As part of the strategic management process, scenarios should be reviewed regularly. Companies should monitor signposts that may lead to changes in assumptions and inputs, and consider whether scenarios need to be updated.

Do you know?

Climate risks are typically classified into two major categories:

1) Physical risks

Risks related to physical impacts of climate change, which can be driven by events such as floods and typhoons (acute risks) or longer-term shifts in climate patterns such as sustained high temperatures and sea level rise (chronic risks).

2) Transition risks

Risks related to the transition to a lower-carbon economy, which may entail policy, legal, technology, and market changes to address mitigation and adaptation requirements related to climate change.

Set the scope and boundaries of scenario analysis

The scope and boundaries of a scenario analysis determine how far the analysis extends to. For example, whether the analysis focuses on major operations of a company's business or covers operations of the whole group. It is crucial that the scope and boundaries represent a company's material business operations. Smaller companies may consider an analysis of their direct operations to be sufficient; while larger companies may consider expanding the analysis beyond their headquarters or even their supply chain and customers.

Make use of publicly available scenarios

There are a number of publicly available scenarios which a company can use as they are, adapt, or use as guidance to develop in-house scenarios. Table 2.1 sets out publicly available scenarios companies may use to conduct scenario analyses or to act as guidance for developing in-house scenarios:

Table 2.1 Overview of publicly available scenarios

Source	Characteristics	Pathways
Intergovernmental Panel on Climate Change (IPCC)	<ul style="list-style-type: none"> • Focuses on physical impacts • Simulates future scenarios based on varying levels of GHG concentration 	Representative Concentration Pathways (RCP)⁷ <ul style="list-style-type: none"> • Stringent pathways: RCP 1.9, RCP 2.6 • Intermediate pathways: RCP 4.5, RCP 6.0 • High emissions pathway: RCP 8.5
	<ul style="list-style-type: none"> • Focuses on socio-economic impacts • Provides narrative descriptions of alternative futures as a result of varying socio-economic challenges to adaptation and mitigation 	Shared Socioeconomic Pathways (SSP)⁸ <ul style="list-style-type: none"> • Stringent pathway: SSP 1 • Intermediate pathways: SSP 2, SSP 3, SSP 4 • High emissions pathway: SSP 5
International Energy Agency (IEA) ⁹	<ul style="list-style-type: none"> • Focuses on energy and emissions scenarios describing the future energy mix 	<ul style="list-style-type: none"> • Stringent pathway: Sustainable Development Scenario (SDS)¹⁰ • Business-as-usual pathway: Stated Policy Scenario (SPS)
Network for Greening the Financial System (NGFS) ¹¹	<ul style="list-style-type: none"> • Explores a set of six scenarios that take into account transition risks, physical risks and the implementation of climate policies 	<ul style="list-style-type: none"> • Orderly pathways: Net-Zero 2050 scenario, Below 2°C scenario • Disorderly pathways: Divergent Net-Zero scenario, Delayed Transition scenario • Hot house world pathways: Nationally Determined Contributions scenario, Current Policies scenario

7 Reference/public data source: IPCC Fifth Assessment Report, RCP database, Water Risk Mapping Tool, Sea Level Rise Mapping Tool

8 Reference/public data source: SSP Database

9 Reference/public data source: World Energy Model Documentation, Net-Zero by 2050 – A Roadmap for the Global Energy Sector

10 Companies wishing to pursue net-zero goals may consider IEA's Net-Zero Emissions by 2050 case.

11 Reference/public data source: NGFS Climate Scenarios for central banks and supervisors

Develop the company's climate scenarios

To facilitate discussions and analyses on the potential impacts of climate-related issues under different conditions, it is recommended to develop at least two scenarios for comparison. Companies are recommended to consider both a stringent pathway (i.e. a scenario that strives to achieve a lower-carbon economy) and a high emissions/business-as-usual pathway, in order to adequately consider both physical and transition risks.

When developing climate scenarios, the following principles should be adhered to:

High contrast	There should be a strong contrast between different scenarios. Selected scenarios should represent the best-case and worst-case scenarios for companies to sufficiently consider risks posed by climate change. In general, a higher emissions scenario carries higher physical risks, while a scenario that strives to achieve a lower-carbon economy carries higher transition risks
Balanced	The scenarios developed should sufficiently consider both physical and socio-economic impacts
Science-based	When conducting data projection for the selected scenarios, projection should be made on the basis of scientific analysis, e.g. research findings and model simulation

While publicly available scenarios often refer to global or country-level data, companies may refine their scenarios with the latest qualitative and quantitative data published by international organisations or local governments.¹² Hong Kong's climate data can be found on the [Hong Kong Observatory website](#), and Hong Kong's climate-related policies could be found on the websites of different departments of the Hong Kong government.¹³

To illustrate how the management may consider a variety of physical and transition risks under contrasting scenarios, we have categorised some of the publicly available scenarios set out in Table 2.1 above into two major categories, namely, the Turquoise Scenarios and the Brown Scenarios.

Turquoise Scenarios:	Brown Scenarios:
<ul style="list-style-type: none">• RCP 2.6• SSP 1• IEA SDS• NGFS orderly pathways	<ul style="list-style-type: none">• RCP 8.5• SSP 5• IEA SPS• NGFS Hot house world pathways

¹² For latest climate-related data, companies may refer to national environment agency and the national weather service.

¹³ Including the Environmental Protection Department, the Transport Department and Drainage Services Department etc.

Characteristics of the Turquoise Scenarios and the Brown Scenarios are summarised in the table below:

Table 2.2 Characteristics of the Turquoise Scenarios¹⁴ and Brown Scenarios¹⁵

Physical environment:¹⁶

	Turquoise Scenarios	Brown Scenarios
Global mean temperature increase	<ul style="list-style-type: none"> About 1.7°C by 2060 and 1.8°C by 2100 	<ul style="list-style-type: none"> About 2.4°C by 2060, reaching 4.4°C by 2100
Global mean sea level increase	<ul style="list-style-type: none"> Likely at 0.30m by 2065 and 0.50m by 2100 	<ul style="list-style-type: none"> Likely at 0.40m by 2065 and 0.80m by 2100
Arctic sea ice	<ul style="list-style-type: none"> Year-round reduction 	<ul style="list-style-type: none"> A nearly ice-free Arctic Ocean in the summer by 2050
Global glacier volume¹⁷	<ul style="list-style-type: none"> Projected to decrease by 18% from 21st century level by 2100 	<ul style="list-style-type: none"> Projected to decrease by 36% by 21st century level by 2100
Climate change impacts	<ul style="list-style-type: none"> Rather stable. For example, a decrease in crop yield of 2% by 2080 	<ul style="list-style-type: none"> Significant. For example, a decrease in crop yield of 14% by 2080 may compromise common human activities such as growing food and working outdoors by 2100

Socio-economic environment:

	Turquoise Scenarios	Brown Scenarios
Economic development	<ul style="list-style-type: none"> A more inclusive economic development that respects the perceived environmental boundaries 	<ul style="list-style-type: none"> Economic growth and technological advancement are fueled by fossil fuels, resulting in high levels of GHG emissions by 2100, which can exacerbate extreme weather events
Climate policies	<ul style="list-style-type: none"> Many countries have pledged to achieve net-zero by 2050 with detailed near-term targets and action plans 	<ul style="list-style-type: none"> Absence of new climate policies as a result of institutional, political and economic obstacles, i.e. policy inertia
Implementation of policies	<ul style="list-style-type: none"> Stringent climate policies¹⁸ are implemented by governments with low challenges of execution 	<ul style="list-style-type: none"> Lack of detailed near-term action and implementation plans
Common business model	<ul style="list-style-type: none"> Rapid shift from a fossil fuel-dependent economy to a renewable energy driven economy 	<ul style="list-style-type: none"> Profit driven business model with only casual consideration of environmental and social impacts
Level of commitment	<ul style="list-style-type: none"> Corporates are committed to contribute to national and regional climate action goals, i.e. business partners work together to achieve lower-carbon operations 	<ul style="list-style-type: none"> Insufficient public environmental awareness to drive system change

14 These parameters are extracted from IPCC's SSP 1-2.6 and IEA's Sustainable Development Scenario as of August 2021, with reference to NGFS's orderly pathways. In August 2021, IPCC published its Sixth Assessment Report setting out a core set of five scenarios. It is expected that parameters of the IPCC scenarios will be updated based on the Sixth Assessment Report in near future.

15 These parameters are extracted from IPCC's SSP 5-8.5 and IEA's Stated Policies Scenario as of August 2021, with reference to NGFS's hot house world pathways. In August 2021, IPCC published its Sixth Assessment Report setting out a core set of five scenarios. It is expected that parameters of the IPCC scenarios will be updated based on the Sixth Assessment Report in near future.

16 Compared to pre-industrial baseline, it applies to all physical environment description for both scenarios.

17 Excluding glaciers on the periphery of Antarctica (and excluding the Greenland and Antarctic ice sheets).

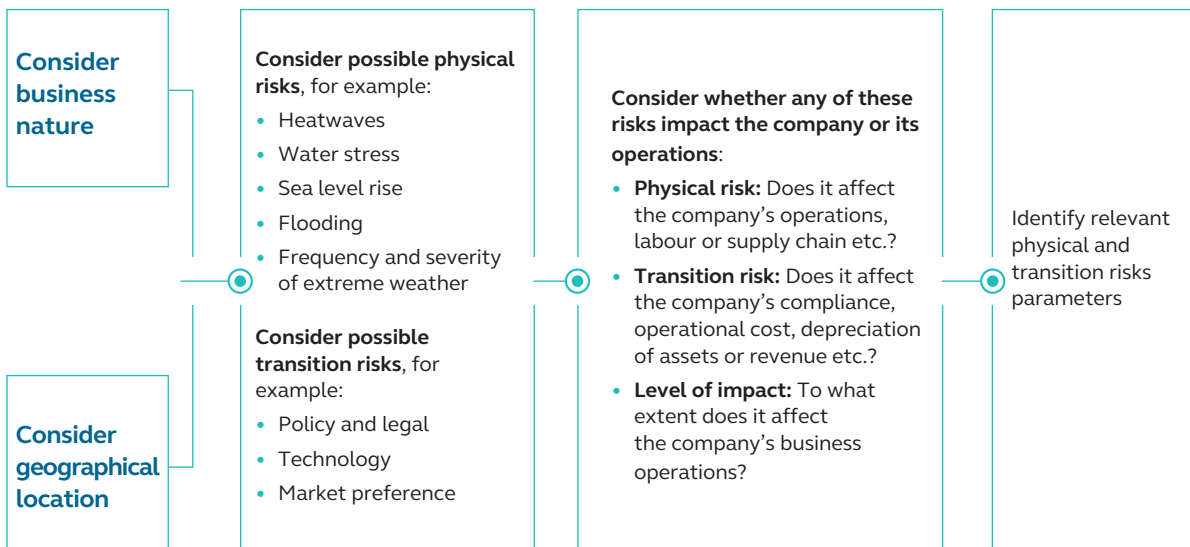
18 For example, policies to increase the percentage of renewable energy, the control of fuel-propelled cars and development of carbon-zero ready buildings.



Identify physical and transition risks parameters that matter

After selecting the appropriate scenarios, companies should identify physical and transition risks parameters that matter to their business operations.

Chart 2.3 Process for identification of physical and transition risks parameters¹⁹



19 Risks/parameters identified are for illustrative purposes only, and are not intended to be exhaustive.

Case study:

HyCo is principally engaged in the operation of a manufacturing plant in Guangzhou, China. The management went through the process above to identify physical and transition risks parameters of relevance.

Table 2.4 Identifying physical risks parameters under Brown Scenarios

Physical risk	Is it relevant?	Reason	Examples of relevant parameter
Heatwave	✓	During periods of heatwaves, employees may not be able to work outdoors due to extreme hot weather, resulting in an increase in cost of operations. Heatwaves may also lead to crop failure which in turn result in an increase in cost of raw materials. Both may lead to loss of revenue.	<ul style="list-style-type: none"> • Annual number of very hot days • Heat and labour productivity • Crop yields
Water stress	X	As the company's manufacturing plant is located in Guangzhou and its operations do not involve a huge amount of water, it has a lower risk of water stress. Therefore, water stress will not be factored in for scenario analysis at the moment.	–
Sea level rise	✓	Sea level rise in the long-term may force operations located in coastal areas to be relocated to inland areas.	<ul style="list-style-type: none"> • Mean sea level with vertical land displacement
Flooding	✓	During rainy seasons, the increased frequency of flooding may halt operations due to damage to property or equipment, and/or employees being unable to commute to work. This may result in an increase in cost of operations and depreciation of equipment.	<ul style="list-style-type: none"> • Population in areas below projected high tide line • Population in areas below projected annual average coastal flood levels
Frequency and severity of extreme weather	✓	The increase in frequency and severity of extreme weather may cause damage to property and equipment, resulting in an increase in cost of operations as well as depreciation of equipment. Moreover, the increased severity of extreme weather events may also threaten the safety of employees working at the premises.	<ul style="list-style-type: none"> • Exposure to extreme weather • Direct losses from tropical cyclones

Table 2.5 Identifying transition risks under Turquoise Scenarios

Transition risk	Is it relevant?	Reason	Examples of relevant parameter
Policy and legal	✓	The Guangzhou government may implement more stringent climate policies (such as the implementation of carbon-pricing mechanisms, the shift of energy use towards renewable energy). This may increase cost of operations and thus lead to loss of revenue.	<ul style="list-style-type: none"> • Non-nuclear energy mix • Regulations on electric vehicles • Carbon price
Technology	✓	With the emergence of new technologies (such as renewable energy, energy efficiency), the company may have to keep up with the latest technologies in order to meet higher standards of efficiency. This may increase the cost of upgrading existing equipment.	<ul style="list-style-type: none"> • Electric commercial vehicles • Efficiency of battery storage
Market preference	✓	The shift in market preference (such as consumer preference, demand and supply) may lead to more consumers demanding environmentally-friendly products. This may increase the cost of the production process as well as raw materials used. Lagging behind peers in capturing the shift in market preference may lead to a loss of revenue and market share.	<ul style="list-style-type: none"> • Commodity prices

At the end of this chapter, we set out data in respect of each parameter identified above under the Turquoise Scenarios and the Brown Scenarios. Companies may include these parameters in their analysis in order to calculate the financial impacts under different scenarios (see [Chapter 7](#) for further details).

Prepare the disclosure

Disclosures should cover the following key elements in order to give stakeholders a clear picture of the scenarios used by the company for climate-related impact analysis:

Key elements

Parameters used [2.A](#)

- Parameters used when conducting scenario analysis
- Significance of these parameters to the company’s operation

Assumptions made by the company [2.B](#)

- Assumptions made, including but not limited to business development strategy, government policies etc.

Analytical choices [2.C](#)

- Scope and boundaries of the scenario
- Description of the selected scenario
- Time horizon
- Source of supporting data

Below is HyCo's disclosure on climate scenarios:

Sample disclosure

As a conglomerate in Hong Kong, we understand that climate change may have significant impacts on our operations. To better understand the potential impacts of climate change on our company's business, we conducted climate scenario analyses for two time horizons, 2030 and 2050, under the following pathways:

- RCP2.6, SSP1 and IEA Sustainable Development Scenario supplemented by the Net-Zero Emissions by 2050 case
- RCP8.5, SSP5 and IEA Stated Policies Scenario **2.C1**

The scenario analyses include all businesses under our operational control. **2.C2**

Set out below are parameters used and reasons for their relevance: **2.A3 2.A4**

- Carbon price – Upon the promulgation of laws relating to carbon pricing, we will have to pay for our GHG emissions.
- Renewable energy – The proportion of renewable energy used by our company affects the amount of carbon offset required.
- Electric vehicles (EV) – The cost required for replacing existing fleets with EVs and the cost-savings brought by EVs.
- Sea level rise – Some of our properties are prone to flooding because of their location and design.
- Extreme weather – The increase in the frequency of extreme weather (e.g. black rainstorm warning signal and typhoon signal 8 or above) may affect our business operations.

Low emissions scenario (1.5-2°C) **2.B5**

- Carbon prices reach US\$63/tonne and US\$140/tonne for advanced economies by 2030 and 2050, respectively.
- Our renewable energy mix will gradually increase.
- EVs dominate the global car and light truck fleet market by 2050. All private cars currently owned by our company are EVs, hence, we assume there will be no significant impact on our company.

High emissions scenario (>4°C) **2.B5**

- No carbon price or tax has been established.
- Higher mean sea level causes more frequent flooding. We have assessed the risk of flooding in relation to our property portfolio.
- Increase in frequency of extreme weather.

Commentaries

2.C1 HyCo stated its choice of the two scenarios and the time horizons of its analyses.

2.C2 HyCo also stated the scope and boundaries of its scenarios.

2.A3 Based on its business nature, HyCo identified parameters that are most relevant to its operations.

2.A4 HyCo listed out the parameters used for the two scenarios and described how each parameter can affect its operations.

2.B5 Assumptions are stated to allow readers to understand the difference between the two scenarios.

Further recommendation

HyCo may explicitly state the outcome of the two time horizons.

Key:

2.A Parameters used

2.B Assumptions made by the company

2.C Analytical choices



Possible enhancements

For a more in-depth climate scenario analysis, a company may:

- Pursue an IPCC's SSP1-1.9 scenario, that is, a scenario developed based on limiting global temperature rise within 1.5°C. Exploring and testing a company's strategies against a broad range of scenarios will help to illustrate a company's financial resilience under a variety of climate-related conditions.
- Beyond assessing the risks and opportunities related to energy transition, companies may consider the physical impacts of climate change and analyse them along its entire value chain.

Further readings:

- [Global Warming of 1.5°C \(IPCC, 2019\)](#)
- [The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities \(TCFD, 2017\)](#)

For illustrative purposes only – key parameters for climate policies

To illustrate how climate policies differ in different cities, the key parameters²⁰ for climate policies in Hong Kong²¹ and Shanghai²², a major city in China, are listed below. In the absence of formally announced governmental policies, we made projections with reference to current policy trends in comparable cities. In areas where there are no publicly announced targets, global targets for developed countries are used as proxies for Hong Kong, and China national targets are used as proxies for Shanghai. For companies operating in other cities, research should be conducted to ascertain the relevant parameters under each scenario. The data presented are extracted from publicly available sources. For certain parameters, there may be more than one data source available. Companies should understand the methodology, assumptions and bias in each data source, in order to select the appropriate data for scenario analysis.

Table 2.6 Transition risks parameters

Parameter	Hong Kong				Shanghai				Unit
	Turquoise		Brown		Turquoise		Brown		
	2030	2050	2030	2050	2030	2050	2030	2050	
Non-nuclear renewable energy mix	61%	88%	3-4%	<10%	>25%	85%	2020: 28%, expected to remain the same as 2020 level		-
Green building percentage	100% of new buildings	>85% of all buildings	New government buildings with construction floor area of >10,000m ² and new public housing to achieve at least BEAM Plus Gold		>70% of new buildings	100% of new buildings	2020: 50%, expected to remain the same as 2020 level		-
Private electric vehicles	20% ²³	100% ²⁴	2020: 12.4% of new private registration are EVs, expected to gradually increase		>50%	>80%	2020: 31% of new private car registration are EVs, expected to gradually increase		-
Carbon price²⁵	63	140	No carbon price		32-43	100-125	12-17	35-70	US\$/t CO ₂
Crude oil price²⁶	57	53	76	85	57	53	76	85	US\$/barrel
Natural gas price	4.4	4.1	7.5	8.3	5.2	4.6	8.3	8.8	US\$/MBtu

20 The parameters presented are as of July 2021. Companies are encouraged to review the latest data available upon conducting the scenario analysis.

21 Assuming that Hong Kong is a region with similar economic development as other developed economies, such as the European Union and Japan, certain figures in the projection refer to projection data for developed economies.

22 Assuming that Shanghai will refer to the national policies as the minimum target.

23 No new registration of fuel-propelled vehicles including hybrid vehicles in 2035 or earlier, hence, we expect the proportion of EVs to be a fifth of the total number of private vehicles in 2030.

24 There is a zero vehicular emissions target by 2050.

25 Assuming that carbon pricing is established in all advanced economies and several developing countries have set a limitation to carbon emissions, especially for high emissions industries.

26 The weighted average import price among IEA member countries, including China. Therefore, the numbers for Hong Kong and Shanghai are the same.

Table 2.7 Physical risks parameters

Parameter	Hong Kong				Shanghai				Unit
	Turquoise		Brown		Turquoise		Brown		
	2030	2050	2030	2050	2030	2050	2030	2050	
Temperature change	+0.9	+1.3	+1.1	+2.0	No data available	+1.2 to +1.8	No data available	+2.5	°C
Annual number of hot nights	42	55	43	71			No data available		Days
Annual number of very hot days	28	34	29	46			No data available		Days
Annual number of extremely warm-and-humid days	18	25	20	44			No data available		Days
Mean sea level with vertical land displacement	+0.2	+0.3	+0.2	+0.4	May use Hong Kong projection as proxy				Metre
Population in areas below projected high tide line²⁷	No data available	0.77	No data available	0.78	No data available	29	No data available	31	Millions
Population in areas below projected annual average coastal flood levels²⁸	No data available	1.1	No data available	1.1	No data available	92	No data available	95	Millions
GHG emissions (absolute)	-26 to -36%	-100% ²⁹	+4%	+34%	peak at 2030	-76%	+38%	+75%	-
Frequency and severity of extreme weather	A sea level of 3.5 mCD ³⁰ that can cause a 1-in-5 year to 1-in-10-year event by 2021-40 regardless of the GHG concentration scenario		Causing 4.29 billion HKD of economic impact from typhoon signal 8+ per typhoon day		May use Hong Kong projection as proxy		Increase in intensity and severity		-

27 Data presented in Shanghai reflects the population affected in the entire China. The population affected will be more prominent by 2100, with 0.84 million and 40 million in Hong Kong and China respectively.

28 Data presented in Shanghai reflects the population affected in the entire China. The population affected will be more prominent by 2100, with 1.2 million and 110 million in Hong Kong and China respectively.

29 As the Hong Kong Government announced the carbon neutral target by 2050, it is expected that 100% of emissions will be reduced or offset.

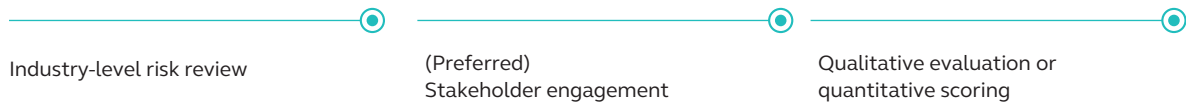
30 CD refers to Chart Datum, which is the level to which tide heights are referenced, and is approximately the level of lowest astronomical tide in the Victoria Harbour. Chart Datum is 0.146 m below the Hong Kong Principal Datum, the level to which land surveys in Hong Kong are referenced.

3. Identify and Prioritise Climate-related Risks

Objectives

In this chapter, we will discuss the steps in identifying climate-related risks, as well as the common approaches to risk prioritisation.

Workflow



Identify climate-related risks

Industry-level risk review

As climate-related risks faced by companies are highly dependent on its industry sector, an industry-level risk review is a common approach used by companies for identifying risks.

The following are common ways of gathering relevant information:

- Reviewing publications of peer companies which may set out risks faced by them
- Engagement with risk owners, risk management and sustainability practitioners
- Industry review
- Media monitoring
- Web scraping
- Internal and external audit

Below are key steps of an industry-level risk review:

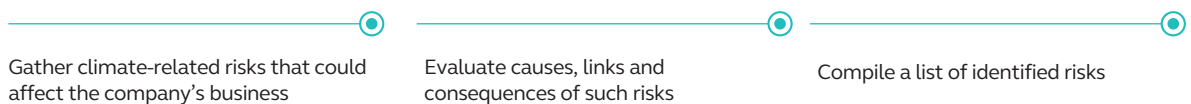


Table 3.1 Common climate-related risks

Policy and Legal Risks	<ul style="list-style-type: none"> • Increased carbon pricing • Enhanced emissions reporting obligations • Mandatory regulation of existing products and services • Exposure to litigation
Market and Technology Risks	<ul style="list-style-type: none"> • Substitution of existing products and services with lower emissions options • Unsuccessful investment in new technologies • Costs of transition to lower emissions technology • Changing customer behaviour • Uncertain market signals • Increased cost of raw materials
Reputation Risks	<ul style="list-style-type: none"> • Shifts in consumer preferences • Stigmatisation of industry sector • Increased stakeholder concern or negative stakeholder feedback
Acute Physical Risks	<ul style="list-style-type: none"> • Increased severity of extreme weather events such as cyclones and floods
Chronic Physical Risks	<ul style="list-style-type: none"> • Changes in precipitation patterns and extreme variability in weather patterns • Rising mean temperatures • Rising sea levels

Do you know?

Climate change impacts on different aspects of our livelihoods. Instead of having an isolated impact on the company, climate change often aggravates existing risks faced by a company by increasing the likelihood or impact of such risks.

Stakeholder engagement

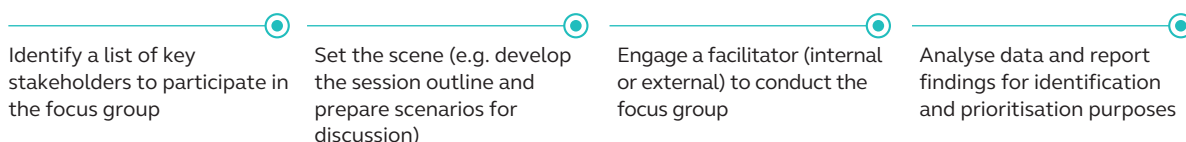
Companies are encouraged to conduct stakeholder engagement as it provides a broader view of how climate-related risks may potentially impact their businesses. Engaging both internal and external stakeholders enables companies to identify climate-related risks that:

- Have a significant impact on stakeholders
- May be overlooked by internal management

Reference materials

Please refer to HKEX’s [How to Prepare an ESG Report](#) for further examples of stakeholder engagement.

Focus group is a common and effective engagement method used to collect direct feedback from stakeholders. It also promotes interactive communication between the company and its stakeholders. Below are the key steps for conducting a focus group:



Prioritise climate-related risks

Risk prioritisation facilitates the efficient allocation of resources to the most pressing risks. This section discusses two common methods used by companies to prioritise risks, namely (A) the qualitative evaluation method and (B) the quantitative scoring method. Companies may adopt such methods they see fit with reference to their corporate practices.

Criteria for prioritisation

Set out below are common criteria useful for both the qualitative evaluation method and the quantitative scoring method.

Likelihood	<p>If an event is more likely to occur, it should be ranked as a higher priority. The possibility that a given event will occur in terms of the following:</p> <ul style="list-style-type: none"> • Frequency of event • Chance of happening
Impact	<p>If an event costs a more severe impact on the company, environment or society, it should be ranked as a higher priority. Examples of impacts include:</p> <ul style="list-style-type: none"> • Financial loss • Reputation damage • Prosecution and fines • Loss of strategic partners
Adaptability	<p>If an event costs more effort and time to adapt to, it should be ranked as a higher priority.</p>
Recovery	<p>If an event costs more effort, resources and time to recover a business, it should be ranked as a higher priority.</p>

Qualitative evaluation

Qualitative evaluation relies on the management’s internal discussions and prioritisation of identified risks. Its effectiveness depends primarily on the management’s climate competence. While external experts may be brought in for advice, the management is expected to have sufficient knowledge on the identified risks and the potential impacts before agreeing on the prioritisation.

Capacity building of the management’s climate competence is crucial to the success of the qualitative evaluation approach, and should be carried out regularly in order to ensure that the management’s knowledge in climate-related issues remains up-to-date. The management should continuously evaluate the merits of criteria adopted for risk prioritisation. Where necessary, management may seek expert support to enhance their climate knowledge. This enables the qualitative evaluation approach to be improved over time.

Capacity building

- Assess management’s capacity in climate-related issues
- Seek expert support, if needed
- Constant evaluation and learn from past experience

Criteria discussion

- Discuss the criteria (i.e. likelihood, impact, adaptability or recovery) used for prioritisation

Prioritisation

- Prioritise climate-related risks based on material issues
- Prioritise climate-related risks based on the selected criteria

Quantitative scoring

The quantitative scoring approach adopts a rating system. Assessment of the severity of risks is based on their impact on the company and likelihood of occurrence.

1. Define scoring scale

Define risk prioritisation criteria with a scoring scale:

- Level of impact
- Likelihood
- Adaptability
- Recovery

Table 3.2 Illustrative example of scoring of level of impact

Score	Financial loss	Reputation damage	Prosecution and fines	Loss of strategic partners
4 – High	Over [•]%	Sustained severe negative publicity or material damage to the company’s reputation from the standpoint of public opinion or with any significant stakeholder	Prosecution/fines more than [•]% of revenue	Threatened or actual loss of [•]%
3 – Medium/High	Between [•]% to [•]%	Short-term negative publicity or damage to reputation to the general public	Prosecution/fines less than [•]% of revenue	Threatened or actual loss of [•]%
2 – Low/Medium	Between [•]% to [•]%	Short-term negative publicity or damage to reputation to a specific audience	Minor fines less than \$ [•]	Threatened or actual loss of [•]%
1 – Low	Less than [•]%	Minor negative publicity or damage to reputation to “non-vital” audience	No prosecution or fines	Minor complaints from strategic customers

Note: Actual factors and definitions could be referenced to the company’s internal risk assessment system.

2. Risk analysis

Conduct analysis to assess the identified risks, methods include:

- Peer review
- Projection data
- Historical data

3. Rating

Rate the impact, likelihood, adaptability, and recovery of the identified risks based on findings of the analysis and the defined rating scale.

4. Prioritisation

Prioritise identified risks based on statistical analysis to form a list of material risks:

Table 3.3 Illustrative example of risk prioritisation

Time horizon	Risk	Level of impact	Likelihood	Adaptability	Recovery
Short to medium-term	Policy change in order to achieve net-zero goals	High	High	Low/Medium	Low
Short to medium-term	Increased investors' concerns	Medium/High	Medium/High	Low	Low/Medium
Short to long-term	Increased severity of extreme weather events	Medium/High	High	Low/Medium	Medium/High
Short to long-term	Shifts in consumer preferences	Low/Medium	Medium/High	Low/Medium	Low

Common bias to avoid

The following common bias should be avoided when identifying and prioritising climate-related risks:

Availability bias	People tend to believe that events are more likely to occur if they have recently heard of them happening, or where events bring great consequences.
Confirmation bias	People tend to seek or interpret data that confirms their established belief, expectations, or hypothesis and to discount information that conflicts with their belief.
Groupthink bias	People tend to make faulty decisions when they are deeply involved in a cohesive group and the strive for unanimity override their motivation to realistically choose among alternatives.
Status quo bias	People tend to display a bias toward the status quo when choosing among alternatives. Climate-related risks are often new and emerging, or unexpected, and therefore, less likely to be identified.

Prepare the disclosure

Disclosures should cover the following key elements in order to illustrate the process and results of the identification and prioritisation of climate-related risks:

Key elements³¹

Process 3.A

- Describe the process of risks identification (such as industry-level risk review) and prioritisation
- Specify choices made during the process

List of material risks 3.B

- Present the material risks relevant to the company

31 Companies should also disclose the impacts and the target residual risk level along with mitigation plan, which will be discussed in later chapters.

Below is HyCo's disclosure on identification and prioritisation of climate-related risks:

Sample disclosure

With the help of external experts, our Sustainability Committee conducted an industry-level risk review. [3.A1](#)

A meeting was then convened to gather management from different departments to further identify climate-related risks. [3.A2](#) The industry-level risk review, result of materiality assessment and selected scenarios were presented during the meeting to gauge further insights from the management with regard to our operations. [3.A3](#)

In order to gain deeper insights from various stakeholder groups, our Sustainability Committee also conducted three focus groups, engaging with stakeholder groups such as employees, investors, suppliers and local NGOs. [3.A4](#) Subsequently, a list of climate-related risks was identified for prioritisation.

Utilising the quantitative scoring method, we prioritised climate-related risks identified. [3.A5](#)

Criteria including likelihood, impact, adaptability and recovery were used to rank the priority of relevant risks. [3.A6](#)

Our Sustainability Committee invited the management and our Risk Committee to conduct the scoring process together. [3.A7](#)

Results of prioritisation were presented to our Risk Committee and our Board for validation. [3.A8](#)

From the aforementioned exercises, we confirmed the following material climate-related risks:

- Policy change in order to achieve net-zero goals;
- Increased investors' concerns;
- Increased severity of extreme weather events; and
- Shifts in consumer preferences. [3.B9](#)

Commentaries

[3.A1](#) HyCo disclosed the process of identification of climate-related risks.

[3.A2](#) HyCo invited management from different business functions to identify risks. This allows them to avoid the groupthink bias and to leverage on different expertise from its management.

[3.A3](#) Materiality assessment³² is also applied to better align with the overall operations.

[3.A4](#) Besides desktop research, HyCo engaged its stakeholders to obtain more in-depth information related to climate change. Stakeholder engagement is preferred as stakeholders may have insights that might have been overlooked by the management.

[3.A5](#) HyCo disclosed the process for climate-related risks prioritisation.

[3.A6](#) HyCo stated the criteria used to prioritise risks. This gives readers a clearer understanding of the methodology for prioritisation of risks.

[3.A7](#) This demonstrated that the Sustainability Committee is collaborating with different business functions to prioritise climate-related risks.

[3.A8](#) This demonstrated that climate-related risks are not just part of the Sustainability Committee's responsibility, but also the Risk Committee's responsibility.

[3.B9](#) HyCo disclosed the list of risks, allowing readers to understand climate-related risks faced by HyCo.

Key:

[3.A](#) Process

[3.B](#) List of material risks

Possible enhancements

- Besides identifying risks, companies can also identify opportunities in each scenario.

Further reading:

- Recommendations of the Task Force on Climate-related Financial Disclosures (TCFD, 2017)

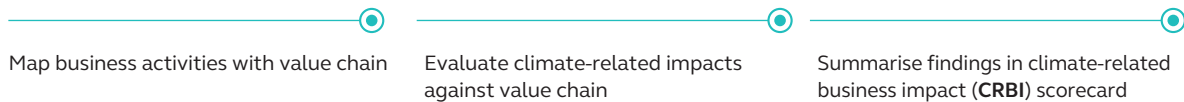
32 Please refer to HKEX's How to prepare an ESG Report for further examples of materiality assessment.

4. Business Mapping with Material Risks

Objectives

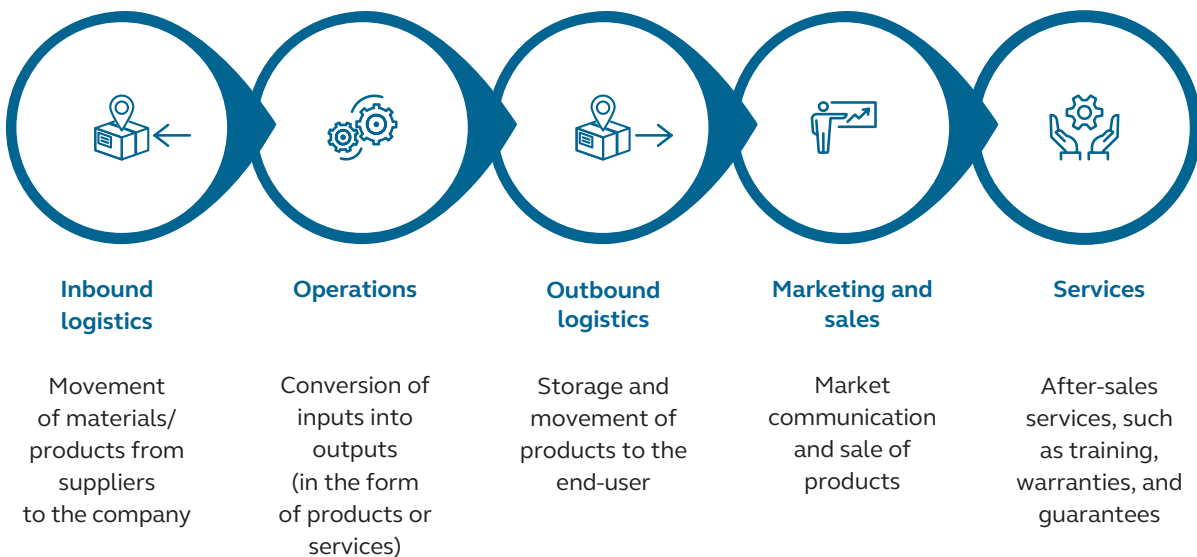
In this chapter, we will discuss how to assess the impacts of material risks on the company's business and their relevance to specific business functions.

Workflow



Map business activities with value chain

A value chain describes the chain of business activities required to create a product or service, and usually includes five major components:



Companies should identify major business activities for each business segment and map them with the value chain components. Different businesses may have different activities in each value chain component. For example, a manufacturing company may have more activities on the inbound logistics, operations and outbound logistics, while companies in the service industry may not have as many inbound and outbound logistics activities.

The table below shows examples of business activities of various industries along the value chain.

Table 4.1 Value chain mapping³³

Industry	Value chain				
	Inbound logistics	Operations	Outbound logistics	Marketing and sales	Services
Manufacturing	<ul style="list-style-type: none"> Procurement and transportation of raw materials 	<ul style="list-style-type: none"> Manufacturing of products, from product design to product manufacturing 	<ul style="list-style-type: none"> Transportation of products from manufacturing facilities to sales points 	<ul style="list-style-type: none"> Sale of products 	<ul style="list-style-type: none"> Maintenance of products
Real estate	<ul style="list-style-type: none"> Procurement and transportation of material/products required for property development/management 	<ul style="list-style-type: none"> Property development, from building design to property construction 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Marketing and sale of properties 	<ul style="list-style-type: none"> Maintenance, retrofitting and refurbishment of buildings
Construction	<ul style="list-style-type: none"> Procurement and transportation of construction raw materials 	<ul style="list-style-type: none"> Construction of buildings or infrastructure 	<ul style="list-style-type: none"> Removal and treatment of construction waste 	<ul style="list-style-type: none"> Delivery of construction project 	<ul style="list-style-type: none"> Maintenance of construction project
Finance	<ul style="list-style-type: none"> Procurement of office equipment and supplies to support operations 	<ul style="list-style-type: none"> Delivery of financial products and services 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Marketing and sale of financial products and services 	<ul style="list-style-type: none"> After-sales services

³³ The significance of different components along the value chain depends on the actual business model of a company. The examples shown are for illustrative purpose only.

Evaluate climate-related impacts

After the mapping, companies should evaluate the impacts of identified climate-related risks on each component of their value chain. One method to do so is through considering a combination of qualitative and quantitative information known as the six capitals under the Integrated Reporting Framework, namely the financial, manufactured, intellectual, human, social and relationship and natural capitals.

Table 4.2 sets out guiding questions for assessing the impact and dependency of climate-related risks on value chain components using the six capitals, where:

- **[Climate risk X]** denotes climate-related risks identified and prioritised in [Chapter 3](#)
- **[Value chain Y]** denotes different value chain components

Table 4.2 Evaluation of climate-related risks using the six capitals – guiding questions

	(A) Impact question How, with respect to a specific business activity, does a particular risk result in changes in capital? How do these changes impact different stakeholders?	(B) Dependency question How does a particular business activity depend on specific features of the capital in order to create and sustain value?
1. Financial capital Funds available for the manufacturing of products or the provision of services, which can be obtained through financing, or generated through operations or investments.	<ul style="list-style-type: none"> • Will [climate risk X] affect the funding needs for [value chain Y]? 	<ul style="list-style-type: none"> • Will [climate risk X] affect the company's capacity to raise funds for [value chain Y]?
2. Manufactured capital Manufactured physical objects available for the manufacturing of products/ services, including buildings, equipment and infrastructure.	<ul style="list-style-type: none"> • Will [climate risk X] affect the production process for [value chain Y]? 	<ul style="list-style-type: none"> • Will [climate risk X] affect the company's capacity to deliver the products/services necessary for [value chain Y]?
3. Intellectual capital Organisational, knowledge-based intangibles, including intellectual property (e.g. patents and copyrights) and organisational capital (e.g. tacit knowledge, systems, procedures and protocols).	<ul style="list-style-type: none"> • Will [climate risk X] affect the company's operations due to its technological capacity for [value chain Y]? 	<ul style="list-style-type: none"> • Will [climate risk X] affect the company's tacit procedures in delivering products/services for [value chain Y]?
4. Human capital Employees' competencies, capabilities and experience, and their motivations to innovate.	<ul style="list-style-type: none"> • Will [climate risk X] affect the work efficiency of the company's talents for [value chain Y]? 	<ul style="list-style-type: none"> • Will [climate risk X] affect the company's talent composition or capacity to deliver products/ services for [value chain Y]?
5. Social and relationship capital Institutions and the relationships within and between communities, groups of stakeholders and other networks, and the ability to share information to enhance individual and collective well-being.	<ul style="list-style-type: none"> • Will [climate risk X] affect the company's ability to deliver quality products/services to customers for [value chain Y]? 	<ul style="list-style-type: none"> • Will [climate risk X] affect the company's relationship with its customers for [value chain Y] (e.g. reputation damage)?
6. Natural capital All renewable and non-renewable environmental resources and processes relevant to the provision of products/ services that support the prosperity of a company.	<ul style="list-style-type: none"> • Will [climate risk X] affect the environment at the location of the company's business for [value chain Y]? 	<ul style="list-style-type: none"> • Will the change in environment by [climate risk X] affect the company's ability to deliver products/services for [value chain Y]?

The same guiding questions should be asked in respect of each prioritised climate-related risk (identified in Chapter 3) against each value chain component, and results could be summarised in the scorecard set out in Table 4.3:

Table 4.3 Evaluation of climate-related risks by the six capitals methodology – scorecard

Climate risk X (e.g. extreme weather events)				
	Evaluation criteria: six capitals	(A) Impact score (0 = nil, 1 = minor, 2 = major)	(B) Dependency score (0 = nil, 1 = minor, 2 = major)	Sub-total score against each capital (A + B)
Value chain Y: (e.g. Inbound logistics)	1. Financial			
	2. Manufactured			
	3. Intellectual			
	4. Human			
	5. Social and relationship			
	6. Natural			
Total score for climate risk X against value chain Y				

Companies wishing to conduct a more detailed analysis may further breakdown their value chain components by countries, sites or facilities in the evaluation process.

After completing the evaluation process, companies can summarise the scores using the CRBI scorecard (Table 4.4).

Table 4.4 CRBI scorecard

	Climate risk 1 (e.g. extreme weather events)	Climate risk 2	Climate risk 3	Climate risk 4	Climate risk 5
Inbound logistics					
Operations					
Outbound logistics					
Marketing and sales					
Services					



Identify CRBI hotspots

CRBIs with the highest scores, hereinafter referred to as the CRBI hotspots, represent areas where impacts of climate-related risks are the most severe. CRBI hotspots should be given priority in the company's selection and determination of metrics, indicators, targets and action plans in later chapters.

Prepare the disclosure

Disclosures should cover the following key elements to illustrate the material impacts on relevant businesses:

Key elements

Impact assessment process 4.A

The process of impact assessment, including:

- Methods of mapping relevant business activities to material risks
- Major business activities that are assessed
- Impact assessment methods

Impacts on the company's business 4.B

The impacts of material risks on relevant business sectors, including:

- Value chain component(s) that is(are) affected
- Description of impacts or dependencies on different capitals
- Description of value loss
- Risk level
- Time horizon (short/medium/long-term)

Below is HyCo’s disclosure of material impacts on relevant business:

Sample disclosure

We have identified the value chain for all our business functions and mapped it with the prioritised risks through the scoring of impacts and dependencies against six capitals, namely the financial, manufactured, intellectual, human, social and relationship and natural capitals. [4.A1](#)

Below are risks relating to the location of one of our functions: [4.A2](#)

Risk	Sea level rise
Time horizon	Medium to long-term
Component of value chain	Manufacturing operations in Guangzhou
Risk level	High
Trend 4.B3	Increase

Impacts or dependencies [4.B4](#)

Sea level rise may lead to more frequent flooding, which may impact our factories located in Guangzhou, disrupting their operations. Facilities and equipment may be damaged. Additionally, cost of capital may increase due to the higher risk in its operations. [4.B5](#)

Value loss

Factories may have to be redesigned or relocated to minimise damage caused by flooding in order to secure future insurance cover or reduce cost of borrowing. [4.B6](#)

Commentaries

[4.A1](#) HyCo stated its process of impact assessment.

[4.A2](#) HyCo disclosed risk areas with a high risk level. Companies may disclose risk areas with a lower risk level if those are their priority.

[4.B3](#) Indicating the trend of the risk is a good practice since this informs the readers of the expected risk level over time.

[4.B4](#) HyCo mentioned impacts that are most relevant to their operations.

[4.B5](#) Since financial and manufactured capitals are most relevant to HyCo's operations in Guangzhou, the impacts of sea level rise on such capitals were disclosed.

[4.B6](#) HyCo also stated the value loss of the two most relevant capitals as a result of sea level rise.

Key:

[4.A](#) Impact assessment process

[4.B](#) Impacts on the company’s business

Possible enhancements

- For a more detailed analysis on value chain, secondary functions of a value chain (such as technology development, human resources management, infrastructure and procurement) may also be considered.
- Other than evaluation of impacts using the six capitals, companies may also use other approaches such as SWOT analysis.

Further readings:

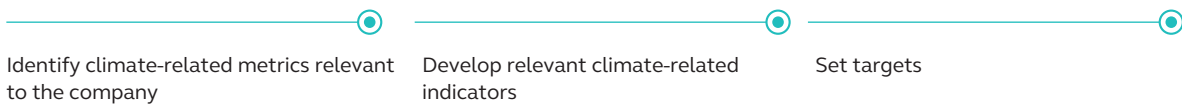
- [The Competitive Advantage: Creating and Sustaining Superior Performance](#). (M.E. Porter, 1985, republished with a new introduction in 1998)
- [sSWOT: A Sustainability SWOT](#) (World Resources Institute, 2012)

5. Choose Metrics, Indicators and Targets

Objectives

This chapter assists companies in identifying different types of metrics and indicators, as well as setting corresponding targets. Metrics, indicators and targets allow companies to measure and monitor their climate-related risks. They facilitate stakeholders', including investors', assessment of the company's potential risk-adjusted returns, ability to meet financial obligations, general exposure to climate-related issues, and progress in managing or adapting to those issues.

Workflow



Identify climate-related metrics & indicators

To measure the level and impact of the company's climate-related risks, metrics and specific indicators should be developed for each of the CRBI hotspot identified in [Chapter 4](#).

Climate-related metrics³⁴ are quantities measured to assess climate-related risks in a company.

Climate-related indicators are specific constructs of metrics designed to reflect the level of business impact of particular climate-related risks. Through monitoring these indicators, the management could assess the effectiveness of actions adopted by the company, thereby facilitating the oversight and management of its climate actions.

Example:

Metrics	Indicators
The size of asset that is affected by climate-related issues	<ul style="list-style-type: none">✓ Size of asset affected in terms of floor area<ul style="list-style-type: none">• Measuring the floor area that represents the coverage of relevant climate-related issues✓ Size of asset affected in terms of revenue<ul style="list-style-type: none">• Measuring the revenue that represents the monetary value affected by climate-related issues✗ Size of asset affected in terms of mass<ul style="list-style-type: none">• Measuring the mass is not a common measurement of asset size, therefore, it is not a representative indicator

34 The definition of climate-related metrics from TCFD is broken down into climate-related metrics and climate-related indicators in this Guide to facilitate a more in-depth analysis.

Develop relevant climate-related indicators

Companies should consider the following principles when developing climate-related indicators: ³⁵

Decision-useful	Whether it facilitates the understanding of potential impacts (e.g. financial impacts and the operational consequences) of climate-related risks over a specified time period
Understandable	Whether it can be presented in a manner that is clear and easily comprehensible, with all limitations and cautions explicitly stated
Verifiable	Whether it supports effective internal controls for data verification and assurance
Objective	Whether it is unbiased and not influenced by value judgement, enabling an objective disclosure of the overall performance
Comparable	Whether it can be calculated and disclosed consistently from year to year to facilitate trend analysis (company's performance over time), and comparative analysis (analysis relative to other companies) for progress-tracking and performance evaluation purposes

Absolute or intensity indicators

Indicators are often categorised into two major types, namely absolute or intensity indicators:

	Absolute indicators	Intensity indicators
Definition	Indicators measured by a set amount. For example, conducting resilience assessment for all assets	Normalised indicators set in relative to a denominator, such as the number of employees, revenue, gross floor area. For example, GHG emissions per revenue
Remarks	A simple and straightforward approach to measure performance that applies to most sectors and metrics	Converting an absolute indicator into intensity terms could better illustrate the relationship between the indicator and the company's profile. A different denominator may be chosen depending on the sector of the company

Do you know?

Given the importance of comparability over time horizons (historical, current and forward-looking) to track a company's performance, it is crucial that the same climate-related indicators are used across all periods. Companies are encouraged to devote adequate time and resources for the selection of appropriate indicators at the outset in order to minimise future alterations.

³⁵ With reference to [Guidance on Metrics, Targets and Transition Plans](#) (TCFD, October 2021)

Examples of climate-related metrics & indicators

Set out below are recommended climate-related metrics applicable to all industries. Companies may use these metrics to construct indicators that can best reflect their business conditions. For illustrative purposes only, customised indicators are included for the following industries: manufacturing, real estate, construction, and finance.

1) Metric: GHG emissions^{36, 37}

Importance: GHG emissions are crucial for any discussion of cross-industry, climate-related metrics. They form a base component for estimating many other climate-related metrics.

Examples: All industries should disclose Scope 1 and 2 emissions. While the disclosure of Scope 3 emissions is subject to materiality,³⁸ companies are encouraged to expand the disclosure of Scope 3 emissions over time. The examples below explain relevant Scope 3 emissions from different industries and the common indicators used.

Industry	Major Scope 3 GHG emissions	Indicator
Manufacturing	Upstream emissions from raw materials, as well as upstream and downstream logistics	GHG emissions per unit of product
Real estate	Downstream emissions from tenants	GHG emissions per gross floor area of rented space
Construction	Upstream emissions from raw materials and logistics	GHG emissions per tonne of cement used on site
Finance	Financed emissions	GHG emission per M\$ loan portfolio

2) Metric: Carbon price

Importance: Carbon prices are essential for analysing and assessing the economic impacts of carbon-related risks, and allow investors to assess the reasonableness of key assumptions adopted for the company's risk assessment.

Examples:

Industry	Indicator
Manufacturing	Carbon cost due to assumed carbon tax on GHG emissions
Real estate	Carbon credit cost due to offsetting GHG emissions
Construction	Carbon cost generated from projected carbon prices such as carbon tax
Finance	Carbon price range per tonne of carbon dioxide (CO ₂) to evaluate the resilience of potential investment

³⁶ Including Scope 1, Scope 2, and relevant material categories of Scope 3 emissions (indirect emissions that occur in the value chain of the company, including both upstream and downstream emissions). Further information could be found on [GHG Protocol website](#).

³⁷ GHG emissions should be calculated in line with the GHG Protocol methodology to allow for aggregation and comparability across companies and jurisdictions. As appropriate, companies should consider providing related, generally accepted indicators of GHG emissions intensity.

³⁸ See, [Guidance on Metrics, Targets and Transition Plans](#) (TCFD, October 2021).

3) Metric: Proportion of assets and/or business activities materially exposed to physical and transition risks

Importance: Disclosure of the proportion of assets and/or business activities exposed to material climate-related physical and transition risks enables better understanding, tracking, and estimation of the company’s potential financial exposure.

Examples:

Industry	Physical risk indicator	Transition risk indicator
Manufacturing	Proportion of factories and equipment materially exposed to flooding	Proportion of manufactured products materially exposed to changes in customers’ demand for sustainable materials
Real estate	Proportion of operating activities materially exposed to super typhoon	Proportion of new developments that are subject to tightened standards on carbon emissions
Construction	Proportion of operating activities materially exposed to extremely hot weather	Proportion of construction materials that are subject to cross-border carbon tax
Finance	Proportion of investing and financing activities materially exposed to extreme weather events	Proportion of investment funds that are subject to tightened ESG standards

4) Metric: Amount of expenditure or capital investment deployed toward climate-related risks and opportunities

Importance: Expenditure and capital investment metrics on new technologies, infrastructure, as well as climate-related physical and transition risks management, indicate the extent to which the company’s future earning capacity might be affected.

Examples:

Industry	Indicator
Manufacturing	Capital investment in renewable energy
Real estate	Expenditure on green building investment
Construction	Expenditure on sustainable materials or capital investment in the development of energy efficiency technology
Finance	Capital investment of portfolio of projects focused primarily on physical climate risks mitigation

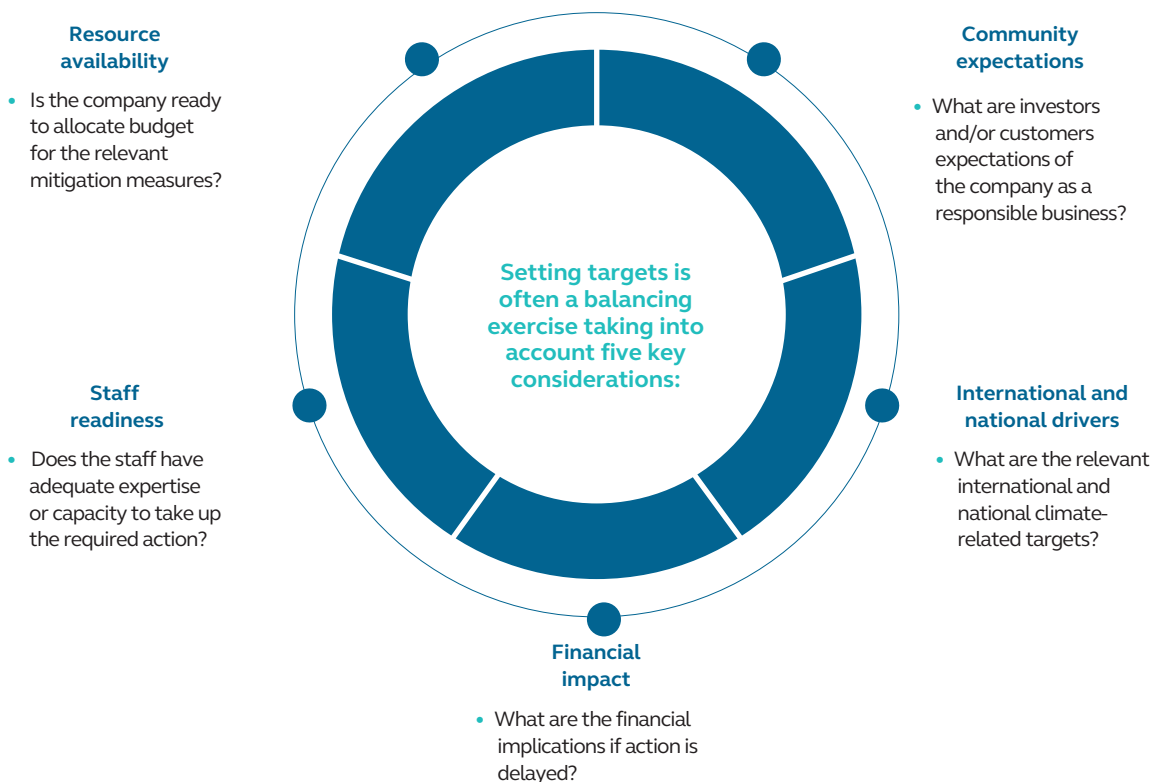
Reference materials

In addition to the above metrics and indicators, companies may choose to report on specific climate-related metrics and indicators, such as sea level, land use, temperature change based on their business nature and location. Further examples could be found in the TCFD’s [Guidance on Metrics, Targets, and Transition Plans](#).

Set targets

Climate-related targets are indicators of a defined level, threshold, or quantity that a company wishes to meet over a defined time horizon with a view to achieve its overall climate-related ambition and strategy.

Targets should be set for climate-related indicators identified in the previous section to reflect the progress of mitigation or adaptive activities (to be discussed in [Chapter 6](#)) in response to CRBI hotspots (identified in [Chapter 4](#)). Targets are useful to monitor risk management initiatives and evaluate the effectiveness of climate change policies, management systems and mitigation measures.



To achieve the optimum balance, companies may find it useful to conduct regular engagement exercises with internal and external stakeholders. Targets are expected to remain consistent over time to ensure their credibility. Once targets are set, no material adjustments should be made unless there are significant changes to the environment in which the company operates in.

Further to the carbon neutrality target to be achieved by 2050, the Hong Kong Government announced Hong Kong's [Climate Action Plan 2050](#)³⁹ in October 2021. Companies wishing to make a net-zero⁴⁰ commitment are encouraged to set near-term and long-term targets for carbon management.

39 Hong Kong's Climate Action Plan 2050 sets out the vision of "Zero-carbon Emissions – Liveable City – Sustainable Development" and outlines the strategies and targets for combating climate change and achieving carbon neutrality. See the [Climate Ready website](#) and paragraphs 96 to 98 in the [Chief Executive's 2021 Policy Address](#) of the HKSAR Government.

40 The IPCC defines net-zero as that point when "anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period."

Do you know?

Companies are reminded to put in place adequate controls or processes to ensure data quality. Internal audit and/or external assurance is/are also recommended for a more accurate assessment of progress made against targets set.

Targets should be defined clearly with a specified:

- **Baseline** - a consistent base year across targets against which progress will be tracked
- **Time horizon** - a consistent time horizon across targets which are intended to be achieved

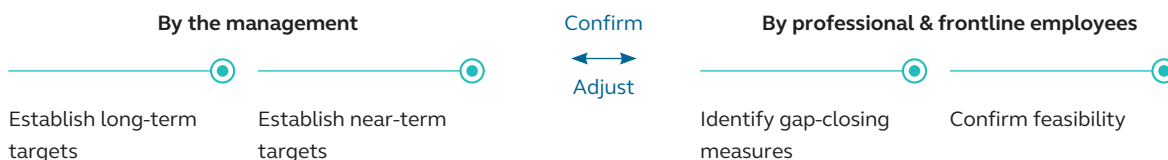
Companies should note that a robust and reliable data collection system for identified indicators is crucial for determining the baseline for targets.

Reference materials

Please also refer to HKEX’s [How to Prepare an ESG report](#) for the discussion using the “S.M.A.R.T.” approach to target setting.

Steps for confirming targets

Near-term targets are useful for effective progress monitoring of long-term targets.⁴¹ In order to ensure that targets set are achievable, they should be confirmed by management and working level employees. For more information regarding the adjustment to near-term targets and identification of gap-closing measures, please refer to [Chapter 6](#).



Both long-term and near-term targets should be reviewed periodically and adjusted where appropriate, while reviews of the latter should be conducted more frequently due to its short-term nature.

41 Where long-term targets are relatively long (e.g. 10 years or so), near-term targets (e.g. within 5 years or so) should be set.

Prepare the disclosure

Disclosures should cover the following key elements in order to present the indicators and targets for material climate-related risks management:

Key elements

Climate-related indicators 5.A

- Types of measurement used
- Methodologies
- Reasons on the changes in indicators (if any)

Targets 5.B

- Scope
- Baseline
- Time horizon
- Absolute or intensity targets
- Near-term and long-term targets
- Actions taken to achieve the targets⁴²

Do you know?

Time horizons and consistency are crucial for disclosures. Companies should strive to use the same climate-related indicators across reporting periods. In the event of changes in indicators, companies should disclose the underlying reasons to ensure transparency and continuity in measuring impacts.

For more comprehensive climate-related risks management, companies may use more than one indicator to track a certain metric. Metrics may be disclosed alongside with indicators to provide a clearer picture of the relevant area.

42 The formulation of action plans will be discussed in [Chapter 6](#).

Below is HyCo’s disclosure on indicators and targets:

Sample disclosure

We set out the below examples of indicators and targets in relation to our manufacturing business in Guangzhou. [5.B1](#)

Indicator 5.A2	Target type	2020 baseline (historical) 5.B3	2021 (current)	2030 (Forward-looking target)
GHG emissions (Scope 1,2 and 3) per unit of product	Intensity	[•] tonnes of CO ₂ -e per unit of product	10% reduction for Scope 1 and 2 emissions per unit of product	To achieve net-zero emissions by 2050, interim target is set with a 50% reduction of Scope 1 and 2 emissions per unit of product and 30% of Scope 3 emissions per unit of product relative to the 2020 baseline
Proportion of factories and equipment materially exposed to flooding	Absolute	90%	85%	Ensure at least 50% of flood-exposed assets according to the 2060 projection of 100-year floodplain have risk mitigation in place
Capital investment in renewable energy	Absolute	0%	10%	Invest at least 25% of annual capital expenditure in renewable energy

Key:

[5.A](#) Climate-related indicators

[5.B](#) Targets

Commentaries

[5.B1](#) HyCo stated the scope of the indicators and targets, i.e. manufacturing business in Guangzhou.

[5.A2](#) HyCo disclosed indicators annually in order to provide comparison over time.

[5.B3](#) HyCo used 2020 as the baseline for all its indicators and targets, enabling the company to track its performance over time.

Do you know?

Methodologies used when developing an indicator should be stated to facilitate readers’ understanding of information represented by the indicator.



Possible enhancements

- Set metrics, indicators and targets for the company's supply chain
- Set science-based targets in accordance with the Paris Agreement

Further readings:

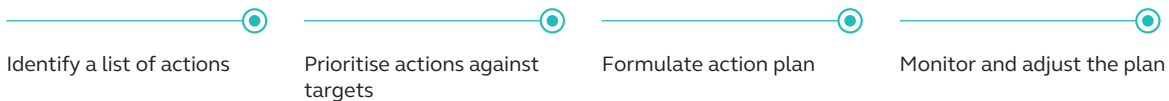
- [Recommendations of the Task Force on Climate-related Financial Disclosures \(TCFD, 2017\)](#)
- [Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures \(TCFD, 2017\)](#)
- [Guidance on Metrics, Targets, and Transition Plans \(TCFD, October 2021\)](#)
- [Science-based Targets initiative](#)

6. Formulate Climate Action Plan

Objectives

In previous chapters, targets were set against indicators for CRBI hotspots. In this chapter, we will discuss the principles in formulating a climate action plan to help companies achieve their targets and increase efficiency and accountability within the company.

Workflow



Guiding principles of a climate action plan

A climate action plan refers to detailed steps to be taken by a company to achieve targets and to build climate resilience through mitigation and adaption measures. The following guiding principles should be considered when developing a climate action plan:

Inclusive	Involve both internal and external stakeholders
Fair	Seek solutions that equitably address the risks of climate change and distribute the costs and benefits of actions
Relevant	Be relevant to corporate strategy and support corporate priorities
Actionable	Propose cost-effective actions that can be realistically implemented, taking into account the company's finances and capabilities
Evidence-based	Reflect scientific knowledge and local understanding, and use empirical inputs (such as emissions figures) to inform decision-making

Identify a list of actions

Companies have identified indicators and set targets against CRBI hotspots (discussed in [Chapter 5](#)). For each target, companies may identify available actions through expert review, peer analysis or internal stakeholder engagement exercises.

In particular, the participation of professional and frontline employees is important as they can often provide insights on improvement opportunities and practical constraints, which help to ascertain the feasibility of available actions. This is an iterative process where plans may be adjusted according to feedback received in order to ensure the effectiveness of the climate action plan.



Below is a list of actions developed by HyCo to achieve its targets for illustrative purposes only.

Table 6.1 Example of a list of actions

Target 1	
Reduce 60% of GHG emissions (Scope 1 and 2) per dollar of revenue by 2030	
Action list	
1.	Install renewable energy systems to reduce purchased electricity usage which in turn reduces Scope 2 GHG emissions
2.	Adopt green building design to reduce emissions throughout the building's life cycle
3.	Improve efficiency of properties by replacement of inefficient equipment, thereby reducing the consumption of fuel/ electricity
Target 2	
100% of buildings owned or to be developed by the company are free from flooding risks by 2030	
Action list	
1.	Adopt flood-resilient design for buildings to be developed by the company located in areas with high risks of flooding
2.	Conduct flooding risk assessment for buildings owned or to be developed by the company
3.	Partner with local governments and communities to ensure adequate local drainage systems and coastal defenses to reduce the risk of flooding

Prioritise actions against targets

Actions on the list should be prioritised across the targets. While a company may develop its own criteria based on its needs, the following are factors that could be considered in the process:

Criteria	Example of guiding questions
Financial feasibility	Has full or partial funding been secured for this action? Alternatively, has potential source of funding been identified?
Technological feasibility	Is the technology required to implement this action readily available on the market?
Internal capacity	Is there sufficient manpower and/or expertise to implement and support the action?
Impact	Could this action result in substantial negative impacts on the environment or communities?

Companies should note that the same prioritisation criteria should be applied for all actions, and actions that are most feasible should be prioritised.

Formulate climate action plan

The next step is to solidify each prioritised action with specific implementation details, which may include the following key elements:

Timeline	Referring to the start date and end date of the action. Actions with a shorter timespan have a greater flexibility in timeline, while actions with a longer timespan should be planned early in order to allow sufficient time to reflect its impact
Responsible body	The department/business unit that is responsible for the implementation of the action
Status	Status of the action (i.e. in progress, completed)
Estimated costs	Estimated costs required for the implementation of the action
Estimated impacts	Can be in terms of energy saving, carbon reduction or lowering of risk level

Table 6.2 Example of an action plan⁴³

	Target	Action	Timeline	Responsible body	Status	Estimated cost	Estimated impact
1	Reduce 60% of GHG emissions (Scope 1 and 2) reduction per dollar of revenue by 2030	Install renewable energy systems to reduce purchased electricity usage	Q2 – Q4 2022	Operation team	Planning	\$34M	1.8M tonnes of CO ₂ reduced by 2023
2	100% of buildings owned or to be developed by the company free from flooding risks by 2030	Conduct flooding risk assessment for buildings owned or to be developed by the company	Q1 – Q3 2022	Property management team	Planning	\$1.2M	Identify buildings with low resilience for enhancement work
3	No injuries due to extremely hot weather	Purchase of cooling vests for construction workers	Q4 2021	Construction team	Ongoing	\$750K	Improved working environment for workers

⁴³ For illustrative purpose only. The estimated cost and impacts do not necessary reflect the actual cost or impact of the actions.

Monitor and adjust the plan

Following the development of a climate action plan by the management, it will be the responsibility of all operational departments to implement it. In order to achieve targets, constant review and monitoring of the plan is essential. Progress of specific actions should be evaluated against the corresponding climate-related indicators and targets.

It is also important to ensure that the plan reflects the most up-to-date conditions of the company, changes in internal and external policies, and updates in technology developments, all of which may affect action planning.

Responsible departments/business units should report to the management periodically. This facilitates the management's assessment of the effectiveness of the plan, allowing it to make adjustments where necessary.

Prepare the disclosure

Disclosures should cover the following key elements in order to present the climate action plan:

Key elements

Overall climate action plan 6.A

- Major action aspects
- Response to material climate-related risks/targets
- Implementation progress
- Monitoring process

Key actions in climate action plan 6.B

- Actions that have major contribution to the targets
- Performance/expected results of key actions



Below is HyCo’s disclosure on its climate action plan:

Sample disclosure

Below is an extract of our climate action plan: [6.A1](#)

Target	Action 6.B2	Status		
		2020	2021	2022
Reduce 60% of GHG emissions (Scope 1 and 2) reduction per dollar of revenue by 2030	Install renewable energy systems to reduce purchased electricity usage which in turn reduces Scope 2 GHG emissions	✓		
		Completed With the installation of solar panels at our assets, it is estimated 1.8M tonnes of CO ₂ will be reduced by 2023		
	Adopt green building design to reduce emissions throughout the life cycle of a building	✓	●	●
		Ongoing 60% of new building projects are green buildings as of 2020		
	Improve efficiency of properties by replacement of inefficient equipment, thereby reducing the consumption of fuel/electricity	✓	●	
		Ongoing 50% of buildings conducted efficiency assessment as of 2020		
100% of buildings owned or to be developed are free from flooding risks by 2030	Adopt flood-resilient design for buildings to be developed in areas with high risks of flooding	✓	●	●
		Ongoing 60% of new building projects are flood-resilient as of 2020		
	Conduct flooding risk assessment for buildings owned or to be developed	✓	●	
		Ongoing 30% of buildings conducted efficiency assessment as of 2020		
	Partner with local governments and communities to ensure adequate local drainage systems and coastal defenses to reduce the risk of flooding			●
		Planning Conversation with local governments and communities initiated		
No injuries due to extremely hot weather	Purchase cooling vests for construction workers	✓		
		Completed 100% of construction workers are distributed with cooling vests		
	Conduct relevant training with construction workers and project managers	✓		
		Completed 100% of construction workers and project managers are trained		

Key:

[6.A](#) Overall climate action plan

[6.B](#) Key actions in climate action plan

Commentaries

- 6.A1** HyCo has categorised its action plan into different aspects, identified the relevant risks that the actions correspond to, and stated the progress of each action.
- 6.B2** HyCo described the actions taken or to be taken in respect of particular targets as well as the actual/expected results of such actions.

Further recommendation

HyCo may also describe the monitoring process of the climate action plan.

Possible enhancement

- Companies may refer to the below guidance to formulate adaptation plans to mitigate the impact of climate-related risks on their products/services, as well as employees, customers and suppliers etc.

Further readings:

- [Business and Climate Change Adaption: Toward Resilient Companies and Communities](#) (United Nations Environment Programme, 2012)
- [Small and Medium Enterprise Sector Adaptation Plan](#) (Queensland Government, 2019)

7. Financial Impact Assessment



Objectives

In this chapter, we will discuss the linkage between a company's climate-related indicators and its financial performance and position, as well as the translation of indicators into financial impacts.

Workflow

Identify linkage between indicators and financial items

Assess the impacts on each financial item

Identify linkage between CRBI hotspots and financial items

After assessing the company's CRBI hotspots and determined the corresponding climate action plan, the company may then consider the impacts of such hotspots on its financial performance⁴⁴ and financial position.⁴⁵ Since climate-related issues may affect several important aspects of a company over a prolonged period of time, all historical, current and potential financial impacts of these climate-related issues should be considered. It should note that while climate-related issues affect a company's broad financial pathways in long-term, strategies that align with the long-term financial pathways could provide progressively more concrete estimates of financial implications in near-term.

Do you know?

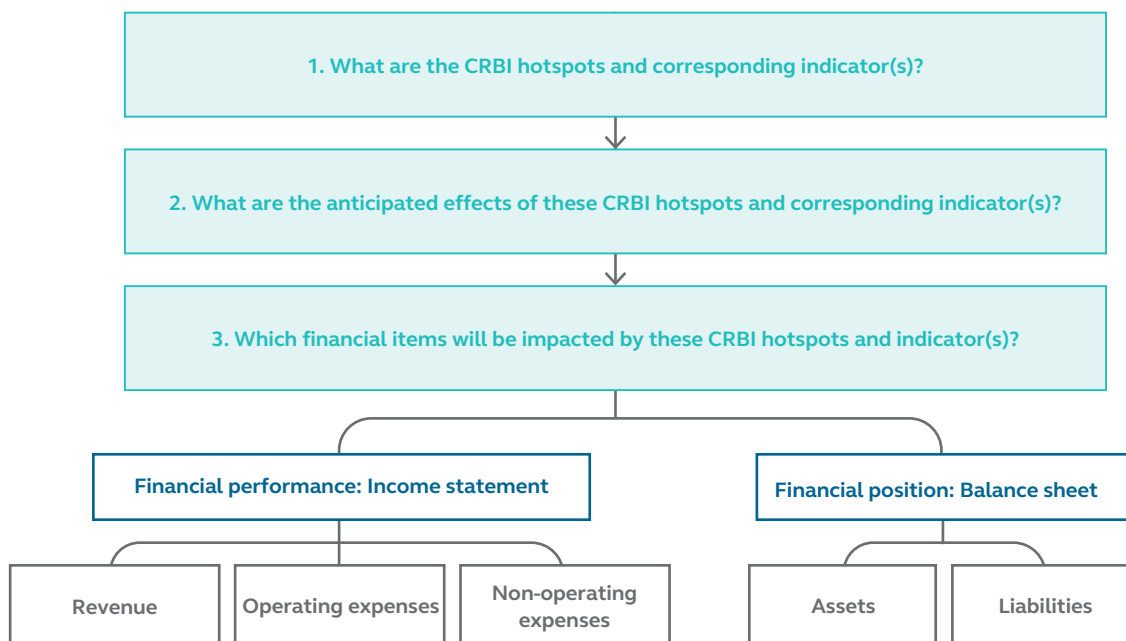
Climate-related financial impacts refer to the impacts of climate-related risks and opportunities on a company's financial performance or financial position across different time horizons (historical, current and forward-looking).

44 Financial performance refers to a company's income and expenses as reflected on its income and cashflow statements (actual) or potential income and expenses. In this Guide, we use income statement as examples to show the relationship of CRBI hotspots and a company's financial performance.

45 Financial position refers to a company's assets, liabilities, and equity (capital and financing) as reflected on its balance sheet (actual) or potential assets, liabilities, and equity (capital and financing). In this Guide, we use assets and liabilities as examples to show the relationship of CRBI hotspots and a company's financial position.

Below are (1) a flowchart setting out the process of linking CRBI hotspots with financial items, and (2) an example of the process for illustrative purposes only:

(1) Flowchart:



(2) Illustrative example:

1. **CRBI hotspot:** Policy change to achieve net-zero goals
Corresponding indicator: GHG emissions (Scope 1, 2 and 3)⁴⁶

2. **Anticipated effects:**
 - Local government may implement climate regulations to limit GHG emissions in order to achieve country-wide net-zero goals (e.g. more robust standards for polluting activities, higher fines for non-compliance), affecting the cost of operations

3. **Balance sheet: Liabilities**
 - May need to make provision for potential fines in case of non-compliance with new climate regulations

A mapping table connecting climate-related indicators with financial items can be developed based on the above guidance. It is important to note that even within the same industry, the analysis for different companies may be different. Table 7.1 sets out some common examples⁴⁷ for illustrative purposes only.

⁴⁶ “GHG emissions” by itself is a metric rather than an indicator as explained in Chapter 5. Depending on the company’s industry or specific circumstances, the indicator(s) will be different. For details, please refer to the section headed “Examples of climate-related metrics & indicators” in Chapter 5.

⁴⁷ Examples listed are not exhaustive.

Table 7.1 Linking climate-related indicators to income statement financial items⁴⁸

Indicator	Revenue ⁴⁹	Operating expenses ⁵⁰	Non-operating expenses ⁵¹
GHG emissions		<p>Increased compliance cost due to stricter climate-related regulations imposed by the government</p> <p>(Possible relevant industries: energy, consumer discretionary, healthcare, information technology)</p>	<p>Increased financing costs/costs of capital as credit is indexed to GHG emissions</p> <p>(Possible relevant industries: energy, industrials, consumer discretionary, utilities, properties & construction)</p>
Assets exposed to climate-related risks	<p>Market share loss from revenue instability stemming from material/increased frequency of business interruption</p> <p>(Possible relevant industries: energy, consumer discretionary, consumer staples, telecommunications, utilities, properties & construction)</p>	<p>Increased premiums of insurance contracts due to more frequent extreme weather events</p> <p>Increased cost of replacement as extreme weather events may accelerate wear and tear and reduce the useful lives of equipment</p> <p>Increased depreciation from changes to the carrying values of asset due to change in cash flows</p> <p>Increased exposure of assets that undergo permanent and non-recurring reductions in the value of an asset</p> <p>(Possible relevant industries: energy, consumer discretionary, industrials, healthcare, telecommunications, utilities, properties & construction)</p>	<p>Increased financing costs as credit is indexed to climate-related risks</p> <p>(Possible relevant industries: energy, industrials, consumer discretionary, utilities, properties & construction)</p>

48 Industries in the table follow the classification under the Hang Seng Industry Classification System, except that “Conglomerates” is not included since companies from this industry may be engaged in businesses classified as other industries.

49 Revenue is the total income generated by the gross sales of goods and services, affected by market share, new markets, and stability.

50 Operating expenses are general (non-accounting) categories inclusive of the costs of goods sold (COGS), Selling, General & Administrative (SGA) costs, depreciation, as well as non-income tax.

51 Non-operating expenses include interest expenses, the cost of capital and special expenses (e.g. disposition).

Indicator	Revenue	Operating expenses	Non-operating expenses
Climate-related capital expenditure (CapEx)		<p>Increased expenditure due to changes in business models, activities or operations (e.g. increase R&D for the shift to an climate-friendly products, invest in more efficient equipment)</p> <p>Relevant CapEx expensed as depreciation over the expected useful life of the assets</p> <p>(Possible relevant industries: energy, materials, industrials, consumer discretionary, utilities, properties & construction)</p>	<p>Increased interest expense on debt instruments used to finance CapEx</p> <p>(Possible relevant industries: energy, consumer discretionary, utilities, properties & construction)</p>
Financed emissions	<p>Decreased market share due to shifting of investor preferences to sustainable finance products</p> <p>Increased revenue volatility as high weighted average carbon intensity may result in high exposure to transition climate risk</p> <p>(Possible relevant industries: financials)</p>	<p>Increased compliance cost due to stricter climate-related regulations imposed by the government</p> <p>(Possible relevant industries: financials)</p>	<p>Increased financing costs/costs of capital as credit is indexed to GHG emissions</p> <p>(Possible relevant industries: financials)</p>
Proportion of investment portfolio exposed to physical risks	<p>Increased revenue volatility as asset returns vary with physical climate risks</p> <p>Decreased market share as a result of investors' increasing awareness in physical climate-related risks</p> <p>(Possible relevant industries: financials)</p>		<p>Increased cost of capital as lines of credit recognise financial impact of climate-related risks</p> <p>(Possible relevant industries: financials)</p>

Table 7.2 Linking climate-related indicators to balance sheet financial items

Indicator	Assets ⁵²	Liabilities ⁵³
Assets exposed to climate-related risks	<p>Obsolete or write-down of inventories as a result of changes in market demand (e.g. consumers shift to more climate-friendly products)</p> <p>(Possible relevant industries: energy, consumer discretionary, consumer staples, utilities)</p> <p>Decreased estimated residual values and expected useful lives of long-term assets due to extreme weather events, which accelerate the wear and tear of assets</p> <p>(Possible relevant industries: energy, materials, industrials, consumer discretionary, telecommunications, utilities, properties & construction, information technology)</p>	
Amount reserved for potential levies, fines and taxes		<p>Potential levies, fines or taxes imposed by the government for failing to meet climate-related targets due to the introduction of climate-related regulations (e.g. GHG emissions requirement).</p> <p>(Possible relevant industries: energy, materials, industrials, consumer discretionary, utilities, properties & construction)</p>

Companies should bear in mind that financial impact mapping is not restricted to risks but can also be applied to opportunities. For instance, see the following example for linking climate-related capital expenditure to income statement financial items:

52 Assets are things of value that a company owns and has in its possession, or something that will be received (such as inventories, properties, plants and equipment, intangible assets)

53 Liabilities are amount that a company owes to others and are obligations that must be paid under certain conditions and time frames.

Table 7.3 Linking climate-related capital expenditure to income statement financial items when considering opportunities

Indicator	Revenue	Operating expenses	Non-operating expenses
Climate-related capital expenditure	Increased market share by capturing increasing consumer demand for sustainable products (Possible relevant industries: consumer discretionary, consumer staples, financials)	Decreased operating expenses due to acquired asset/ investment (e.g. energy efficient materials, storm-resistance materials, thereby lowering inspection and general maintenance cost) (Possible relevant industries: energy, industrials, consumer discretionary, utilities, properties & construction)	Decreased financing costs through issuance of green bonds (Possible relevant industries: energy, industrials, utilities, properties & construction)
	Increase in ancillary revenue by expanding into new markets such as renewable energy etc. (Possible relevant industries: energy, utilities, financials)		
	Revenue resilience by mitigating exposure to physical and transition climate risk (Possible relevant industries: energy, consumer discretionary, utilities, properties & construction)		

Assess the impacts on each financial item

After linking the identified indicators with relevant financial items, the company should be able to calculate the financial impacts with reference to inputs from previous chapters, such as climate-related risk assessment results, identified metrics, other relevant indicators and targets, and climate action plan.

The following example illustrates how climate-related indicators can be translated into financial impacts. Tracking the datapoint of Scope 1 GHG emissions, companies subject to a direct carbon tax would incur higher non-income tax expenses to comply with regulatory requirements:

Indicator(s)	Parameter(s)	Financial item(s)
GHG emissions (A) 1,500 tonnes of CO ₂ -e (Scope 1)	Tax on GHG emissions (B) US\$100/tonnes of CO ₂ -e (Scope 1)	Operating Expenses (A) x (B) US\$150,000 in non-income tax expense

In some cases, companies may need more than one parameter to calculate the financial impact. Multiple formulas may be necessary to account for all financial implications. The calculation will vary based on a list of criteria (e.g. corporate practices, the affected financial item(s)).

In this process, effective communication among different departments and business functions is key. For instance, the marketing department may have data related to the market share of climate-related products. By incorporating such data into the company’s assessment, the company may then estimate the quantity of inventories subject to write-down, and hence understand the proportion of assets exposed to climate-related risks.

Where a significant financial impact is expected, the company should consider whether this constitutes inside information under section 307A(1) of the Securities and Futures Ordinance (Cap.571)(SFO) and make necessary disclosures in accordance with Part XIVA of the SFO where required.

A company’s resilience and vulnerability to certain climate-related risks will change over time. It is therefore crucial to conduct regular high-level reviews to understand the financial impact of such risks.

Prepare the disclosure

Disclosures should cover the following key elements in order to present the financial impacts caused by material climate-related risks:

Key elements

Climate-related financial impacts 7.A

- Relevant financial items affected by climate-related issues
- Qualitative or quantitative financial impacts
- Types of measurement used
- Changes over time

Do you know?

It may be more appropriate to report forward-looking financial impacts in the form of ranges, qualitative directions, or numbers tied to specific assumptions about the future state of the world.

Below is HyCo’s disclosure on financial impacts:

Sample disclosure

Following a financial impact assessment, we consider that climate-related risks have the following major financial impacts on our manufacturing business in Guangzhou:

Risk 7.A1	Climate-related indicator 7.A1	Financial item 7.A1	Qualitative impact 7.A2	Quantitative indicator ⁵⁴ 7.A2
Policy change in order to achieve net-zero goals	GHG emissions (Scope 1,2 and 3)	<ul style="list-style-type: none"> • Liabilities 	<p>Since the Chinese government has already committed to carbon neutral by 2060, subsequent corresponding regulations may be implemented. Provisions may need to be made for potential fines in case of non-compliance with new climate regulations, which we may not be able to comply with immediately</p>	<ul style="list-style-type: none"> • \$ paid historically in comparable cases of legal proceedings, multiplied by the probability of occurrence

54 Since disclosing the amount here may not be useful for users of the Guide, we just included the indicators for users’ reference.

Risk 7.A1	Climate-related indicator 7.A1	Financial item 7.A1	Qualitative impact 7.A2	Quantitative indicator 7.A2
Increased severity of extreme weather events	Proportion of factories and equipment materially exposed to flooding	<ul style="list-style-type: none"> Revenue Operating Expenses Assets 	Depreciation of assets and loss of revenue may be the immediate result. We will have to rebuild the damaged factories. Premiums of insurance contracts are also likely to increase, which will in turn increase operating expenses	<ul style="list-style-type: none"> \$ per unit times units of output loss \$ invested for repair or reconstruction Increase of insurance premium in \$ \$ of depreciation in assets
Shifts in consumer preference	Amount of expenditure or capital investment deployed toward climate-related risks	<ul style="list-style-type: none"> Revenue Operating Expenses 	Consumers may shift to more climate-friendly products which can result in a decrease of our revenue. We will thus have to invest in the manufacturing of more climate-friendly products	<ul style="list-style-type: none"> \$ of output loss per year \$ invested in R&D

Key:

7.A Climate-related financial impacts

Commentaries

7.A1 HyCo disclosed the relationship between climate-related risks, indicators and financial items.

7.A2 HyCo disclosed both the qualitative and quantitative financial impacts of the different material risks.

Further recommendation

HyCo may disclose historical, current and forward-looking financial impacts across different time horizons in order to allow comparison over time.

Possible enhancements

- Conduct sensitivity analysis/value-at-risk analysis to provide forward-looking guidance on financial impact per risk factor, as well as track changes to the resilience of the business model over time
- Disclose material financial impacts in annual reports

Further readings:

- How can companies considering TCFD recommended scenario analysis provide disclosures that help investors: a short guide (Climate Disclosure Standards Board, 2018)

8. Integrate Climate-related Impacts into Business Strategy

Objectives

In this chapter, companies will understand how to incorporate climate-related impacts into its strategy. This requires a collaborative contribution from the board, management and operation level employees.

Integrate climate-related impacts in business strategy

Managing immediate climate-related impacts is only the beginning of the climate-related risk management journey. The board should think one step ahead, and consider how the company can avoid or mitigate climate-related risks through strategic actions, such as transforming its business model or adopting a different investment or divestment plan.

Companies may have their own tools and methodologies for strategic planning. As the first step, the company should identify the relationship between CRBI hotspots and the components of its business strategy. Set out below are examples of integrating climate-related considerations into a company's business strategy using the "five components" methodology,⁵⁵ which comprises five components namely, corporate strengths, customer relationships, market segment, partnerships and resource allocation.

1. Corporate strengths

Timely climate actions could boost investors' confidence in the company and improve its corporate image and business reputation, which paves the way towards achieving market dominance.

Possible strategic direction

Strengthening a company's climate and sustainability governance structure would help the management monitor how climate-related risks and potential impacts may affect the strengths and weaknesses of various business aspects.

2. Customer relationships

In light of investors' growing demand for information regarding a company's management of climate-related issues, climate-related communications could cause both positive and negative media coverage and affect a company's reputation.

Possible strategic direction

Customer relations and/or investor relations departments should be cautious of external communication that touch upon climate-related issues, and should be proactive in disclosing information regarding climate-related risks management.

Examples

Logistics sector:

- As part of emissions evaluation process, more companies would become aware of emissions attributed to their logistics value chain components, and expect logistics companies to implement transition plans to reduce emissions. It is crucial for a logistics company to have adequate, transparent and timely communication with customers on its lower-carbon transition in order to maintain positive customer relationships.

Financial sector:

- In light of increasing inquiries on ESG performance and climate disclosures, finance firms may have to put more resources into developing in-house analysis in order to satisfy the demand for high quality disclosures.

⁵⁵ The five components methodology presented in this chapter is extracted and modified from Business Model Canvas, a common strategic management tool for business model development.

3. Market segment

Mismanagement of climate-related risks may lead to loss of current and/or new market segments. For example, changes in market preference require adaptation measures such as transformation of products or services.

Possible strategic direction

With foreseeable adverse impacts due to climate change, planning alternative and extra routes, channels or platforms to maintain the company's revenue streams and customer outreach is vital.

Examples

Information technology sector:

- There is an increasing demand for climate data analyses, cloud storage solutions, and tools offering predictive analysis and machine learning for corporates to build their climate resilience. IT companies should consider changes in customer preference when developing their business strategies.

Real estate sector:

- Many governments around the world are calling for the construction of sustainable and green (residential, commercial and industrial) buildings that are climate resilient. Real estate and property developers should formulate acquisition/development strategies that align with these governments' policies.

4. Partnerships

The company's revenue streams and distribution channels could be at risk when climate-related impacts incur a knock-on effect on its upstream and downstream suppliers and partners. Business partners could demand the company to disclose more climate-related risks and potential impacts for responsible investment or company evaluation. Investors and shareholders are also increasingly concerned about climate-related impacts on their portfolio companies and assets.

Possible strategic direction

Enhanced and transparent climate disclosures would help maintain trust between the company and its business partners.

Examples

Real estate sector:

- Real estate companies have to consider climate-related risks affecting the properties and assets that they operate or own. Physical risks and transition risks could affect insurance premiums and property valuation. It is important to obtain performance data from business partners, including construction contractors and property managers, for resilience management.

Information technology sector:

- In general, the technology sector is believed to be causing substantial environmental impact as an energy consumer and electronic waste producer. Information technology firms may have to improve the quality and transparency of climate disclosures to their suppliers, distributors, investors and stakeholders. Getting the management ready to answer questions related to corporate sustainability policy and climate resilience is key to promote trust with business partners.

5. Resource allocation

Allocation of resources such as capital assets and human resources is important not only in mitigating potential climate-related impacts, but also in the maintenance of daily business operations when climate-related impacts have occurred.

Possible strategic direction

Depending on a company's industry and risk exposure, there may be a need to consider investing in resources to protect assets against physical and transition risks (e.g. relocation of assets).

Examples

Financial sector:

- Besides financial analysis and traditional due diligence work, financial firms may need to dedicate resources for climate specialists and sustainability experts to conduct assessments for climate-related risks and financed emissions, TCFD reporting and climate scenario analysis in respect of various asset classes or portfolio companies.

Hotel & tourism sector:

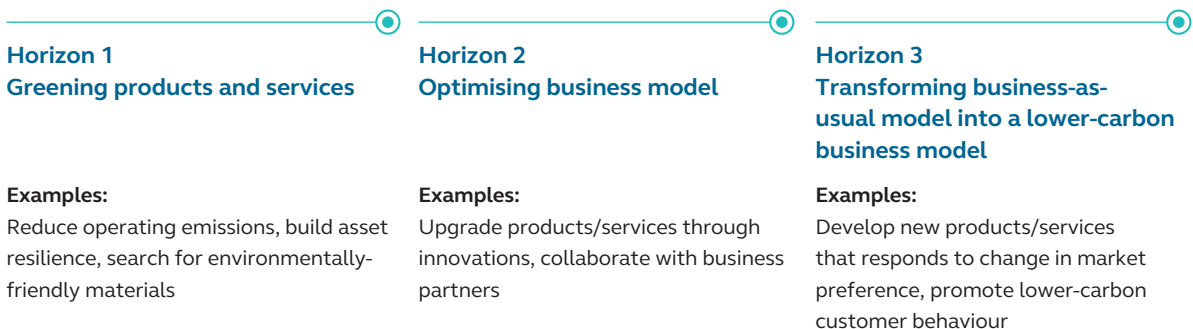
- It may be increasingly important to equip employees working in hotels and tourist attractions with appropriate training in dealing with physical climate-related impacts and emergencies such as flooding, storm surges and heatwaves. Furthermore, allocation of resources for the protection of hotels, resorts and attractions from climate-related impacts is vital.

By adjusting its strategy against material climate-related impacts, a company will come up with an updated business strategy that will improve its resilience.

Expand horizons for climate competent business strategy

Establishing the relationship between CRBI hotspots and business components is only the first step of business integration. When a company constantly improves its climate-related risks management, it will lead to greener operations, products and/or services and eventually, a transformation into a lower-carbon business model.

Previous chapters have provided an overview of the essential steps in identifying, managing and disclosing material climate-related risks. As the next step, companies should start exploring climate-related opportunities while continuing to strengthen their management of climate-related risks. The board should develop a mindset that includes the following horizons:



The management must have sufficient knowledge on climate change in order to make meaningful decisions. Employees' buy-in is also essential for a successful business model transformation. Combining a top-down direction and a bottom-up culture to cultivate a climate-integrated business model is the key to successful implementation.



Looking ahead

Climate science is constantly evolving, so do policies adopted by governments and regulators to deal with climate-related risks. Companies that have managed to follow the steps in this Guide would have made a significant move to improve their business strategy in response to this global challenge. Taking actions in the right direction is important in dealing with an uncertain future.

Prepare the disclosure

Disclosures should cover the following key elements in order to illustrate how climate-related issues are integrated into the business strategy:

Key elements

Integration of climate-related impacts into business strategies **8.A**

- Process of climate-related impacts integration
- A climate competent business strategy showing planned changes in strategic directions and expanded horizons

Below is HyCo’s disclosure on how climate-related issues are integrated into its business strategy:

Sample disclosure

We have decided to change our investment directions and adopt a new business model. An integration plan is set out below: **8.A1**

Climate Integration Plan

We are committed to achieving net-zero within our operations by 2040 and across our supply chain by 2050.

8.A2 As a result, we have implemented the Climate Integration Plan that sets out a range of targets and action plans intended to align with the emissions reduction pathway consistent with the 1.5°C ambition of the Paris Agreement. Our Board has approved the transition plan and will oversee it with the support of our management.

As governments start implementing policies and regulations to reduce the impacts of climate change, we believe that incorporating climate considerations into our business model is a strategic move that will strengthen our business outlook during the transition to a lower-carbon economy. By adapting to policy and customer behaviour changes and capturing opportunities brought by the transition, we will be able to gain competitive advantage.

This will involve two fundamental shifts in our business strategies: **8.A3**

- **Change in investment focus:** We will start relocating our factories and set up new factories in cities with net-zero commitments. These factories will be located at sites that are not subject to flooding risks even under the Brown Scenarios.
- **Change in business model:** We will phase out product lines that are vulnerable to supply chain disruption, and switch to a service model with lower-carbon footprint, which will make our company less susceptible to future carbon tax.

Commentaries

8.A1 HyCo showed its commitment in adapting to a lower-carbon economy through the establishment of an integration plan.

8.A2 HyCo has demonstrated that its board has rejected the “business-as-usual” mentality, which will enable the company to thrive in a new paradigm.

8.A3 HyCo disclosed some of its planned actions in shifting its business strategies, including its investment as well as its business model.

Key:

8.A Integration of climate-related impacts into business strategies

Possible enhancements

- Transform the company’s business model to meet the challenges posed by different climate scenarios
- Build partnership with corporates and supply chain for continuous improvement along the value chain

Further reading:

- The Business and Sustainable Development Commission

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