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【Overview of this practical guide】

This guide is divided into the main part and an appendix. The main part explains "Summary of TCFD/TNFD recommendations," "Points for scenario analysis," and "Points for TNFD disclosure," and the appendix provides reference information including ICP

	Chapter structure and overview of this practical guide	Corporate needs	Intended reader: Management	Business unit	Sustainability unit
Main Part	**Chapter 1 Introduction** Explains the purpose of this practical guide, the outline and significance of the TCFD and TNFD recommendations, and the position of scenario analysis	The overview of TCFD recommendations and TNFD recommendations are, and what scenario analysis is in the TCFD recommendations	◎	◎	◎
Main Part	**Chapter 2 TCFD scenario analysis practical points** Explains specific promotion methods and practical points for "scenario analysis," which is the point in the TCFD recommendations that draw companies' concerns	Specific methods for promoting scenario analysis and practical points.	○	◎	◎
Main Part	**Chapter 3 Preparing for nature-related financial disclosure** Explains the relationship between TCFD and TNFD, examples of TNFD disclosure, and analysis tools useful for TNFD disclosure	The steps and methodology for disclosing TNFD	○	◎	◎
Appendix	**Chapter 1 TCFD scenario analysis Disclosure cases (domestic and international) and reference parameters and tools** Provides information on domestic and international disclosure cases related to scenario analysis (domestic and international), as well as parameters and tools that serve as materials for scenario analysis	Disclosure examples, tools, and literature that can be helpful in scenario analysis	-	○	◎
Appendix	**Chapter 2 Definition, theory, practice, and reference information of ICP（internal carbon pricing）** Provides the definition of ICP (internal carbon pricing), the significance of its introduction, theoretical and practical points for operation, operational examples, and reference information for operation.	The outline of ICP and the points for implementing and operating ICP	-	○	◎
Appendix	**Chapter 3 Case study on TNFD scenario analysis and goal setting** Presenting the results of the 2024 Model Project to Support Disclosure of Nature-related Financial Information by Making Use of Climate-related Financial Information Disclosure (commonly known as the Nature Disclosure Practice Project).	How to analyze natural scenarios and set goals	-	○	◎

- The TCFD scenario analysis method used in this practical guide is based on the technical supplement related to scenario analysis ("TCFD Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities" (2017.6)), as well as its own original method. It was created based on the methodology and interpretation of

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This guidance introduces analysis and disclosure of corporate climate-related/nature-related information and internal carbon pricing.

Background

Sustainability disclosure is increasingly becoming important for companies. Particularly, in attention to climate- and nature-related information disclosure.

- The Task Force on Climate-Related Financial Disclosures (TCFD) was established by the Financial Stability Board at the request of the G20, in fear of climate change may undermine the stability of the financial system. The final recommendations were released in 2017
- A Taskforce on Nature-related Financial Disclosures (TNFD) will be established in 2021 to develop a framework in helping companies and organizations to manage and disclose information on critical situations and risks on nature and biodiversity. It was established as a final recommendations which was released in 2023.

Positioning and Purpose of this Guide

This Practical Guide aims to promote corporate sustainability information disclosure (climate-related and nature-related) by providing an overview of climate-related information disclosure, such as guidance on practicing scenario analysis, an overview of nature-related information disclosure and examples of TNFD disclosure, an overview of ICP (Internal Carbon Pricing) that contributes to decarbonization management and how it should be introduced and operated. Purpose of this report is to promote corporate sustainability information disclosure (climate-related and nature-related). The main contents of the guide on climate-related disclosure, nature-related disclosure, and ICP are as follows;

Climate-Related Disclosures	① Intends to improve understanding of the background to the demand for **climate-related financial disclosures (TCFD)** ② Among the 11 recommended disclosure items in the TCFD recommendations, explaining **"scenario analysis"** in particular, which companies draws concerns ③ Providing **information necessary for analysis**, such as actual disclosure cases, climate change-related parameters, and related guidelines
Nature-Related Disclosure	① In addition to climate change, promoting to understand the background **to the need for additional responses to nature-related issues and TNFD** ② Providing information on the responses required in **the TNFD Final Recommendations issued in September 2023** and the start of the TNFD ③ Explanation of **the areas of commonalities and differences between TCFD and TNFD** as companies that have been engaged in TCFD disclosure work on TNFD ④ Reduce the workload of companies by organizing the commonalities between the TCFD and nature-related information. ⑤ Disclosure of the results of a model project (TNFD scenario analysis and target setting) conducted by the Ministry of the Environment as a case study.
ICP	① Intends to improve understanding of the background to the growing implementation of ICPs, such as those recommended by CDP and TCFD ② Explaining the outline of ICP, theoretical interpretation of its introduction, and practical methods of introduction and operation ③ Providing information necessary for introduction and operation, such as good examples of ICP introduction and operation, setting prices and operation methods of companies that have introduced ICP in Japan

Who is this guide intended for

This guide is intended for business operators of all sectors and all positions (management level/business units/departments responsible for sustainability and ESG)

- Management ：Receive an overview of TCFD and TNFD recommendations in Chapter 1 of this volume, an overview of TCFD scenario analysis in Chapter 2 of this volume, and an overview of nature-related information disclosure in Chapter 3 of this volume.
- Scenario analysts/businesses ： Able to understand the TCFD recommendations, methodology on conducting scenario analysis, and overview of nature-related information disclosure in Chapters 1-3 of this volume, parameters and reference information that can be used for TCFD scenario analysis in Appendix 1, and overview and implementation/operation of the ICP in Appendix 2.

[TCFD scenario analysis, ICP implementation and operation, and corporate issues in TNFD disclosure]

Through this guide, it promotes to solve the issues companies may face in disclosing information on TCFD, ICP, and TNFD

	Issues companies may face		How to use this guidance	Chapter
TCFD	① They cannot attain understanding from management regarding scenario analysis	▶	To help people understand the significance of TCFD recommendations and scenario analysis	Main part Chapter 1
	② They cannot understand the specific implementation process of scenario analysis.	▶	To check the process of each step, quota allocation, level to aim for, and method	Main part Chapter 2
	③ They do not know how to calculate business impact	▶	To understand the calculation method and extracting useful parameters	Main part Chapter 2 Appendix Chapter 1
	④ They do not know their direction of scenario analysis/disclosure.	▶	To determine the direction of the company while referring to other companies' disclosure examples	Appendix Chapter 1
	⑤ They do not know how to utilize the results of scenario analysis in management.	▶	To understand and practice how to incorporate scenario analysis results into management	Main part Chapter 2
ICP	① They do not understand the definition of ICP or the system itself.	▶	To help people understand the definition and the benefits of introducing ICP	Appendix Chapter 2
	② They do not know the optimal ICP price level	▶	To understand the types of ICP pricing and price ranges implemented by others	Appendix Chapter 2
	③ I do not know how to introduce and operate ICP	▶	To understand the steps and points when introducing and operating ICP	Appendix Chapter 2
	④ I do not know how other companies operate ICP	▶	To understand the actual status of ICP implementation and operation by other companies	Appendix Chapter 2
TNFD	① They cannot attain internal understanding to address nature-related issues	▶	To help people understand trends related to nature and biodiversity and their relationship to business	Main part Chapter 1
	② They would like to know an overview of TNFD and TNFD disclosure recommendations.	▶	To help people understand trends related to nature and biodiversity and their relationship to business	Main part Chapter 3
	③ They would like to know the difference between the TNFD disclosure recommendations compared to the TCFD recommendations.	▶	To check the scope of coverage and differences in recommendations for TCFD and TNFD responses.	Main part Chapter 1 Main part Chapter 3
	④ They would like to know the key points when working on TNFD in addition to TCFD.	▶	To learn key points such as analysis of dependence on and impact on nature, and the importance of location.	Main part Chapter 1 Main Part Chapter 3
	⑤ They would like to update the TNFD analysis	▶	To learn the methodology and examples of TNFD scenario analysis and goal setting	Main part Chapter 3 Appendix Chapter 3

Main revision points from previous years in this practical guide

This year, we added mainly the latest examples of nature-related information disclosure and the methodology and results of the model project (TNFD scenario analysis and target setting)

Main part	Chapter 1	**Update on the latest developments surrounding climate and nature-related information disclosure**	• Update on the latest trends in international disclosure standards and national policies surrounding corporate disclosure of climate and nature-related information
	Chapter 2	No revision this year	• Added direction and specific methods for increasing the sophistication of scenario analysis • The key points for incorporating the results of scenario analysis into management strategies and plans are added and explained them in 4 steps + α of scenario analysis
	Chapter 3	**Latest examples of TNFD disclosures and additional methodology for scenario analysis and goal setting**	• Added examples of disclosures in line with the TNFD framework and results of interviews with investors and others regarding TNFD disclosures • Added explanation of TNFD scenario analysis and target setting methodology supported by the Nature Disclosure Practices Project
Appendix	Chapter 1	**TCFD disclosure examples and Updates and additions to climate-related parameters**	• Addition of good practices for domestic and international TCFD disclosures based on the latest edition of the disclosure • Updated parameters that can be used for scenario analysis based on the latest editions of IEA and other publications
	Chapter 2	**Addition of the latest trends in ICP implementation and operation**	• Update information on the status of ICP implementation and operation by companies based on materials published by CDP and other organizations.
	Chapter 3	**Add case study on TNFD scenario analysis and goal setting**	• Additional examples of TNFD scenario analysis and goal-setting analysis supported by the Nature Disclosure Practices Project

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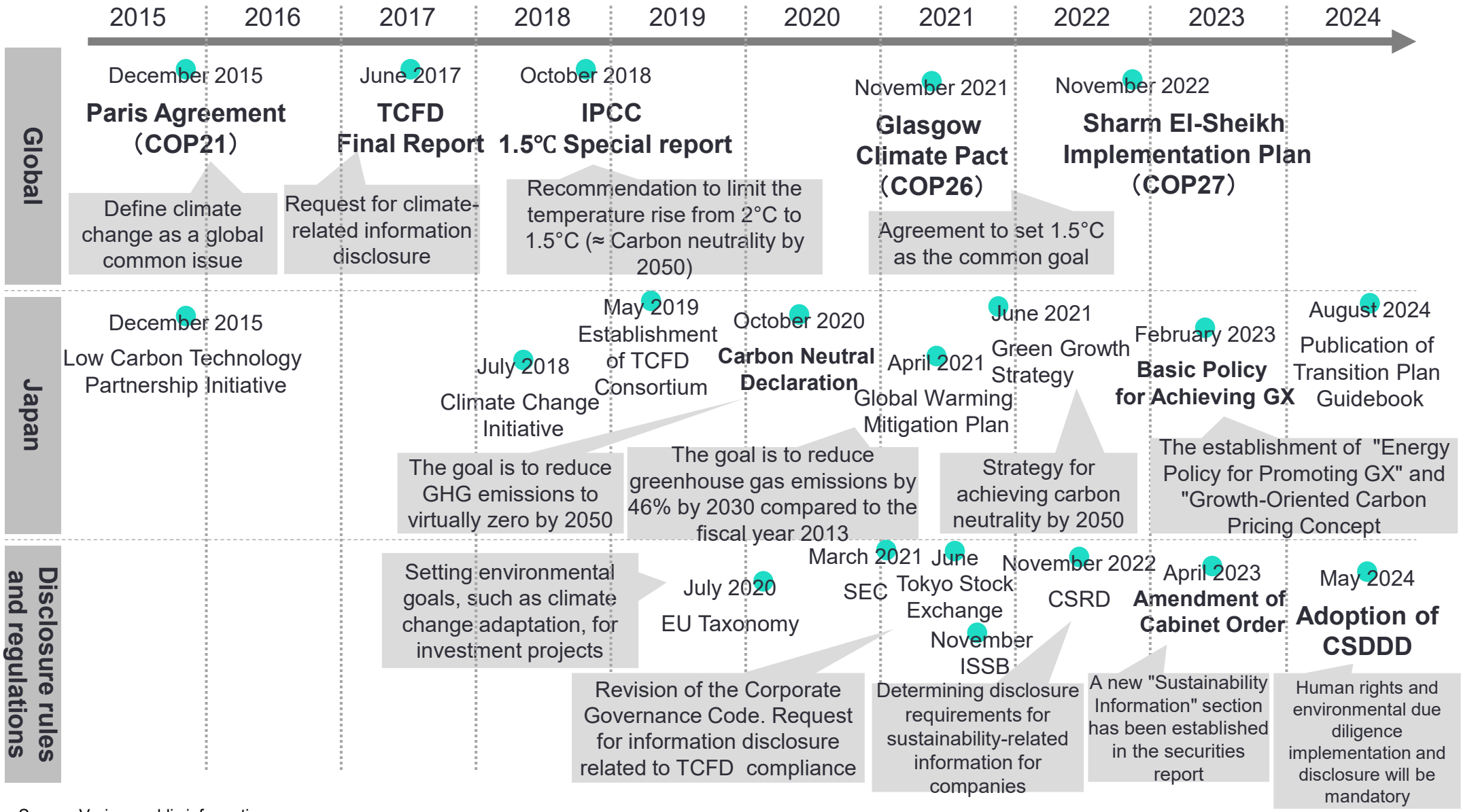
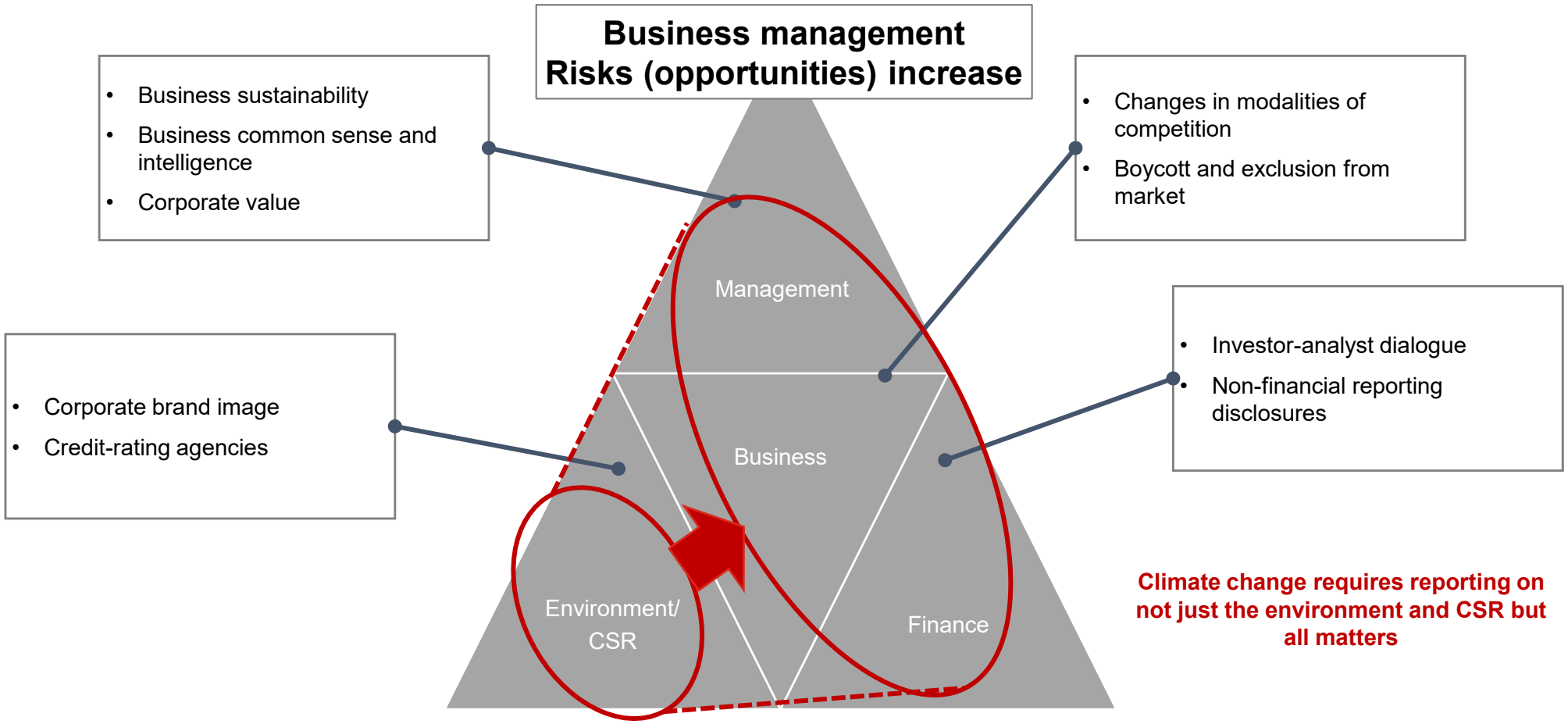
The trend towards decarbonization

As countries and institutional investors declare decarbonization goals such as achieving carbon neutrality by 2050, businesses are increasingly required to adopt decarbonized management and the disclosure of climate-related information has also become a requirement



Source :Various public information

For corporate management, climate change has the potential to become a clear risk and opportunity for the company as a whole



The environment and CSR department has responded to the climate change, however, there is a growing need for a company to respond to the issues as a whole, as climate-related issues can be risks and opportunities in the field of "corporate value", "business sales", and "fund raising."

Climate-related environmental risks are focused on by management globally; environmental risks are listed for all short, medium and long-term time frames, and serious environmental risks are concerned to increase in longer term

Top 10 risks in the World Economic Forum (WEF) ”The Global Risk Report 2025”

■ : Environmental risk

	By time axis and severity	
	Short term (2 years)	Long term (10 Years)
1	Misinformation and disinformation	Extreme weather events
2	Extreme weather events	Biodiversity loss and ecosystem collapse
3	State-based armed conflict	Critical change to Earth systems
4	Societal polarization	Natural resource shortages
5	Cyber espionage and warfare	Misinformation and disinformation
6	Pollution	Adverse outcomes of AI technologies
7	Inequality	Inequality
8	Involuntary migration or displacement	Societal polarization
9	Geoeconomic confrontation	Cyber espionage and warfare
10	Erosion of human rights and/or of civic freedoms	Pollution

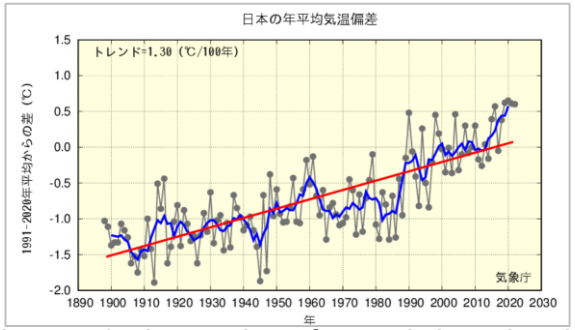
Source : World Economic Forum, *Global Risks Report 2025*, https://reports.weforum.org/docs/WEF_Global_Risks_Report_2025.pdf

In Japan, too, rising average temperatures and more frequent heavy rains are predicted, and physical risks from climate change will affect the sustainable management of companies in time frames spanning from short- to medium- and long-term

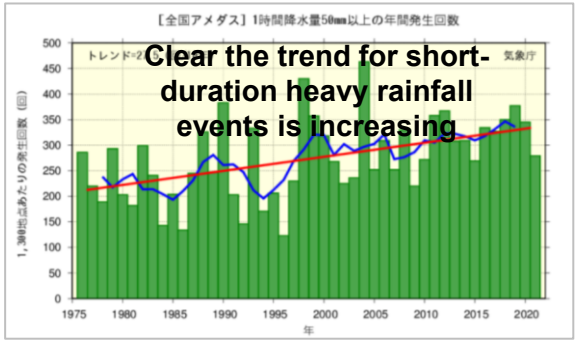
- The global average temperature for 2011 – 2020 is already about 1.1ºC higher than the pre-industrial (1850 – 1900) average. If this trend continues, **global warming will exceed 1.5ºC and 2ºC within the 21st century unless emissions of carbon dioxide and other greenhouse gases are significantly reduced in the coming decades**. (IPCC: the Sixth Assessment Report [the Working Group 1] “AR6 Climate Change 2021: The Physical Science Basis”)
- Global warming is expected to cause increased risk of heat stroke, rising sea levels, and **increased frequency/severity of extreme weather events** such as heavy rains, typhoons, and heatwaves. This will **affect the viability of corporate activities** through supply chain disruptions, damage to facilities, and employee health risks

Changes in annual average temperature in Japan

(Difference from the 1991 – 2020 average)

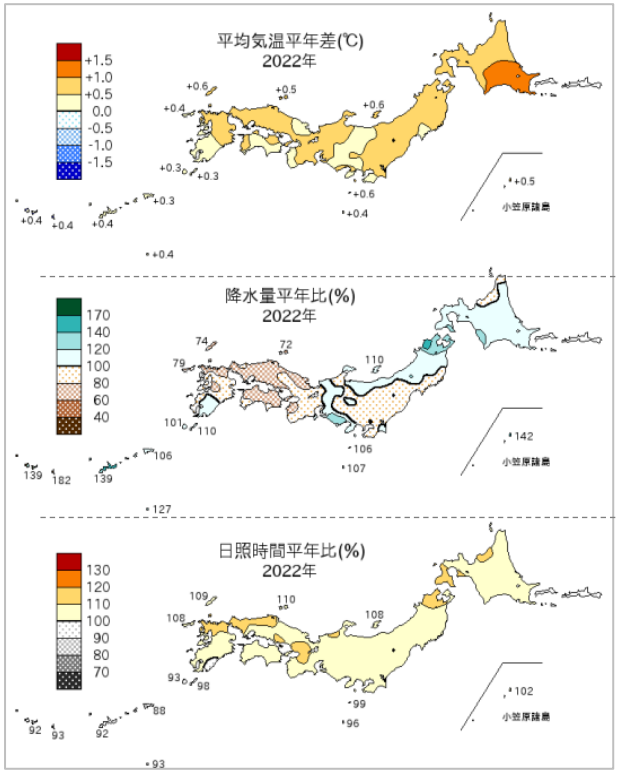


Changes in the number of annual short-duration heavy rainfall events in Japan



Clear the trend for short-duration heavy rainfall events is increasing

Distribution of annual average temperature difference, annual precipitation compared to normal, and annual sunshine hours compared to normal in 2022



High temperatures continued throughout the country from spring to fall, and the low temperatures were temporary, so the average annual temperature **was quite high** nationwide, especially in northern Japan.

※If the average value (average value from 1991 to 2020) exceeds the top 10% of the cumulative frequency during the calculated period, it is expressed as ``considerably high'' and is classified as **extreme weather**

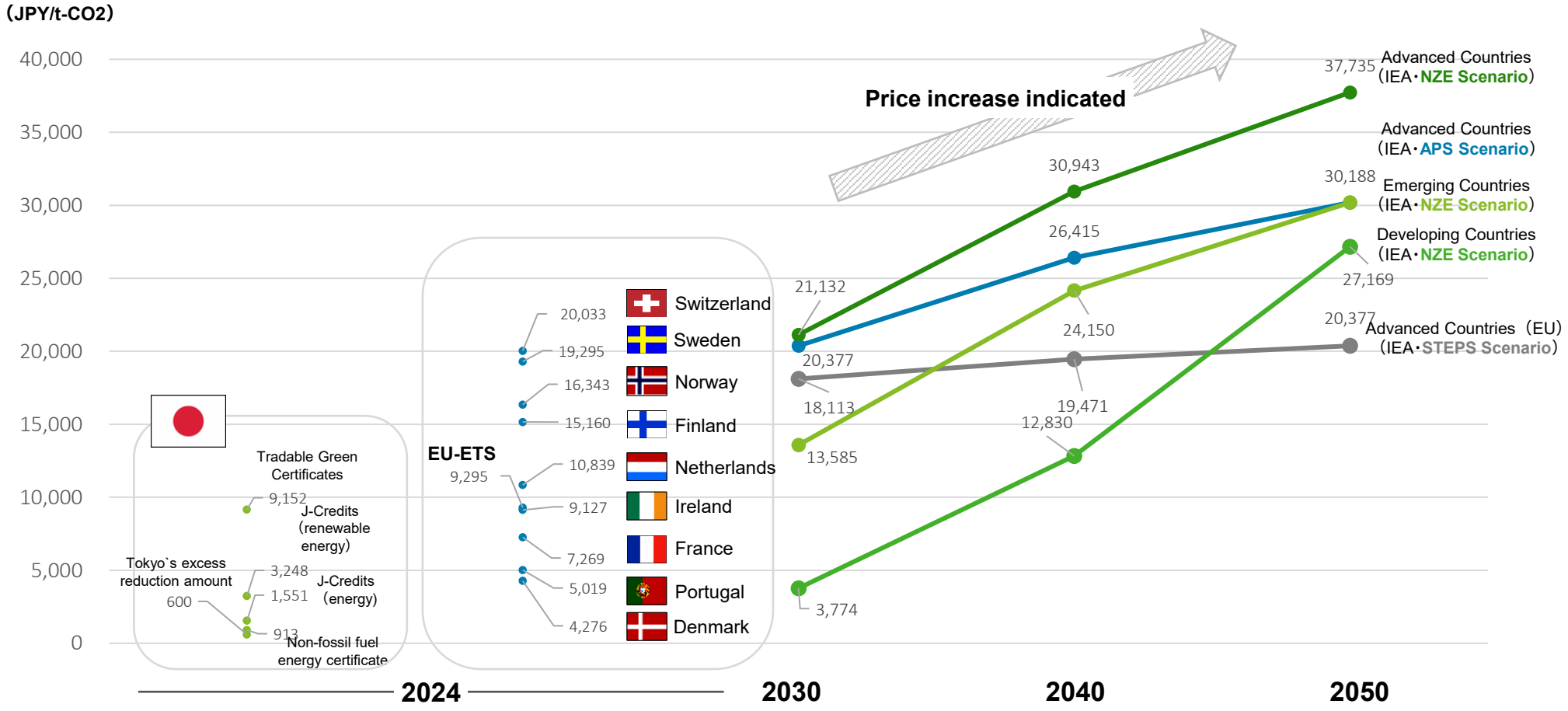
Precipitation was quite high in Okinawa and Amami, and on the Sea of Japan side and the Pacific side of northern Japan. On the other hand, it was considerably less on the Sea of Japan and less on the Pacific side of western Japan. The Sea of Japan and the Pacific side of eastern Japan were near normal

Daylight hours were significantly longer on the Sea of Japan side of northern and western Japan, and on the Pacific side of northern, eastern and western Japan, and on the Sea of Japan side of eastern Japan. Contrary, considerably less in Okinawa and Amami

Source : Japan Meteorological Agency, *Climate Change Monitoring Report2022*, https://www.data.jma.go.jp/cpdinfo/monitor/2022/pdf/ccmr2022_all.pdf

Carbon pricing, which is being introduced in many countries in the transition to a low-carbon economy, will rise to between 10,000 JPY and 30,000 JPY; price increases are expected to occur worldwide in the future, which could be both a risk and opportunity

Market prices (2024) and future predictions



※1 USD＝151.63 JPY、（as of April, 2024）※Future projections for 2030, 2040, and 2050 are based on IEA WEO 2022 and uses exchange rates as of January 31, 2023
※Tradable Green Certificates have been temporarily determined as 4 JPY/kWh
※For the CO2 emission factor for electricity, substitute values “0.000438 (t-CO2/kwh)” (https://ghg-santeikohyo.env.go.jp/calc) from “Emission factors by electric utility” (for calculating greenhouse gas emissions of specific emitters) –FY 2022 results- published by the Ministry of the Environment and Ministry of Economy, Trade and Industry
Source：non-fossil fuel energy certificates：Agency for Natural Resources and Energy website（https://www.enecho.meti.go.jp/category/electricity_and_gas/electric/nonfossil/katsuyou_joukyou/）, J-Credit system “average bid price “（https://japancredit.go.jp/tender/）, Tokyo`s excess reduction amount: Tokyo Metropolitan Government websit（https://www.kankyo.metro.tokyo.lg.jp/climate/large_scale/trade）、IEA「World Energy Outlook2023」（ https://iea.blob.core.windows.net/assets/66b8f989-971c-4a8d-82b0-4735834de594/WorldEnergyOutlook2023.pdf ）、Price Rate 1 (highest price) from World Bank “Carbon Pricing Dashboard”（https://carbonpricingdashboard.worldbank.org/）、EU-ETS, Portugal OECD(Pricing Greenhouse Gas Emissions: Key findings for carbon pricing in Portugal)

In February 2023, the "Basic Policy for Realizing GX" was approved by the Cabinet, and in addition to promoting energy conservation and making renewable energy the main power source, a "growth-oriented carbon pricing concept" was proposed

Outline of the Basic Policy for the Realization of GX (Green Transformation)

Provisional Translation

Background

- ✓ More countries and regions are declaring net-zero emissions with timeline (more than 90% on a GDP basis), and there is intensifying long-term, large-scale investment competition for GX, which delivers both emissions reduction and economic growth. The era has arrived where the success or failure of GX initiatives is directly linked to the competitiveness of companies and nations. Russia's aggression against Ukraine has again highlighted Japan's energy security issues.
- ✓ In the midst of this, Japan will take full advantage of its strengths by accelerating GX and create new demand and markets in the fields of stable energy supply and decarbonization, leading to the enhanced competitiveness of its industries and economic growth.
- ✓ The Government of Japan submits the relevant bills necessary to achieve GX to the 211th Session of the Diet (underlined parts are to be included in the bills).

(1) GX initiatives based on the premise of ensuring a stable energy supply

1) Promotion of thorough energy efficiency improvement

- Strengthening support measures for small and medium-sized enterprises to improve energy efficiency by subsidies which are eligible for multi-year investment plans.
- The relevant ministries and agencies will work together to strengthen support for house to replace windows for high energy efficiency.
- The government encourages the shift to non-fossil fuel energy with newly proposed governmental guidelines for five major industries (steel, chemical, cement, paper, and automobile).

2) Making renewable energy a mainstay power source

- Aiming to achieve a renewable energy ratio of 36% to 38% by FY2030, based on the national master plan, in the next ten years or so, we will accelerate the establishment of the power grid system on a scale more than eight times that of the previous ten years. We will establish undersea direct current power transmission cables from Hokkaido Prefecture with the aim of completing them by FY2030. We will prepare a financial environment necessary for these system investments.
- To increase the deployment of offshore wind power, we will establish the Japanese version of centralized system and begin a public offering with new public offering rules.
- We will strengthen business rules to introduce renewable energy in coexistence with local communities. We will socially implement next-generation solar cells (Perovskite solar cells) and floating offshore wind power.

3) Utilization of nuclear power

- On the premise of ensuring safety, we will materialize plans for building next-generation advanced reactors within the sites of existing nuclear power plants that have determined to be decommissioned. We will consider other development and construction projects, based on the future situation, including the status of reactors operating in each region and how local understanding has progressed.
- On the premise of the rigorous safety reviews, the operation period, limited to 40 years with a possibility of extensions for 20 years, will be approved to be additionally extended for a certain length of outage periods. In addition, we will promote the nuclear fuel cycle, develop a mechanism sharing knowledge and securing funds for steady and efficient decommissioning, encourage country-led understanding by citizens to realize final disposal and drastically strengthen proactive work for local municipalities.

4) Other important matters

- In order to develop hydrogen and ammonia production and supply chains, we aim to implement a support scheme that focuses on their price differences with existing fuels. We will design comprehensive policy measures and update the national strategy with a view to leading the world in the hydrogen field.
- In order to secure supply capacity in the electricity market, we will steadily operate the capacity market and promote systematic investment into decarbonized energy sources by implementing Reserve Power Plants system and Long-Term Decarbonized Power Resource Auction.
- Interests in Sakhalin 1 and 2, and other international projects will be preserved for the time being, as they are important for energy security.
- In light of the growing uncertainty in the LNG market, we will build a mechanism to strategically secure buffer LNG and support the development of technologies such as those related to methane hydrate.
- In addition, we will promote research and development, capital investment, demand creation, and other GX efforts in the areas of carbon recycled fuels (e.g., Methanation, SAF, fuels), batteries, resource circulation, next-generation automobiles, next-generation aircraft, zero-emission ships, investment into digital technology for decarbonization, housing and buildings, ports and other infrastructure, food and agriculture, forestry, and fishery industries, and regions and livelihoods.

(2) Realization and implementation of the "Pro-Growth Carbon Pricing Concept" and other initiatives

- Last May, Prime Minister Kishida announced that more than 150 trillion yen of public and private GX investments would be made over the next decade. In order to achieve this, the government has complied a comprehensive strategy, and will swiftly achieve and implement the following pillars.

1) Upfront investment support utilizing GX Economy Transition Bonds

- We will establish GX Economy Transition Bonds (with the aim of issuing them in a new form that conforms to international standards) and implement initial investment support of 20 trillion yen for 10 years in order to form long-term support measures and increase predictability for private companies. For the cases that are very difficult for the private sector to make investment decisions alone, we will implement the support together with regulatory and systemic measures in areas that will contribute to the strengthening of industries' competitiveness, economic growth, and emission reductions .

2) GX investment incentives through "Pro-Growth Carbon Pricing Concept"

- We will position carbon emission prices through growth-oriented carbon pricing and increase the value added of GX-related products and businesses.
- We will indicate ahead of time a policy of implementing GX efforts as we reduce the total energy-related burden in the medium- to long-term after setting a certain amount of time to make GX efforts instead of implementing them immediately.

⇒ In addition to the support measures, we will establish a mechanism to give incentives to businesses on the forefront of GX efforts.

<Specific examples>

(i) GX League to be developed in stages → Full-scale operation of carbon emissions trading system by companies, including those in high emission industries [FY2026 onward]

(ii) We will implement auctioning* similar to those in Europe for power generation businesses in gradual stages [FY2033 onward]

*: Fixed contributions based on CO_2 emissions

(iii) We will implement a "GX-Surcharge" (Surcharge on fossil fuel supply) for companies such as fossil fuel importers [FY2028 onward]

* In addition, *GX Promotion Organization* will be established to carry out the above in a unified manner

3) Utilization of new financial instruments

- The *GX Promotion Organization* will consider and implement supplementary measures to address risks during the gradual social implementation of GX technologies in order to accelerate investment into GX.
- We will create an environment with measures to promote sustainable finance, including disclosures of information related to climate change, in addition to strengthening efforts to foster international understanding on transition finance.

4) International strategy, Just Transitions, and GX of small and medium enterprises and other businesses

- We will make efforts to materialize the "Asia Zero Emission Community (AZEC) initiative" and further promote GX in Asia.
- We will promote skill acquisition and smooth labor mobility in growth areas such as green ones through reskilling support and other measures.
- In addition to the creation of Decarbonization Leading Areas and the nationwide deployment, local governments will utilize financial support and take the initiative in decarbonizing of the administrative operations. We will launch a new national movement and stimulate demand for decarbonized products.
- We will promote efforts for entire supply chains including those of SMEs through support that uses subsidies including the Project to promote business restructuring of SMEs, training of human resources for SME support organizations that provide push-type support, further expansion of the "Declaration of Partnership Building", and other measures.

(3) Progress evaluation and necessary reviews

- The GX Implementation Council and others will regularly conduct progress evaluations and do necessary reviews effectively taking into account progress in GX investments, global trends, impacts on the economy, and other factors.
- We will clarify the items that require legislative measures in a bill that will be submitted to the 211th Session of the Diet and be sure to implement them.

Source : Created by Ministry of the Environment from "The Basic Policy for the Realization of GX"

Overview of the “Growth-Oriented Carbon Pricing Concept” etc. in the GX Basic Policy

There was an announcement that a carbon surcharge will be introduced for fossil fuel importers from fiscal 2028, and responding to the costs associated with carbon emissions may become an urgent issue in business management

Description in the basic policy for realizing GX

The Basic Policy for the Realization of GX
- A roadmap for the next 10 years -

(3) Carbon pricing that will give incentives for early GX investment

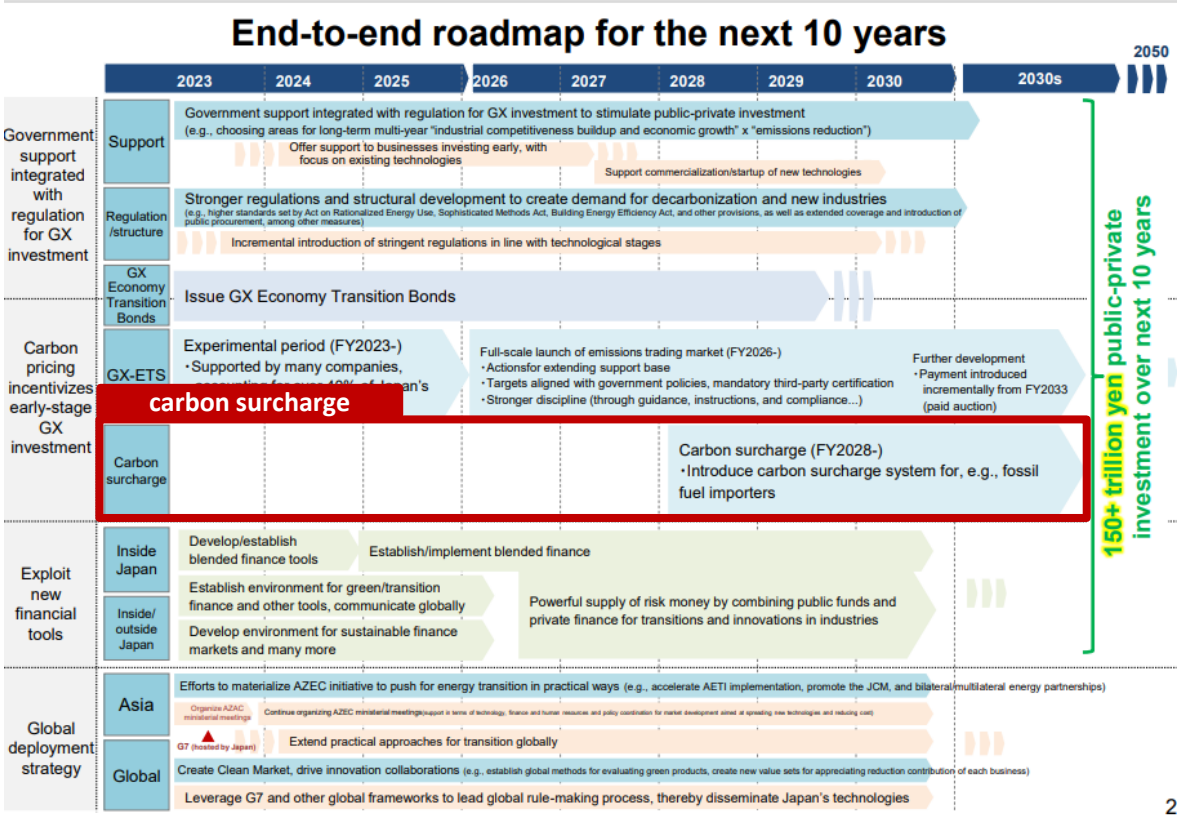
1) Basic concept

With regard to designing concrete carbon pricing schemes, ambitious reduction goals set by individual companies based on their different business situations and with focus on industries with large emissions will form the basis for an emissions trading system that can be introduced to strengthen industrial competitiveness and also reduce emissions efficiently and effectively. Also, for incentivizing general GX approaches not limited to industries with large emissions, GX-Surcharge will be also introduced as a way of applying the carbon pricing scheme to all carbon emissions equally.

c. Introduction of GX-Surcharge

For incentivizing general GX approaches not limited to industries with large emissions, GX-Surcharge will be introduced as a way of applying the carbon pricing scheme to all carbon emissions equally. Specifically, if this scheme were introduced without considering the availability of alternative technologies or the impact on international competition, Japan risks hurting its economy and triggering an exodus of production facilities (carbon leakage). Therefore, this approach will not be introduced immediately and deferred until FY2028 after a period of five years for focusing on GX. More early-stage GX investment by private companies can be promoted by setting a policy for fossil fuel importers and other businesses that sets low initial prices and gradually raise them, with this approach announced in advance.

Overview of roadmap



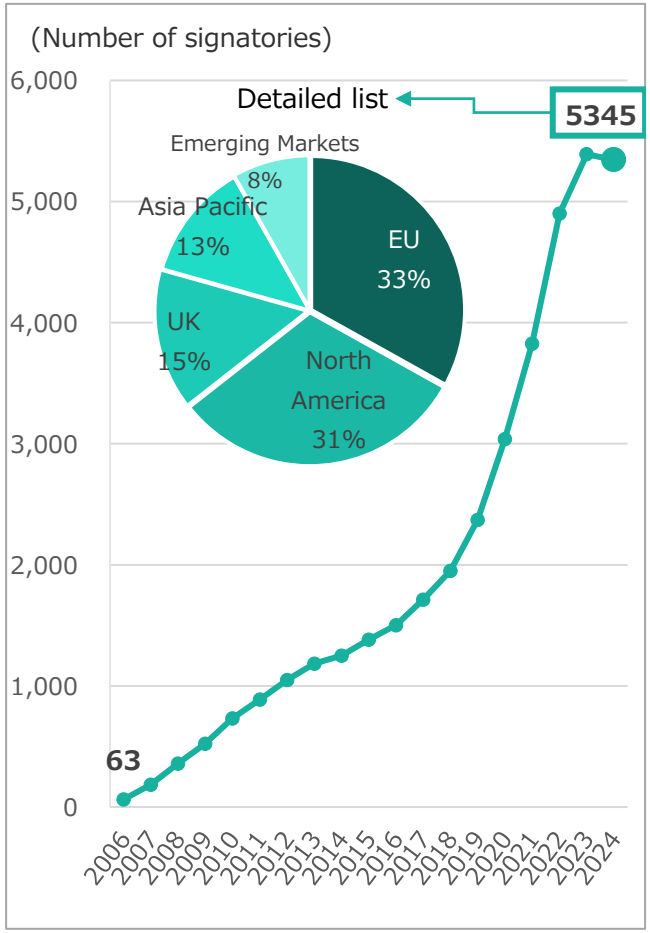
Under the "Basic Policy for Realizing GX," a carbon surcharge is scheduled to be introduced at a low price for fossil fuel importers starting in 2028

Source : Created by Ministry of the Environment from ”The Basic Policy for the Realization of GX”

The amount of ESG investment is continuously increasing, reaching 121 trillion dollars worldwide and 626 trillion yen in Japan

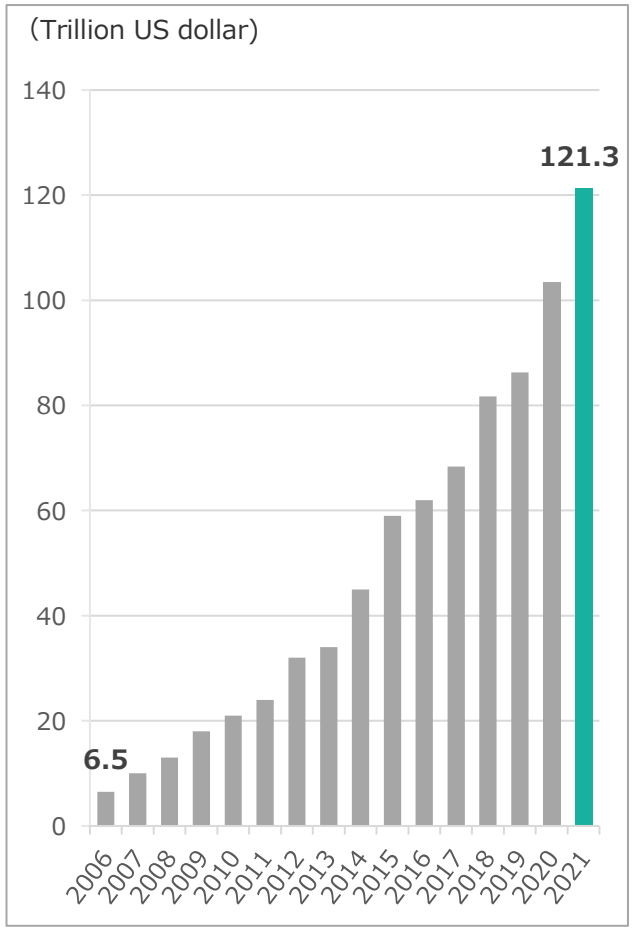
Number of PRI signatures (worldwide)

Number of PRI signatories in 2024 is 5,345 institutions
From 2023, there would be a slight decrease



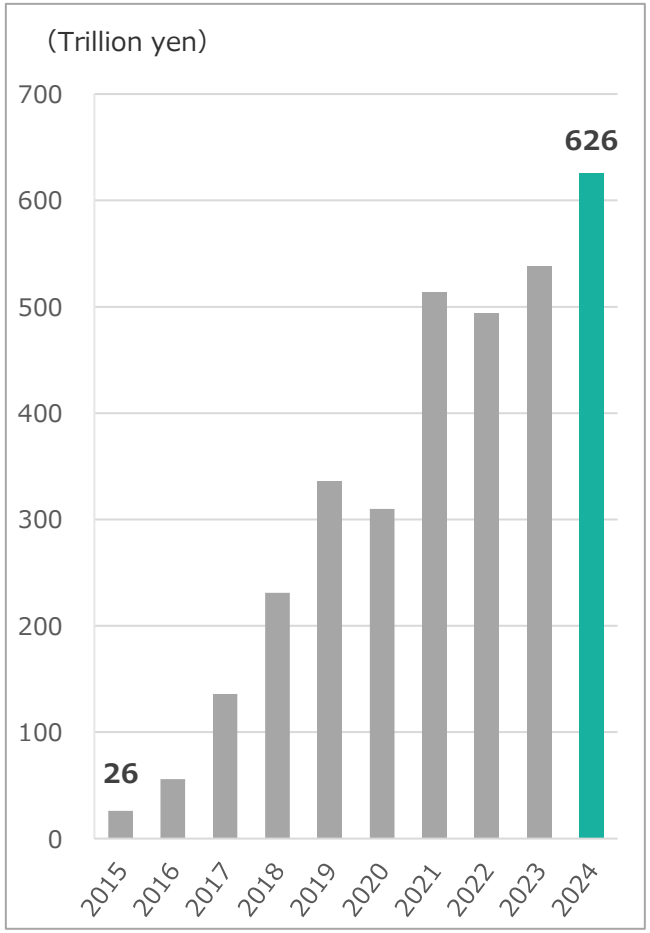
ESG assets under management (worldwide)

Total assets under management in 2021 will be approximately $121 trillion



ESG managed assets (Japan)

Total domestic assets under management as of the end of March 2024 is approximately 626 trillion yen



*As of March 13, 2025, the publicly available PRI data can be confirmed up to 2021
Source : PRI, https://www.unpri.org/about-us/about-the-pri, JSIF (Japan Sustainable Investment Forum) ,https://japansif.com/survey#toc5

Increased Decarbonization Awareness in Investors (2)

There are signs that companies will be required not only to set higher targets that are faster and more effective but also to set interim targets for decarbonization

Investors setting decarbonization targets

- In addition to declaring carbon neutrality, domestic financial institutions that are members of the Net-Zero Banking Alliance (NZBA) have set interim targets for sectors with high CO2 emissions
  - Mitsubishi UFJ Financial Group, Mizuho Financial Group, Sumitomo Mitsui Financial Group, Sumitomo Mitsui Trust Holdings have set **2030 interim targets** for the electric power, oil and gas, and coal sectors, among others（April 2022~）

- Similarly, domestic financial institutions affiliated with the Net-Zero Asset Owner Alliance (NZAOA) and other organizations have also set targets for sub-portfolio engagement transition finance
  - Nippon Life Insurance and Dai-ichi Life Group **set goals for their sub-portfolios of listed stocks**, internal companies, real estate, etc., and also set goals **for engagement and transition finance**（March 2021~）
- Starting in the second half of 2024, major **U.S.** asset management firms and financial institutions **have begun to withdraw** from climate change initiatives
  - Among these, prominent U.S. banks such as Goldman Sachs Group, Wells Fargo, and Citigroup have exited the Net Zero Banking Alliance (**NZBA**)
  - In January 2025, BlackRock also announced its departure from the Net Zero Asset Managers initiative (**NZAM**), which aims to achieve net-zero GHG emissions for investments by 2050. NZAM is made up of approximately 325 asset management firms, managing a total of around $50 trillion (approximately ¥7900 trillion) in assets

Investor engagement with companies

- Major institutional investors demand emission reduction targets be set
  - Larry Fink, CEO of BlackRock of the U.S., the world's largest asset management firms, released a letter to top executives of the companies BlackRock invests in**, requesting that they set short, medium, and long-term GHG emission reduction targets and perform information disclosure in compliance with the TCFD recommendations** (January 2022)
- In addition, several financial institutions put forward proposals at shareholders meetings calling for stronger measures on decarbonization
  - **Environmental NGOs, financial institutions, and other organizations** called several Japanese companies to strengthen their response to decarbonization（June 2022）
- 650 investor organizations worldwide, with a total of $33 trillion in assets, **issued a statement calling on governments to strengthen climate change measures**
  - They urged the enhancement of national emission reduction targets, decarbonization policies for the entire economy, strategies for high-emission industries, measures for nature and biodiversity protection, mandatory climate-related disclosures, and the promotion of climate investments in developing countries (November 2024)

Source : UNEP FI, https://www.unepfi.org/net-zero-alliance/resources/member-targets/、https://www.unepfi.org/net-zero-banking/members/, Compiled by the Ministry of the Environment based on each publicly available information

Increasing awareness of decarbonization among investors (3)

The level of maturity with which investors evaluate TCFD disclosure is increasing, and in recent years there have been calls for disclosure of the path to linking climate change to business opportunities and profits

Japanese Asset management

Regarding TCFD, the level of disclosure has increased in recent years, and there is an impression that analysis and disclosure involving management and business divisions is progressing. Due to initiatives such as GFANZ and international collaboration, the maturity of financial institutions to evaluate the TCFD is increasing, and in recent years, attention has been paid to the relationship between transition plans and scenario analysis and the disclosure of sustainable finance, etc.

As the number of companies that meet the minimum disclosure requirements of the TCFD is increasing, we hope that in the future they will demonstrate the connection between financial and non-financial connectivity, the reflection of climate change response strategies, and value creation. . Although the company appropriately responds to requests such as disclosure of 11 items in four pillars, I have the impression that the disclosure content is fragmented. I think it is important for companies to view climate change as material for their companies and improve the accuracy of their disclosures by including stories about how climate change can be used as opportunities while controlling negative impacts.

Japanese investment bank

Global bank

Investors who evaluate TCFD are not monolithic, but are diverse, including long-term investors, short-term investors, and impact investors. In the future, it will be necessary to make disclosures that are conscious of which investors the TCFD analysis results are aimed at. In addition, I would like investors to understand through disclosure that it is possible to reliably generate profits while responding to climate change, and that responding to climate change can be linked to profits.

Source : Prepared by the Ministry of the Environment based on the results of hearings conducted for the FY2023 project.

The Earth is facing three crises: "climate change“, "loss of biodiversity" and "pollution." The issues that society as whole must address are not limited to just climate change

The three crises the Earth is facing

Climate change

Extreme weather events and temperature rise due to global warming

- Tropical cyclone damage, heavy rainfall, flooding and rising average temperatures have been observed around the world
- In Japan, the heavy rainfall during the 2023 rainy season and the record-high temperatures from late July to early August have been reported as being caused by global warming

India

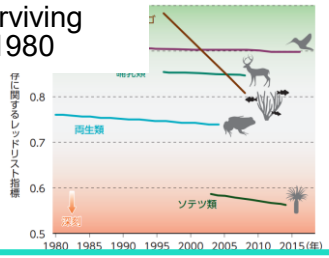
Fukuoka

Loss of biodiversity

The accelerating rate of species extinction on Earth

- Due to human activity, the extinction rate of species on Earth over the past 50 years is at least tens to hundreds of times higher than the average over the past 10 million years
- For example, the catch volume of marine fisheries in Japan is about 50% of its peak the diversity of timber-producing tree species has decreased by about 40% over the past 50 years and in the past 20 years, damage to agriculture, forestry and fisheries from wild animals has increased. Additionally, the risk to human health from zoonotic diseases has also become apparent

The decline in surviving species since 1980

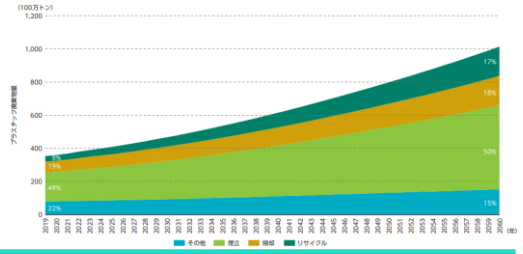


Pollution

The deterioration of the marine environment due to plastic waste ,other pollutants, water shortages and water pollution

- The amount of plastic waste globally is expected to nearly triple from 2019 to 2060 with plastic waste accumulating in lakes, rivers and oceans increasing more than threefold
- Water scarcity is worsening worldwide due to population growth, increased water usage, water pollution and the impacts of climate change. Over 300,000 infants die annually from diarrhea caused by contaminated water

Annual plastic waste volume (forecasted)



In the G7 Hiroshima Leaders' Communique, it was explicitly stated that the Earth is facing three crises. To overcome them, the need for an integrated approach to multiple environmental issues was agreed upon

Source : Prepared by the Ministry of the Environment based on “Outline of the Sixth Basic Environment Plan”、“2024 white papers on environment, circular economy and biodiversity

The expansion of agendas requiring information disclosure

In recent years, the issues requiring information disclosure have expanded beyond climate change to include various sustainability challenges

Challenge	Environment			Society / Governance
	Climate Change	**Natural restoration**	**Circular economy**	**Human rights Human capital**
Social trends	**Building on TCFD disclosures for effective transition plans, management practices ensuring effectiveness across multiple agendas are expected** ▸ Paris Agreement(2015) ▸ Progress towards the 1.5°C target ▸ ESG investment, TCFD disclosures and GX promotion are increasingly influencing businesses	**Following climate change, institutional design progresses, with rising attention after COP15 and the establishment of TNFD** ▸ GBF (2022) ▸ National Biodiversity Strategy(2023) ▸ NFD and SBTN initiatives began in some companies	**At the G7, climate and nature are positioned as key issues, with the development of implementation plans progressing domestically** ▸ Positioned as a focus area for enhancement at the G7 ▸ “Circular Economy Roadmap”, "Growth-Oriented Resource Autonomous Economy Strategy” ▸ The government set a goal to achieve a market size of over 80 trillion yen by 2030	**Issues such as human rights, human capital, and regional disparities span a wide range in the pursuit of a sustainable society** ▸ ‘SDGs(2015) ▸ Guidance on due diligence, including human rights(OECD, EU) ▸ Domestically, responses are progressing such as human capital in the CG code

Actions required

Scope: Addressing other agendas

Depth: Effectiveness

Information disclosure based on the TCFD framework

Establishing a system based on the TCFD's 4 pillars, identifying climate-related risks and opportunities, formulating strategies and plans, setting goals and indicators and disclosing information

Pursuing the effectiveness of decarbonization measures based on the transition plan

Executing company-wide strategies and plans for the transition to a decarbonized society based on the formulated transition plan

Compliance with sustainability-related regulations such as TNFD, ISSB, SSBJ, CSRD and CSDDD

The topics requiring information disclosure are not limited to climate change but also span across various issues such as natural restoration, circular economy, and broader environmental, social, and governance challenges. It is essential to meet the regulatory requirements for a wide range of themes

Practicing sustainability management from a multifaceted perspective

In the context of climate change, just as the transition plan was formulated starting from TCFD disclosures to enhance effectiveness, it is expected that management practices contributing to ensuring effectiveness from a multifaceted perspective, including other agendas, will be required

By disclosing information in an integrated manner, there is the potential to address multiple environmental issues effectively. The Ministry of the Environment has issued a "Guide for Integrated Information Disclosure towards the Realization of the Environmental Triple Society”

- In 2023, the global average annual temperature reached the highest level on record, and the increasing frequency of extreme weather events and large-scale natural disasters worldwide has reinforced the recognition that addressing climate change is a common challenge for humanity. However, the planet’s challenges are not limited to climate change alone; it is facing three major crises: "climate change," "biodiversity loss," and "pollution.“
- The realization of a decarbonized society has become a shared international goal, with governments and the private sector worldwide advancing efforts in this direction. However, the impact of climate change measures aimed at achieving a decarbonized society could also have negative effects on natural capital, such as biodiversity loss, water pollution, and resource depletion. On the other hand, by understanding these interrelationships and integrating climate change measures with nature restoration (nature-positive initiatives) and the circular economy, it is possible to generate co-benefits.
- Based on this perspective, the Ministry of the Environment has proposed the concept of the "Environmental Tri-Society," which aims to expand the positive impacts and minimize the negative impacts among environmental issues. This concept seeks the simultaneous achievement of decarbonization, the circular economy, and nature restoration. It is also positioned as one of the policies in Japan’s Sixth Basic Environmental Plan, formulated in 2024, which aims to realize "new growth" based on natural capital.

A guideline was issued with the aim of promoting companies' integrated information disclosure and initiatives to ensure efficient and effective disclosure responses that consider the interrelationships between environmental issues.

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The Financial Stability Board established the Task Force on Climate-related Financial Disclosures (TCFD) at the G20's request due to concerns that climate change could undermine the stability of the financial system and threaten financial institutions

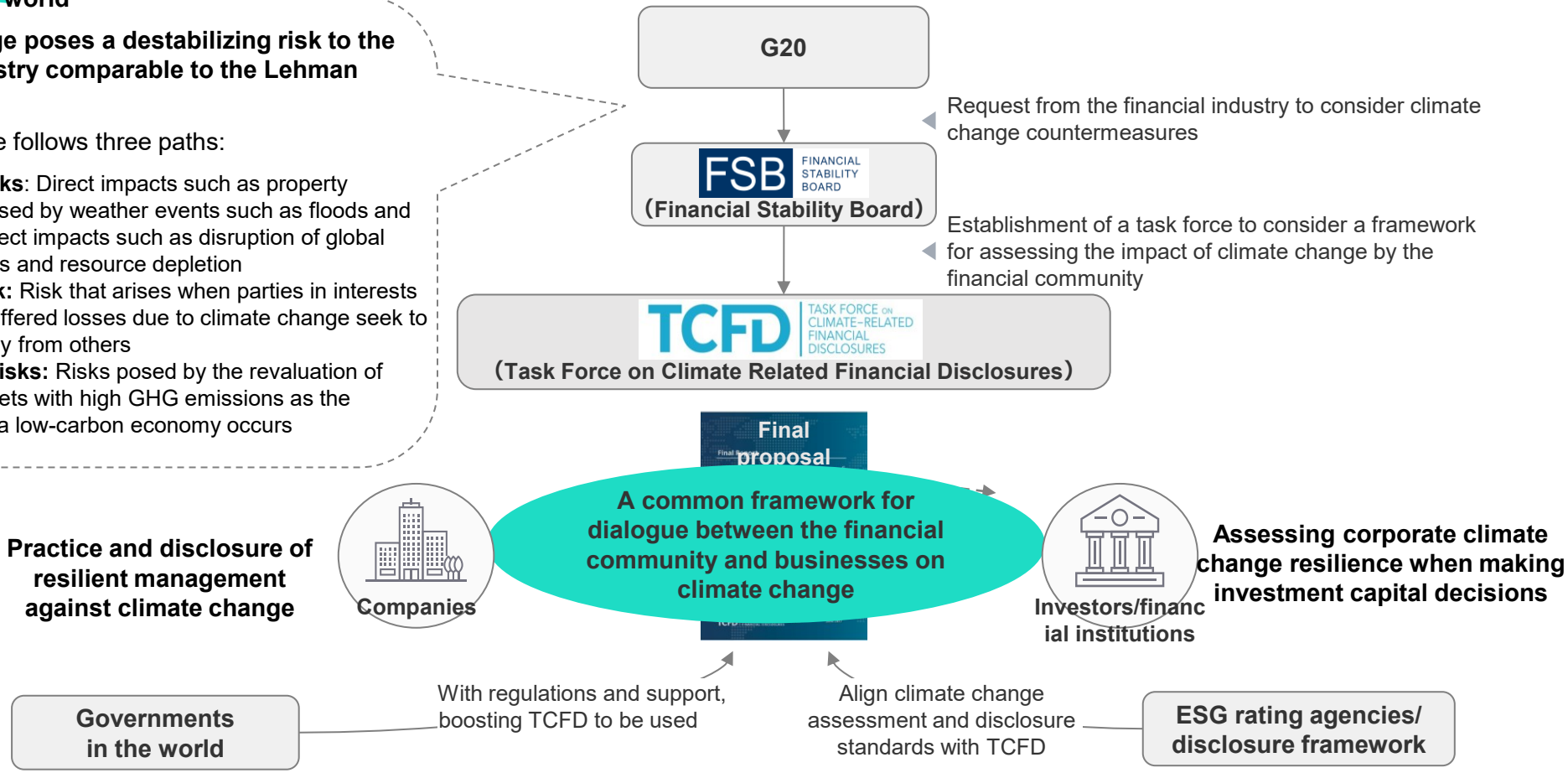
- "The financial risks that could result from the process of adjustment towards a lower carbon economy could prompt a reassessment of the value of a large range of assets with a large volume of greenhouse gas emissions and destabilize the financial system." Speech by Mark Carney, Chair of the Financial Stability Board (FSB), Then Governor of the Bank of England
- Dr. Carney also refers to the possibility that a sudden reassessment could destabilize markets like the subprime loan crises

Sense of crisis arose in the financial world

Climate change poses a destabilizing risk to the financial industry comparable to the Lehman Shock

Climate change follows three paths:

1. **Physical risks**: Direct impacts such as property damage caused by weather events such as floods and storms, indirect impacts such as disruption of global supply chains and resource depletion
2. **Liability risk:** Risk that arises when parties in interests who have suffered losses due to climate change seek to collect liability from others
3. **Transition risks:** Risks posed by the revaluation of financial assets with high GHG emissions as the transition to a low-carbon economy occurs



Various national governments, including Japan, have developed / are in the process of developing disclosure rules in line with the TCFD; the disclosure frameworks are also consistent with the TCFD, with the TCFD playing a central role in disclosures related to climate change

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Global participants: 4,194 groups
1,202 of which are Japanese (as of January 31st, 2023)

Various national governments

- EU:
  Disclosure of information in line with the TCFD recommendations on ESG risks, including climate change risks, is to be gradually made mandatory starting from January 2023
- US:
  The Securities and Exchange Commission is **currently considering regulations that would require** listed companies **to list climate-related information in line with the TCFD recommendations, including climate change risks (planned to be finalized in April 2023)**
- **Other countries including the UK, France, Singapore, Switzerland, and Brazil** have also made TCFD recommendations-compliant disclosure of climate-related information mandatory / are considering making this mandatory
- Japan:
  Through a revision of the Corporate Governance Code, **prime market-listed companies are requested to disclose information in line with the TCFD recommendations** starting from 2022
  Furthermore, on January 31, 2023, the Financial Services Agency announced and put into force amendments to Cabinet Office Ordinances, etc., related to the disclosure of corporate affairs, and a **new column for entering sustainability-related information consistent with the TCFD recommendations was established for securities reports, etc.**[*1]

Disclosure frameworks

- ISSB (International Sustainability Standards Board):
  Announced the final draft of its framework for sustainability-related disclosures based on the TCFD recommendations, including disclosure of climate change-related information, in order to establish internationally consistent requirements for disclosure of financial information **(planned to be finalized in June 2023)**
- CDP:
  Starting from 2018, the CDP **asks companies to respond to questions pertaining to the TCFD recommendations** in its climate change questionnaire
- IIRC:[*2]
  Reports that existing frameworks and standards **are generally consistent with the TCFD recommendations** based on survey results from CDP, GRI, SASB, CDSB, etc.

*1: Applied starting with securities reports, etc. for the business year ended on and after March 31, 2023. However, early application starting with securities reports, etc. submitted on or after the day of entry into force is also permitted
*2: The IIRC merged with the SASB to form the VRF (Value Reporting Foundation), which works to build a comprehensive and unified corporate reporting framework using the IIRC integrated reporting framework and SASB standards

Source : Prepared using various publicly available information sources

There are four elements of TCFD recommendations: Governance, Strategy, Risk Management, Metrics and Targets. Implementation of climate change scenario analysis is recommended in the "strategy" section of the TCFD recommendations

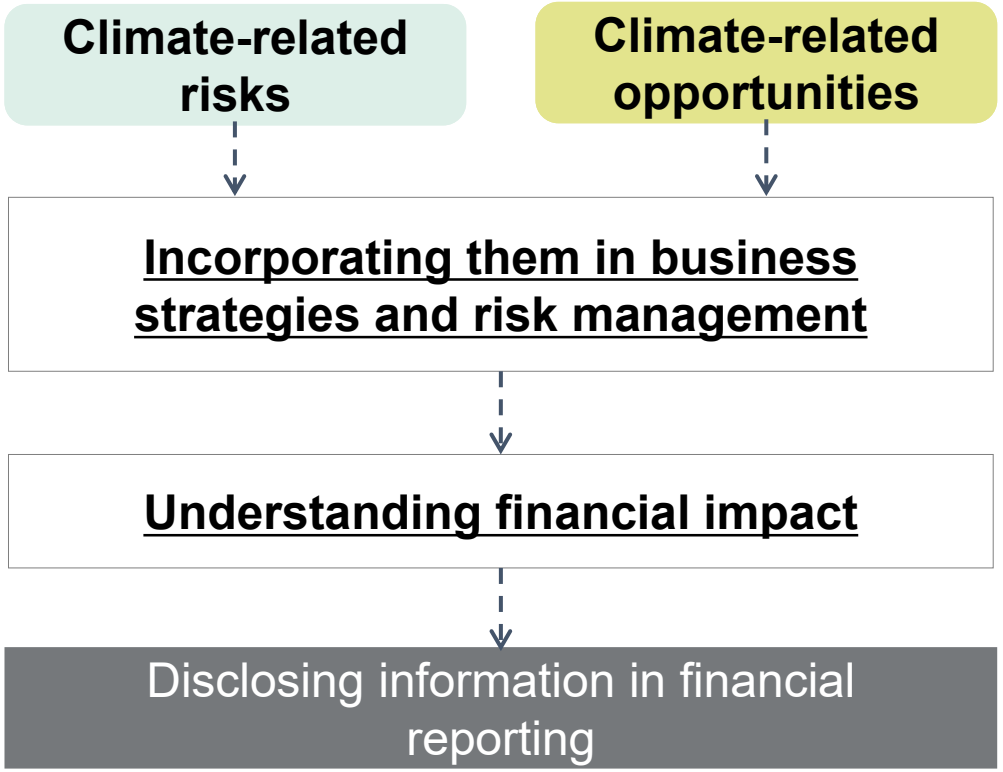
Recommended disclosures	Governance	Strategy	Risk Management	Metrics and Targets
Areas in detail	Disclose the organization's governance around climate-related risks and opportunities	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material	Disclose how the organization identifies, assesses, and manages climate-related risks	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material
Recommended Disclosures	a) Describe the board's oversight of climate-related risks and opportunities	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	a) Describe the organization's processes for identifying and assessing climate-related risks	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) Describe management's role in assessing and managing climate-related risks and opportunities	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	b) Describe the organization's processes for managing climate-related risks	b) Disclose Scope 1, Scope 2, and if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks
		c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management	c) Describe the targets used by the organization to manage climate-related risks and opportunities, and performance against targets

(Differences with the existing information disclosure system)

■ Implementation of scenario analysis:
Recommends disclosure of information using **specific climate-related scenario analysis** as recommended by the TCFD

Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, "Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures", 2017. p.14

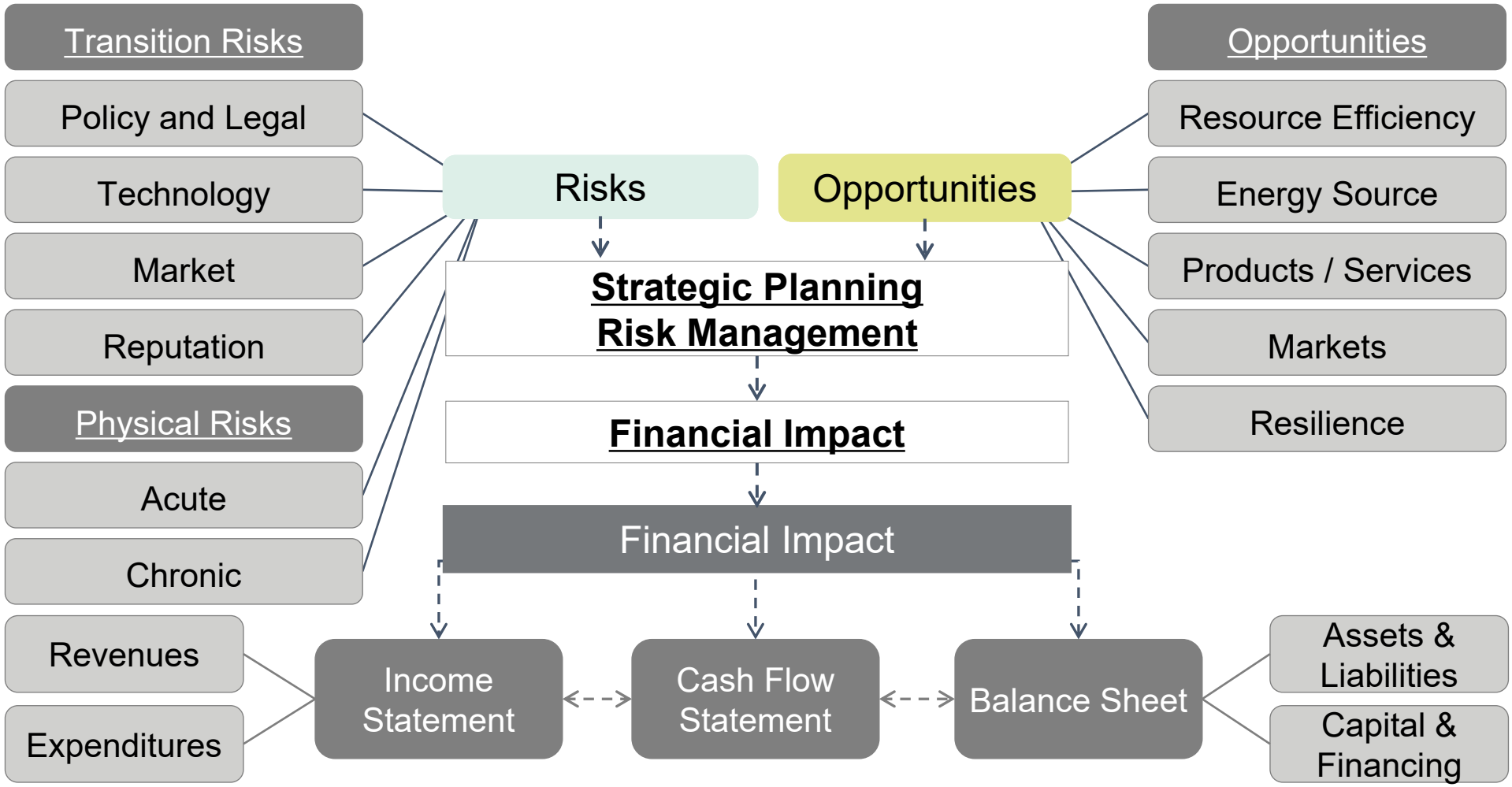
The TCFD recommendations disclosure of information related to climate change that poses financial risks and opportunities



The TCFD recommendations request all companies to (i) use different climate-related scenarios, including a 2°C or lower scenario to (ii) assess their climate-related risks and opportunities, (iii) incorporate such risks and opportunities in their business strategies and risk management, and (iv) understand and disclose their financial impacts.

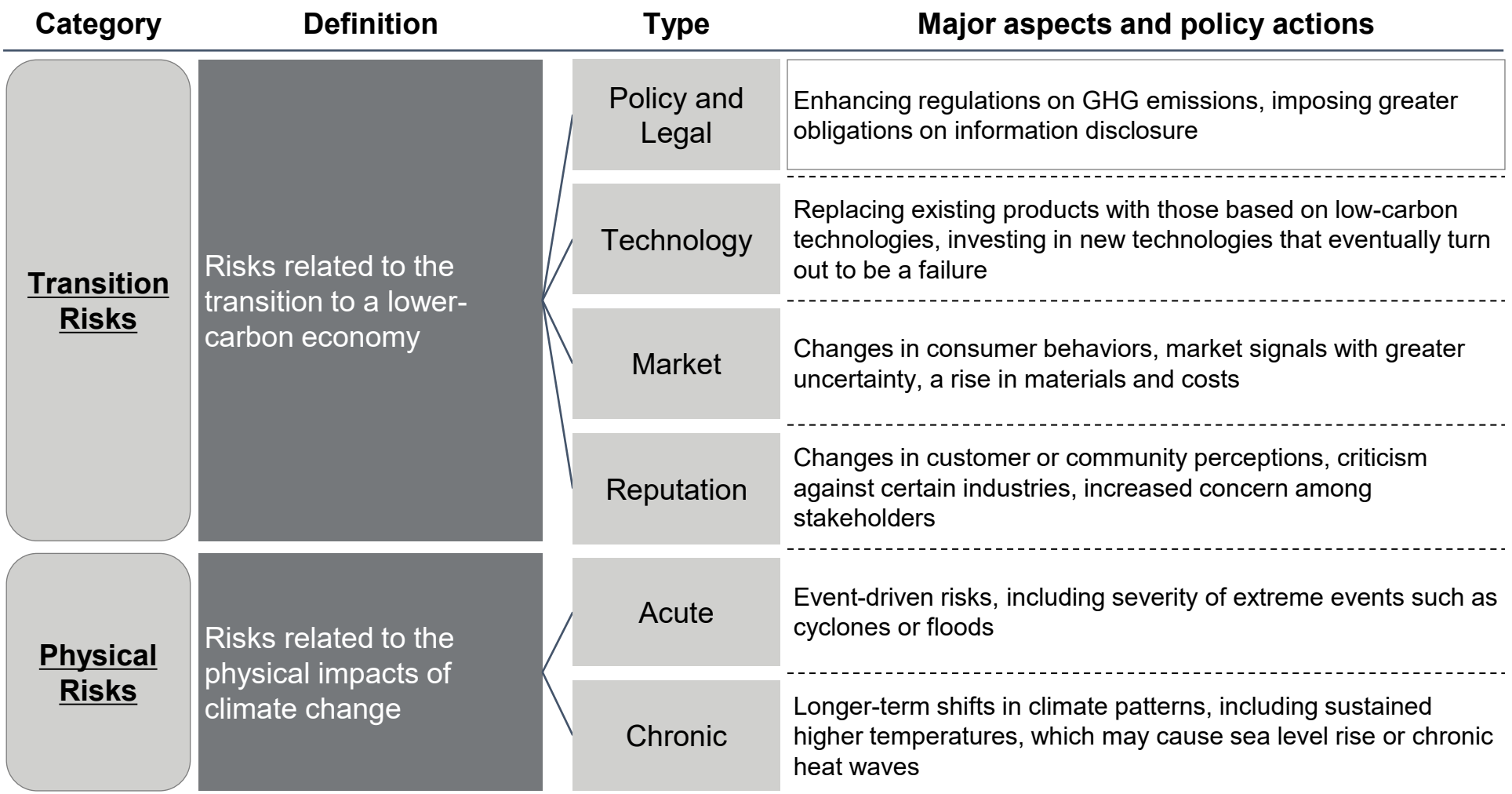
Sources : Prepared by the Ministry of the Environment based on the page 9 of Financial Services Agency's document, "On Reports of the Task Force on Climate related Financial Disclosures (TCFD)" for briefings on "Final Report"

The TCFD recommendations present the scope of climate-related risks and opportunities, and financial impacts to be disclosed



Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, “Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures”, 2017. p.8

The TCFD Recommendations divided climate-related risks into two major categories: transition risks related to the transition to a lower-carbon economy and physical risks related to the physical impacts of climate change



Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, “Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures”, 2017. p.10

The TCFD recommendations identified the following five areas of climate-related opportunities that organizations can produce in the course of their efforts to mitigate and adapt to climate change

Opportunities

Area	Policy actions	Financial impact
Resource Efficiency	■ Use of more efficient models of transport ■ Use of more efficient production and distribution processes ■ Use of Recycling ■ Move to more efficient buildings ■ Reduced water usage and consumption	■ Reduced operating costs (e.g., through efficiency gains and cost reductions) ■ Increased production capacity, resulting in increased revenues ■ Increased value of fixed assets (e.g., highly rated energy-efficient buildings) ■ Benefits to workforce management and planning (e.g., improved health and safety, employee satisfaction) resulting in lower costs
Energy Source	■ Use of lower-emission sources of energy ■ Use of supportive policy incentives ■ Use of new technologies ■ Participation in carbon market ■ Shift toward decentralized energy generation	■ Reduced operational costs (e.g., through use of lowest cost abatement) ■ Reduced exposure to future fossil fuel price increases ■ Reduced exposure to GHG emissions and therefore less sensitivity to changes in cost of carbon ■ Returns on investment in low-emissions technology ■ Increased capital availability (e.g., as more investors favor lower-emissions producers) ■ Reputational benefits resulting in increased demand for goods/services
Products and Services	■ Development and/or expansion of low emission goods and services ■ Development of climate adaptation and insurance risk solutions ■ Development of new products or services through R&D and innovation ■ Ability to diversify business activities	■ Increased revenue through demand for lower emissions products and services ■ Increased revenue through new solutions to adaptation needs (e.g., insurance risk transfer products and services) ■ Better competitive position to reflect shifting consumer preferences, resulting in increased revenues
Markets	■ Access to new markets ■ Use of public-sector incentives ■ Access to new assets and locations needing insurance coverage	■ Increased revenues through access to new and emerging markets (e.g., partnerships with governments, development banks) ■ Increased diversification of financial assets (e.g., green bonds and infrastructure)
Resilience	■ Participation in renewable energy programs and adaptation of energy-efficiency measures ■ Resource substitutes/diversification	■ Increased market valuation through resilience planning ■ Increased reliability of supply chain and ability to operate under various conditions ■ Increased revenue through new products and services

Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, “Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures”, 2017. p.11

The TCFD supplemental guidance, such as “Annex” and “Technical Supplement”, provides additional context and suggestions for implementing the recommended disclosures for four non-financial potentially most affected by climate change

Sector	Industry	Recommended disclosure
Energy	■ Oil and Gas ■ Coal ■ Electric Utilities	Assessment and potential impacts of **legal compliance, operating costs, changes in risks and opportunities; changes in regulations and shift in consumer and investor preferences; and changes in investment strategy**
Transportation	■ Air Transport, Maritime Transportation ■ Land Transportation (Rail Transportation, Tracking Services) ■ Automobiles	Assessment and potential impacts of **financial risks of enhanced regulations and new technology on existing factories and equipment; R&D investment in new technologies; opportunities for use of new technologies to lower emissions standards and regulations on higher fuel efficiency**
Materials and Buildings	■ Metals and Mining ■ Chemicals ■ Construction Materials, Capital Goods ■ Real Estate Management and Development	Assessment and potential impacts of **enhanced regulations on GHG emissions and carbon pricing; risk assessment of increased severity of extreme weather events on construction materials and property; and opportunities for products to improve energy efficiency or reduce energy consumption**
Agriculture, Food, and Forest Products	■ Beverages, Foods ■ Agriculture ■ Paper and Forest Products	Assessment and potential impacts of **GHG emissions reductions; recycling and waste management; business of food and textile products with lower GHG emissions, and shifts in consumer preferences**

Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, “Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures”, 2017. p.52-65

The TCFD recommendations require an organization to describe the board's oversight of climate-related risks and opportunities, and management's role in assessing and managing such risks and opportunities

The organization's governance around climate-related risks and opportunities

The board's oversight of climate-related risks and opportunities

- Processes and frequency by which the board and/or board committees are informed about climate-related issues
- Whether the board and/or board committees consider climate-related issues when reviewing and guiding strategy, major plans of action, risk management policies, annual budgets, and business plans as setting the organization's performance objectives, monitoring implementation and performance, and overseeing major capital expenditures, acquisitions, and divestitures
- How the board monitors and oversees progress against goals and targets for addressing climate-related issues

Management role in assessing and managing climate-related risks and opportunities

- Whether the organization has assigned climate-related responsibilities to management-level positions or committees; and, if so, whether such management positions or committees report to the board or a committee of the board and whether those responsibilities include assessing and/or managing climate-related issues
- A description of the associated organizational structure(s)
- How management (through specific positions and/or management committees) monitors climate-related issues

Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, "Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures", 2017. p.19

TCFD requires an organization to describe the climate-related risks and opportunities over different time frames; their impacts on businesses, strategy, and financial planning; and the strategy's resilience, considering climate-related scenarios, including a 2℃ or lower scenario

Impact on the organization's businesses, strategy, and financial planning (where relevant information is critical)

The climate-related risks and opportunities the organization has identified over the short, medium, and long term

- A description of what they consider to be the relevant short, medium, and long-term time horizons
- The specific climate-related issues for each time horizon that could have a material financial impact on the organization
- The process(es) used to determine which risks and opportunities could have a material financial impact on the organization

The impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

- How identified climate-related issues have affected their businesses, strategy, and financial planning
- The impact on their businesses and strategy in the areas of products and services; supply chain and/or value chain; adaptation and mitigation activities; investment in research and development; and operations
- The impact of climate-related issues on operating costs and revenues; capital expenditures and capital allocation; acquisitions or divestments; and access to capital

Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, "Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures", 2017. p.20-21

The TCFD recommendations require an organization to describe the organization's processes for identifying, assessing, and managing climate-related risks, as well as how these processes are integrated into the organization's overall risk management

How the organization identifies, assesses, and manages climate-related risks

The Organization's processes for identifying and assessing climate-related risks

- Their risk management processes for identifying and assessing climate-related risks
  (An important aspect is how the organization determines the relative materiality of climate-related risks in relation to other risks)
- Whether they consider existing and emerging regulatory requirements related to climate change
- Their processes for assessing the potential size and scope of identified climate-related risks; and definitions of risk terminology used or references to existing risk classification frameworks used

The organization's processes for managing climate-related risks

- Their processes for managing climate-related risks, (including how they make decisions to mitigate, transfer, accept, or control those risks)
- Their processes for prioritizing climate-related risks, (including how materiality determinations are made)

How processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risks management

- How their processes for identifying, assessing, and managing climate-related risks are integrated into their overall risk management

Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, "Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures", 2017. p.21-22

TCFD requires an organization to describe the metrics used to assess climate-related risks and opportunities in line with its strategy and risk management process; GHG emissions; the targets to manage climate-related risks and opportunities, and performance against targets

The metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material

The metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process

- The key metrics used to measure and manage climate-related risks and opportunities (organizations should consider including metrics associated with water, energy, land use, and waste management)
- Whether and how related performance metrics are incorporated into remuneration policies (where climate-related issues are material)
- Their internal carbon prices as well as climate-related opportunity metrics such as revenue from products and services designed for a lower-carbon economy
- Metrics should be provided for historical periods to allow for trend analysis. The methodologies used to calculate or estimate metrics should also be included.

Scope 1, Scope 2, and if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks

- GHG emissions calculated in line with the GHG Protocol methodology to allow for aggregation and comparability across organizations and jurisdictions
- Related, generally accepted industry-specific GHG efficiency ratios (as appropriate)
- GHG emissions and associated metrics should be provided for historical periods. The methodologies used to calculate or estimate the metrics should also be included.

The targets used by the organization to manage climate-related risks and opportunities and performance against targets

- Their key climate-related targets (such as those related to GHG emissions, water usage, energy usage)
- Other goals including efficiency or financial goals through the entire life cycle of products and services
- Whether the target is absolute or intensity; time frames over which the target applies; key performance indicators, etc.

Source : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures, “Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures”, 2017. p.22-23

Perceptions of lacking / having inadequate measures for addressing the TCFD recommendations have a great risk of hindering sustainable management of the company in the short, medium, and long-term

Short term

- **Increased financing costs**: Perceptions of inadequate measures against climate change will lead to increased financial costs due to withdrawn investments and lost opportunities for ESG investment and green financing
- **Environmental reputation/branding**: Decline in environmental reputation and branding due to lack of compliance with international disclosure rules
- **Lawsuits**: Litigation by shareholders and other stakeholders for failure to uphold obligations for reporting material information (example: Commonwealth Bank of Australia)

Short to medium-term

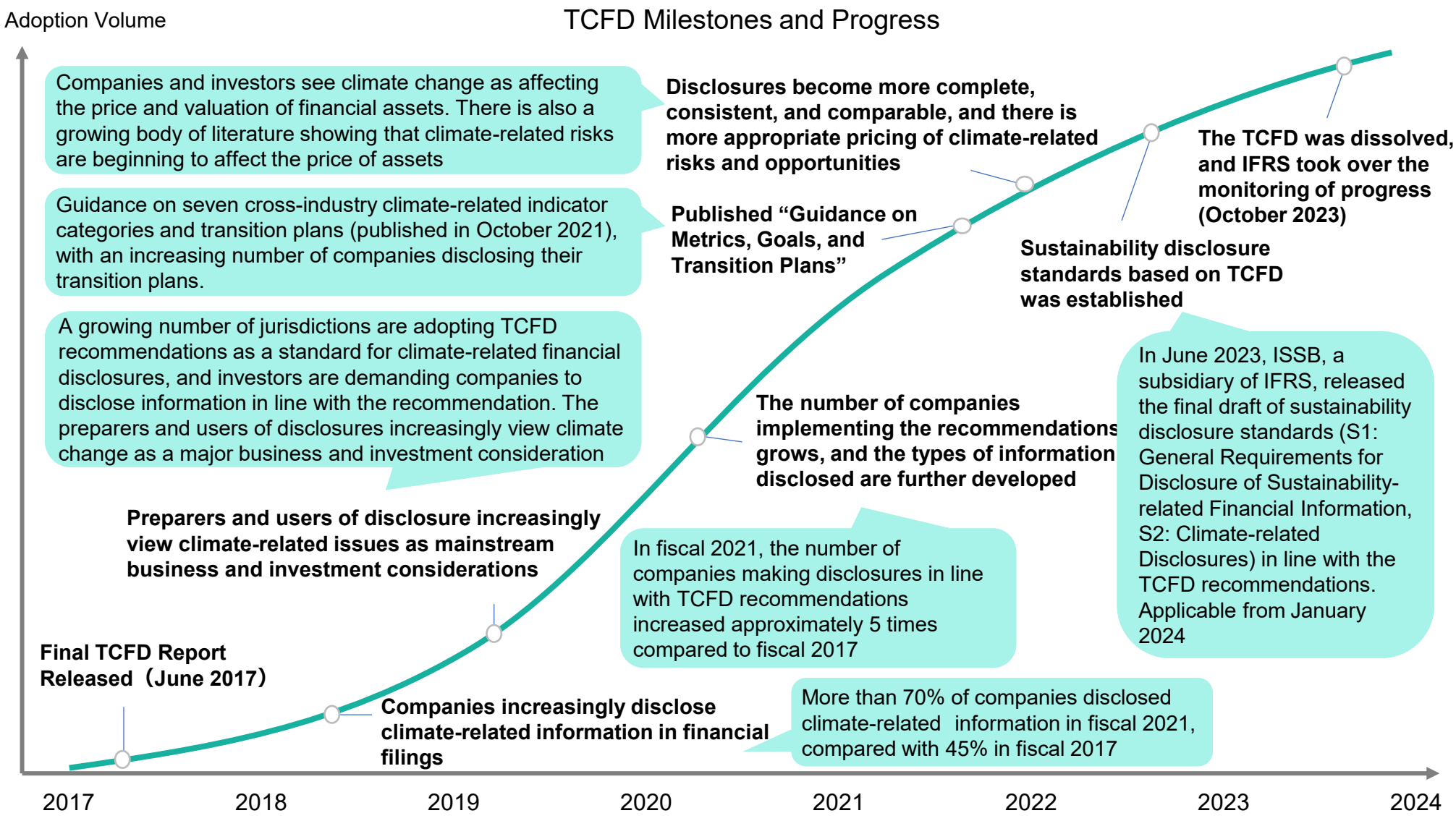
- **Regulations**: Failure to comply with information disclosure rules and accounting standards may lead to a decline in the company's reputation and its competitiveness, as well as incurring penalties from the government (Corporate Governance Code revision in Japan, movement toward legislation in several countries in Europe)

Long term

- **Weakening of business itself**: If the company fails to cope with the uncertainties of climate change, it will lose opportunities / be exposed to risks that may jeopardize its long-term survival

TCFD milestones

More companies are disclosing information in line with TCFD recommendations. Climate change has come to be seen as a major consideration for business and investment, and more companies and investors sees that the prices of financial assets affected



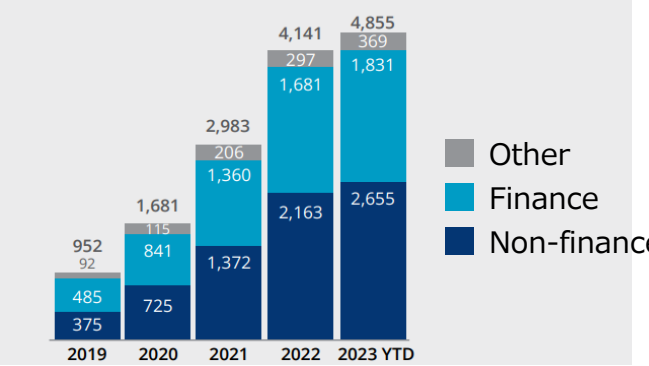
Source : TCFD, *Task Force on Climate-related Financial Disclosures 2023 Status Report*

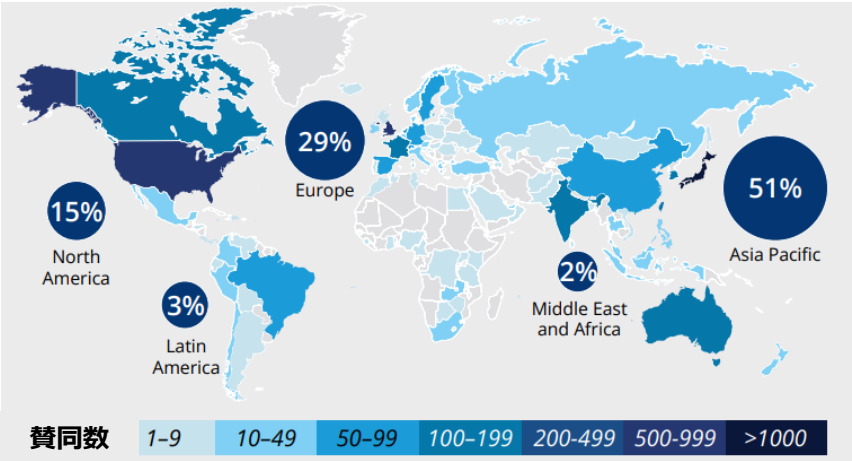
Status of support for TCFD

The number of TCFD supporters worldwide is over 4,800 and has been on the rise since 2019.The number of supporters in Japan is 1,445, the highest in the world, and by sector, industry, finance, and materials have the highest numbers

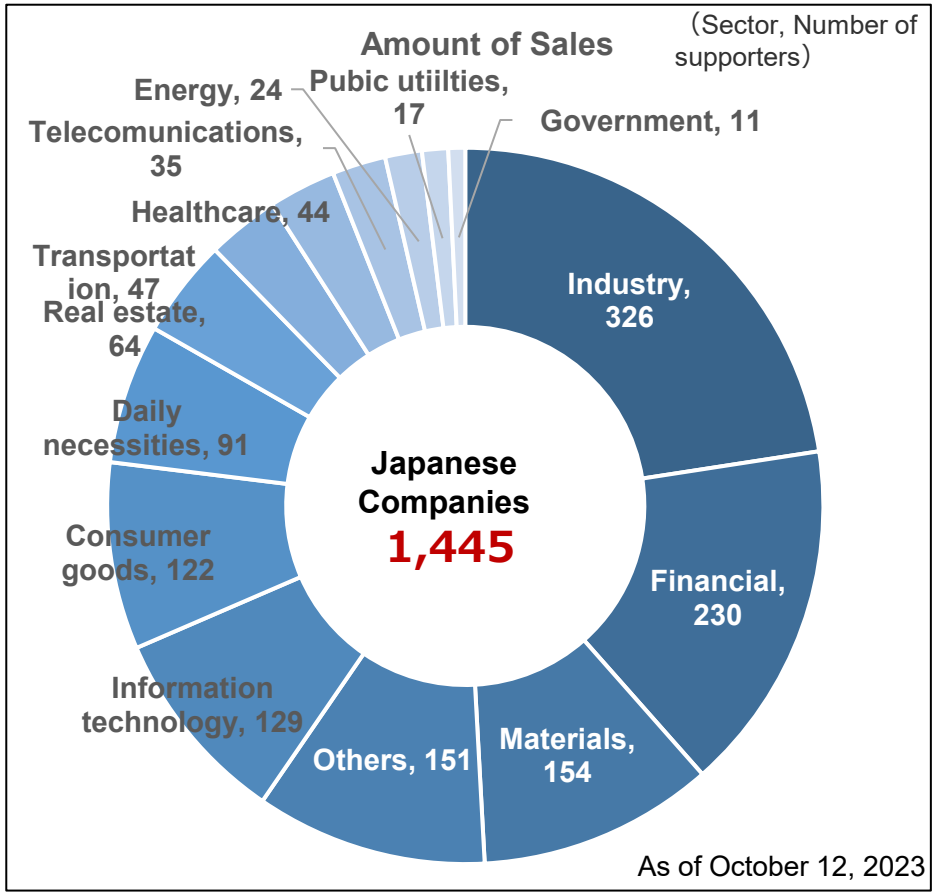
- The number of companies and institutions supporting the TCFD is increasing year by year, and as of October 12, 2023, 4,872 companies and institutions worldwide have expressed support for the TCFD
- By region, Asia Pacific accounts for half (approximately 51%) of the number of supporters
- Looking at Japanese supporting companies by sector, the largest number are in industry, followed by finance and materials
- Following the conclusion of TCFD's activities, as of Nov 2023, the tracking and publication of supporting companies are no longer being carried out

Trends and distribution of number of supporting companies





Number of Japanese Companies Presenting Support by sector

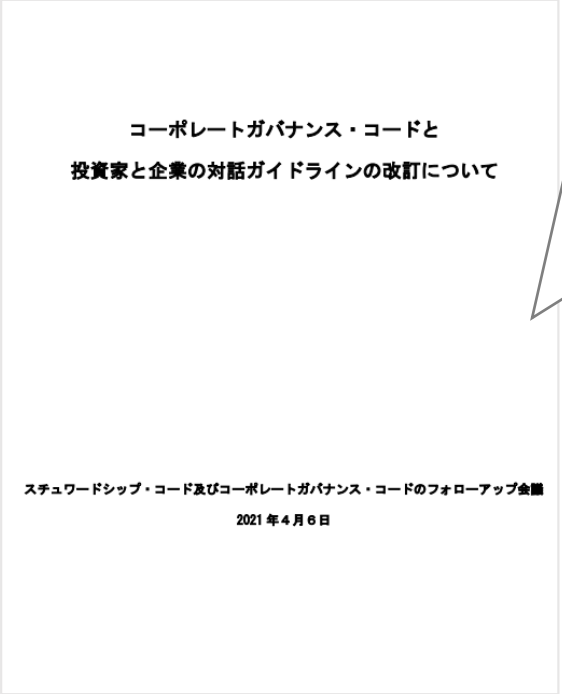


Source：https://www.env.go.jp/earth/datsutansokeiei.html ,https://assets.bbhub.io/company/sites/60/2023/09/2023-Status-Report.pdf

In Japan, the revised Corporate Governance Code requires disclosure based on the TCFD recommendations for prime market listed companies

- The **Corporate Governance Code and guidelines for dialogue between investors and companies were revised** to enable companies to demonstrate more sophisticated governance (June 2021)
- **Prime market listed companies will be required to submit an annual "Corporate Governance Report" every year starting in 2022**[*1]

Details of TCFD-related revisions[*2]



- It is important for listed companies to consider and promote sustainability initiatives on a company-wide basis (e.g., **establishing committees on sustainability**, holding dialogue with shareholders)

- When disclosing management strategies, **listed companies should make appropriate disclosure of their efforts related to sustainability**
- **Prime market listed companies**[*2] should promote the **quality and quantity of their disclosures based on the TCFD recommendations**
- **The Board of Directors** should **formulate basic policies on the company's sustainability initiatives and provide effective oversight**

*1: The revisions in the Corporate Governance Code that cover prime market listed companies will come into effect on April 4, 2022. Reports based on the principles, etc., for prime market listed companies are required to be submitted starting April 4, 2022; the Corporate Governance Reporting Guidelines (April 2022 version) will be effective starting April 4, 2022

*2: One of the market classifications after the Tokyo Stock Exchange listing classification change (scheduled for April 4, 2022). Generally equivalent to the current First Section of the Tokyo Stock Exchange

Source : Financial Services Agency website

In January 2023, the Financial Services Agency announced and put into force amendments to Cabinet Office Ordinances, etc., related to the disclosure of corporate affairs; a new column for entering sustainability-related information was established for securities reports, etc.*1

- The Report by the "Working Group on Corporate Disclosure" of the Financial System Council recommends that systems be developed for disclosure of corporate sustainability-related initiatives and disclosure of information related to corporate governance (June 2022)
- **On January 31, 2023, a revision was made to include disclosures of corporate sustainability-related initiatives in the items for listing in securities reports, etc.,** based on the recommendations and public commentary

Revisions / announcements related to disclosure of corporate sustainability-related initiatives (excerpt)

Overview of revisions / announcements	Details of revisions / announcements
Establishment of a new column for entering sustainability-related information	• A new column for entering information on the company's concept of / efforts toward sustainability is established for securities reports, etc. This is to be a **column for which entry is mandatory in "Governance" and "Risk Management", and one for which entry is requested in "Strategy" and "Metrics and Targets" depending on significance** • Additionally, if the company has included sustainability-related information in any other column in securities reports, etc., the company must **reference those entries in the sustainability-related information entry column**
Statements of forward-looking information / liability for misstatements, and references to other published documents	• For forward-looking information, if a concrete explanation is provided to the extent that is generally considered reasonable, the company will not be held immediately liable for misstatements, etc., even if the actual results differ from the forward-looking information stated in the securities registration statement. • Additionally, when providing the explanation in question, **if, for example, the explanation is one that was reached as a result of appropriate internal consideration of the forward-thinking information based on reasonable grounds, the company must include a statement to that effect, providing an overview of the details of the consideration behind this (e.g., the facts upon which the premise was built and the degree to which tentative assumptions and estimations were used)** • For entries on sustainability-related information and the status of activities by the board of directors, etc., after entering the key matters for inclusion in securities registration statements, the company must then reference other published documents for information on the details for these entries. Furthermore, excepting cases where the act of referencing other published documents may itself constitute a significant misstatement in the securities registration statement (such as where the company has knowingly referenced other published documents that clearly include significant misstatements), the company will not be held immediately liable for misstatements, etc., through documents referenced

*1: Applied starting with securities reports, etc. for the business year ended on and after March 31, 2023. However, early application starting with securities reports, etc. submitted on or after the day of entry into force is also permitted

Source : Financial Services Agency website, https://www.fsa.go.jp/news/r4/sonota/20230131/20230131.html

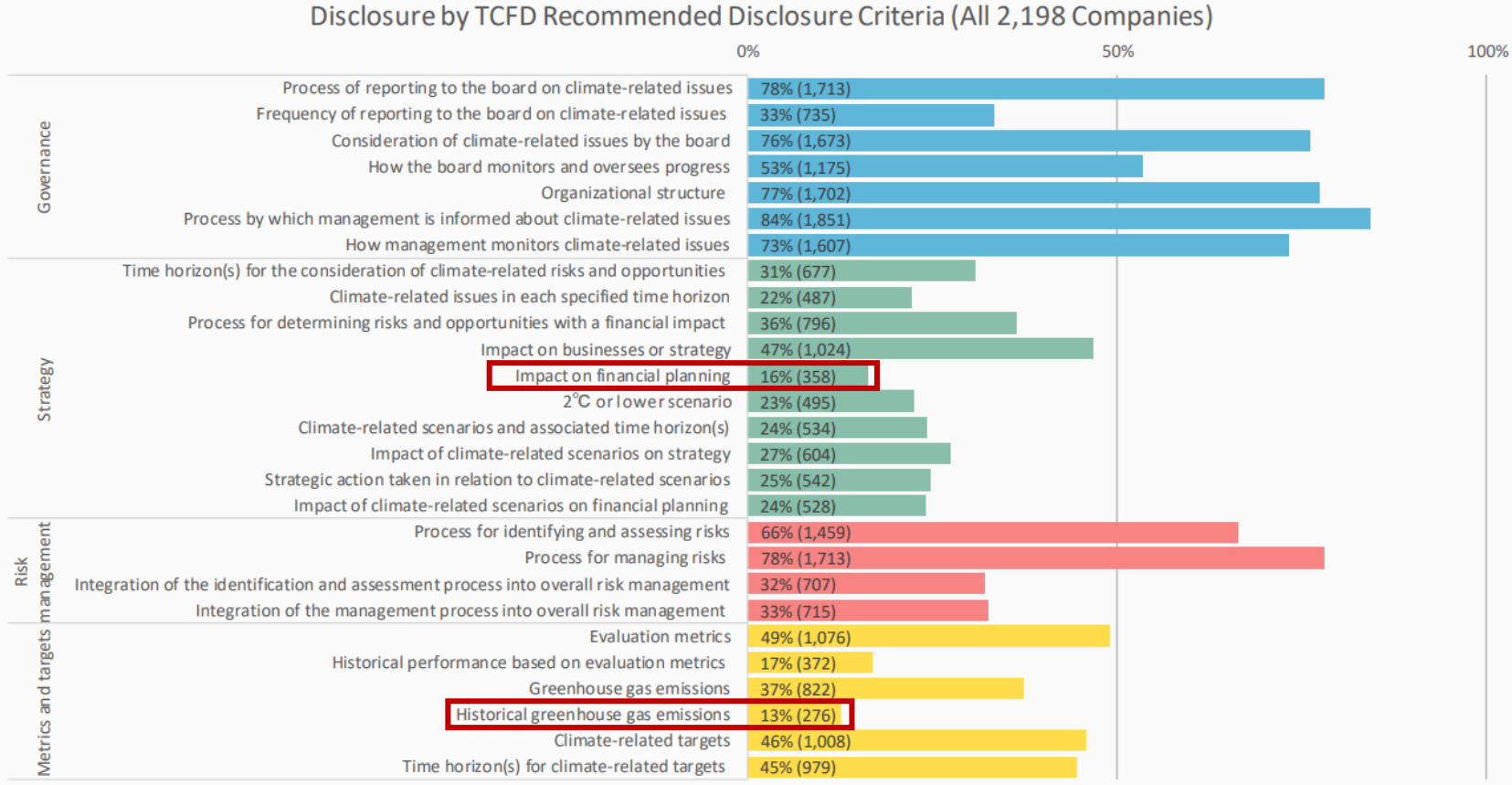
In chapter 1 Appendix of this practical guide, several disclosure examples of corporate scenario analysis are introduced, including overseas examples

Region	Sector	Company Name
Domestic	Financial	Sompo Holdings, Inc., Dai-ichi Life Holdings, Inc., The Norinchukin Bank, Mizuho Financial Group, Inc.
	Energy	J-POWER, The Chugoku Electric Power Company, Inc.
	Transportation	Mitsui O.S.K. Lines, Ltd., East Japan Railway Company
	Materials, Buildings	KH Neochem Co., Ltd., JFE Holdings, Inc., TODA CORPORATION, LIXIL Corporation
	Agriculture, Food, and Forest Products	Kameda Seika Co., Ltd., Kirin Holdings Company, Limited, FUJI OIL HOLDINGS INC.
	Trading, Retail	J. Front Retailing Co., Ltd., Isetan Mitsukoshi Holdings, Ltd., Mitsubishi Corporation
	Electricity, Machinery, Communication	NTT DATA Corporation, Ebara Corporation, Seiko Epson Corporation, NEC Corporation, Panasonic Holdings Corporation
	Consumer Discretionary, Pharmaceutical or Food	Shiseido Company, Limited, SEKISUI CHEMICAL CO., LTD., Nichirei Corporation
	Service（Other）	Members Co., Ltd.,Recruit Holdings Co., Recruit Holdings Co., Ltd.
Overseas	Energy	NRG Energy Inc (US) , Shell plc (UK) , Woodside Energy Limited (Australia)
	Transportation	Canadian National Railway (Canada), FirstGroup plc (UK), Ford Motor Company (US)
	Materials, Buildings	The Dow Chemical Company (US), Freeport-McMoRan Inc (US), Newmont Corporation (US)
	Agriculture, Food, and Forest Products	J Sainsbury plc (UK), Mondi Group (UK)
	Electricity, Machinery, Communication	Eaton Corporation plc (US), Schneider Electric SE (France)
	Consumer Discretionary, Pharmaceutical	Burberry Group plc (UK), Unilever plc (UK)

(Reference) Japanese company's TCFD disclosure situation in Japan

Nearly 70% of the 400 constituents of the JPX-Nikkei Index have disclosed 1 or more disclosure items recommended by the TCFD, indicating that disclosure is progressing

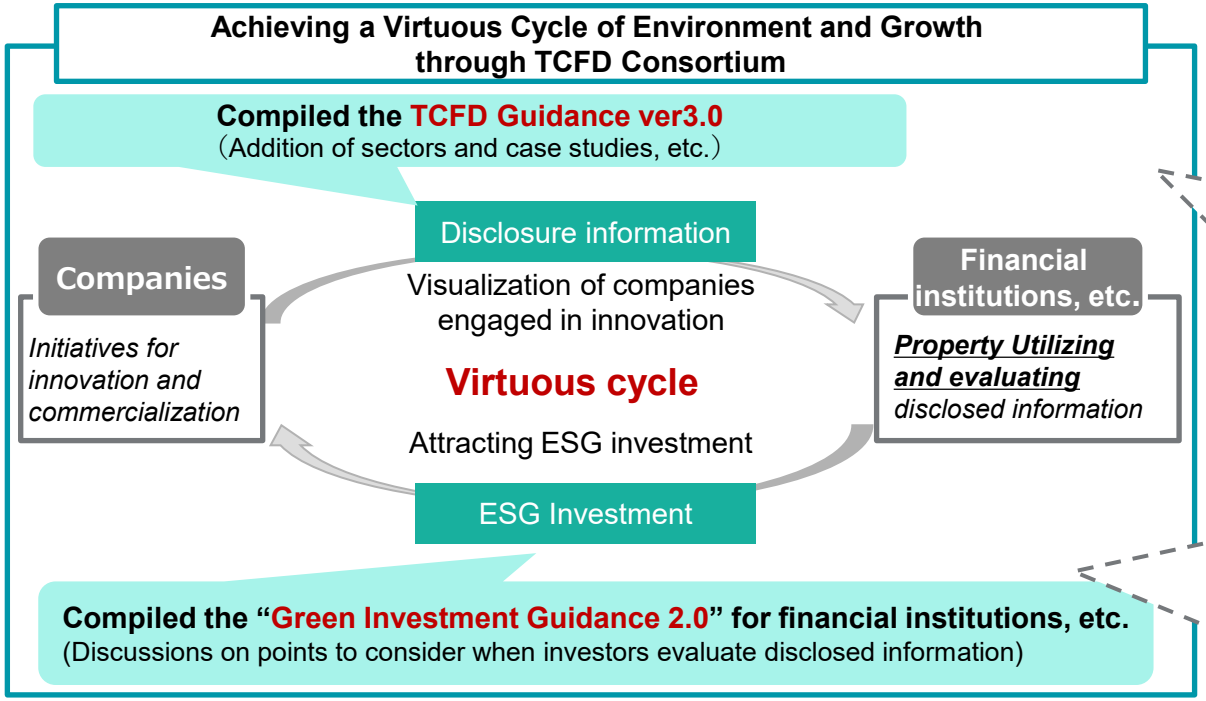
- The Japan Exchange Group conducted a survey on the disclosure status of the TCFD recommendation disclosure items for domestic companies listed on the Tokyo Stock Exchange that submitted their securities reports between April 1, 2023, and October 31, 2023 (as of October 2023)
- Particularly, many companies disclosed items related to "Process by which management is informed about climate-related issues," "Process of reporting to the board on climate-related issues" and "Process for managing risks." On the other hand, **only about 15% of companies disclosed "Historical greenhouse gas emissions" and "the Impact on financial planning."**



Source : Japan Exchange Group, Inc., *Survey of TCFD Disclosure Using Generative AI*, https://www.jpx.co.jp/english/corporate/news/news-releases/0090/dh3otn0000002wyp-att/Survey_TCFD_Disclosure_Using_Generative_AI_en.pdf

The TCFD consortium was established in 2019 with private sector initiative, and has been discussing effective information disclosure by companies and efforts to connect disclosed information to appropriate investment decisions

- In view of the increased awareness on corporate disclosure and use of climate-related information highlighted by the Task Force on Climate-related Financial Disclosures (TCFD) in Japan, **the private-led TCFD Consortium was established on May 27, 2019,** by five founders.
  * Founders of the consortium: Professor Kunio Ito of Hitotsubashi University; Chairman Hiroaki Nakanishi of Keidanren (Japan Business Federation); Chair Makoto Takashima of the Japan Bankers Association; President and Chief Executive Officer Takehiko Kakiuchi of Mitsubishi Corporation; and Chairman of the Board Shuzo Sumi of Tokyo Marine Holdings.
- The Consortium aims to further discussion on **effective corporate disclosure of climate-related information and their use by financial institutions for appropriate investment decision**.
- Published **"Guidance for Utilizing Climate-related Information to Promote Green Investment 2.0 (Green Investment Guidance 2.0)"** (October 2021) **which explains the perspective from which investors and others interpret disclosures based on TCFD recommendations**, and published **"Guidance on Climate-related Financial Disclosures 3.0 (TCFD Guidance 3.0)"** (October 2022)
- In addition, the **TCFD Summit** has been held since 2019 **where leaders from industry and finance that took world leading initiatives gather to discuss TCFD's challenges and future directions**. In October 2022, the 4th TCFD Summit 2022 was held to share best practices and engage in wide-ranging



- An explanation of TCFD's Final Report to provide a first step toward TCFD disclosure, thereby encouraging disclosure by companies based on the TCFD recommendations
  - ➢ See below for more information on the TCFD Guidance ver3.0
    https://tcfd-consortium.jp/news_detail/22100501

- Based on the increase in corporate information disclosure, it provides commentaries on perspectives needed by investors and other stakeholders when understanding the disclosed information.
- It is also expected that companies will deepen their understanding of the viewpoints of investors and other stakeholders, leading to further disclosure.
  - ➢ See below for more information on Green Investment Guidance 2.0
    https://tcfd-consortium.jp/news_detail/21100501

Source : TCFD Consortium

Guidance/guides related to the TCFD in Japan

“Guidance on Climate-related Financial Disclosures (TCFD Guidance)”, “Guidance for Utilizing Climate-related Information to Promote Green Investment (Green Investment Guidance)”, and “Practical guide for Scenario Analysis in line with the TCFD recommendations” (this practical guide)

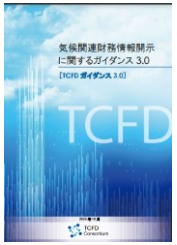
Recommended for planning corporate strategies using sustainability disclosure(climate and nature related)

～Practical guide for Scenario Analysis in line with the TCFD recommendations and integration of nature-related risk and opportunity into corporate management～

- Published by the Ministry of the Environment (March 2025)
- **Explains c) scenario analysis in Strategy** which is one of the recommended disclosure items in the TCFD recommendations
- Covers all industries

Guidance on Climate-related Financial Disclosures 3.0

(TCFD Guidance 3.0)



- Issued by TCFD Consortium（October 2022）
- Explains **the recommended disclosure items in the TCFD recommendations**
- Covers all industries
- Industry-specific guidance is also provided for the following industries: automobiles; steel; chemicals; electrical machinery/electronics; energy; food products; banking: life insurance; casualty insurance, international shipping

Companies

Promotion of climate change-related initiatives → **Disclosure of climate change-related information**

Investors

Assessment of climate change-related information disclosure

Guidance for Utilizing Climate-related Information to Promote Green Investment 2.0 (Green Investment Guidance 2.0)

- Published by the TCFD Consortium(October 2021)
- Provides an explanation that **includes the perspectives needed by investors and similar stakeholders in interpreting disclosure information** for recommended disclosure items in the TCFD recommendations

⇒See chapter 5 for TCFD-related literature

Sources : TCFD Consortium, Ministry of the Environment websites

Based on discussions considering trends such as IFRS and the UK TPT, Transition plan guidebook (English ver.) was released by the TCFD Consortium in September 2024

September 2024 Transition Plan Guidebook

Contents

Ch.1 Purpose and Background

Ch.2 Overview of the Discussion on Transition Plan

Ch.3 How Companies can Formulate Transition Plans

Ch.4 Summary

Case Examples

Purpose and Background

- Based on discussions within the TCFD Consortium, **the positioning of the TCFD transition plan** has been clarified. The document outlines the **international trends** regarding transition plans, **their positioning in other frameworks** and **guidelines for companies in formulating their plans**. It is designed to serve as a reference for both businesses and investors

Overview of the Discussion on Transition Plan

- Explain the positioning and differences of transition plans in TCFD, IFRS S2 and other frameworks (especially GFANZ, TPT), the GX League and the Basic Guidelines for Transition Finance
- Positioned as "**decision-useful information that clearly shows how companies can balance the transition to a low-carbon and decarbonized society with value creation**," the key concepts are: **1) Transition to a low-carbon and decarbonized society, 2) Alignment with business strategy and 3) Engagement with others**

How Companies can Formulate Transition Plans

- **Companies required to develop a transition plan** : **Companies operating in Japan** are expected to disclose a transition plan or at least consider the necessity of disclosure. However, depending on the industry and company size, **priority for disclosure should be considered in light of materiality**
- **Timing of development** : Given its deep connection with business strategy, it is desirable for **management to participate in the transition plan discussion from the early stages of TCFD disclosure** and to gradually enhance the disclosure over time
- **Development structure** : Cross-departmental, including customer and supplier input, is necessary to facilitate discussions across **the entire company and value chain**
- **Content to include** : Items related to "strategy" and **"metrics and targets"** should be the main focus. It is important to summarize the relevance of each item and clearly define **the business strategy for decarbonization and the actions required to achieve it**
- **Disclosure method** : **There is no need to separate transition plan disclosure** from traditional climate-related disclosures. **As long as the necessary elements for a transition plan are included**, it can be considered a valid transition plan

Source : TCFD Consortium" Transition_Plan_Guidebook_e.pdf"

Status of various countries' TCFD initiatives (1/3)

TCFD disclosures are advancing in Europe and are becoming mandatory in the EU as well as UK beginning from 2023

EU

Final approval passed for TCFD-compliant Corporate Sustainability Directive whose implementation will start gradually from January 2024

- **The final draft was announced for implementation of technical standards in line with initiatives such as the TCFD recommendations for disclosure of ESG risks**, including climate change-related risks. The standards apply to major financial institutions that have issued securities recognized for trade in markets regulated by the European Banking Authority and EU member states. The Capital Requirements Regulation (CRR), **makes it mandatory as of June 28, 2022, for major financial institutions to disclose information on ESG risks, including climate change-related risks** (January 2022)
- **The TCFD recommendations-compliant Non-Financial Reporting Directive (NFRD) was revised**, and the Corporate Sustainability Reporting Directive (CSRD) was announced, which newly expands the scope of the Taxonomy on disclosures and requires double materiality-based disclosure of ESG-related information on the company's environmental and social impact. The European Financial Reporting Advisory Group (EFRAG), an EU corporate reporting agency**, began discussion on the proposed standards for the Corporate Sustainability Reporting Directive (CSRD)** in May 2022, and announced the draft for the EU Sustainability Reporting Standards (ESRS).
- As a result of tripartite consultations between the European Parliament, the European Council and the European Commission, **the European Parliament gave final approval to the CSRD in November 2022, and issued the first ESRS (general principles (2types)) on July 31, 2023, topic-specific standards (10 types)) have been finalized.** The schedule for reporting sustainability information based on the CSRD differs depending on the size of the company**, starting from January 2024 for listed companies with 500 or more employees**, and **from January 2025 for large companies other than those listed above**. **Starting from January 2026, it will be gradually applied to listed small and medium-sized enterprises.**

France

Progress both in imposing companies to disclose climate-related information and imposing the companies to link the results with initiatives related to TCFD recommendations and biodiversity

- **Article 173 of the Energy Transition Act requires disclosure of information on climate change-related risks in annual reports** (2015)
- The 40 major French companies listed on the CAC40 index express support for the TCFD. Multiple government officials sign statement of support, demonstrating France's commitment to building a climate resilient financial system through enhanced disclosure in line with the TCFD (December 2020)
- **The French Ministry of Finance has announced a public consultation on plans to strengthen regulations under Article 173 of the Energy Transition Act, in terms of risk reporting based on climate change and biodiversity loss, and in line with the G20-backed TCFD. As a result, disclosure of biodiversity loss and 2030 targets becomes mandatory** (June 2021)
- (Reference) Article 29 of the new Energy-Climate Law was announced, which contains rules on biodiversity-related reporting that make it mandatory for French financial institutions to disclose information related to consistency with long-term biodiversity protection goals, with the objective of achieving consistency with the strengthened rules in Energy Transition for Green Growth Act Article 173 and the SFDR (EU) (June 2021)

UK

TCFD-compliant information disclosures made mandatory through revisions to corporate law in line with the TCFD

- In October 2021, the Department for Business, Energy and Industrial Strategy **announced draft company law regulations that will require large companies and designated financial institutions to disclose information based on the TCFD.** As a result, **mandatory disclosure of information in line with the TCFD recommendations in the annual reports of listed companies and major asset owners was applied from the financial year starting from April 6, 2022.** The gradual mandatory implementation progressed, and the final applicable guidance was published in December 2024 (from October 2021)
- The Financial Conduct Authority (FCA) made an **announcement based on the "TCFD Guidance on Metrics, Targets and Transition Plans" published in 2021 that starting from 2023 it would be mandatory** for listed companies and companies in specific financial sectors, such as asset management companies and regulated companies, **to publish their climate change transition plans**. On November 8, 2022, it **published the draft of its transition plan guidelines,** for which it is currently requesting public commentary until February 28, 2023 (November 2022)

Sources : "2023 Status Report" (TCFD), various publicly available information sources such as Ministry of the Environment, and European Commission websites

As of January 2025

Status of various countries' TCFD initiatives (2/3)

The US and Canada are also recommending information disclosure; the US is currently considering making TCFD-compliant disclosures mandatory

US

The Sesuspended and Exchange Commission (SEC) is pushing forward with making disclosures in line with TCFD recommendations mandatory

- The SEC issued a report recommending that the US consider adopting its own version of the ESG disclosure framework. Standards from the TCFD, GRI, and US Sustainability Accounting Standards Board (SASB) are recognized as being useful for preparing the ESG disclosure framework (May 2020)
- Public commentary was opened concerning mandatory disclosure of information on climate change-related risks, and a joint statement by 180 institutional investors, 155 global companies, and 58 NGOs was published calling for mandatory information disclosure based on TCFD guidelines by listed companies (June 2021)
- **A climate change disclosure proposal based on the TCFD recommendations and the GHG Protocol was published in March 2024**, requiring listed companies **to disclose "governance," "the impact of climate-related risks on strategy and business," "risk management," "indicators," "climate-related targets/transition plans," and "GHG emissions."** The proposed regulations **mandate third-party assurance** for Scope 1 and 2 disclosures and require disclosure of Scope 3 emissions when deemed material or when targets have been set. The application schedule is divided according to the classification of registered companies: large early filers are expected to begin in the 2025 fiscal year, early filers and non-early filers in the 2026 fiscal year, and small reporters in the 2027 fiscal year. The phased implementation will begin with governance, GHG emissions, and assurance, among others. However, in April 2024, due to ongoing legal challenges, the climate disclosure rules were suspended to "facilitate an orderly judicial resolution." As a result of the suspension, some states, including California, are moving forward with their own systems, referencing the SEC's approach for development and adoption (since March 2022)

Canada

Gradual introduction from 2024 planned for TCFD-compliant disclosures by financial institutions

- Financial institutions such as banks and the CSA (Canada Standard Authority) are leading consideration of Canada’s own version of the Taxonomy (September 2021)
- The Canadian federal government released Budget 2022 and **announced its intention to push forward with mandating reporting for climate-related financial risks in a broad range of areas in Canada’s economy based on the TCFD framework**. In 2022, the Office of the Superintendent of Financial Institutions (OSFI) held discussions on climate change-related disclosure guidelines for federally regulated financial institutions. **Starting from 2024, disclosures of climate change-related financial information in line with the TCFD framework would be made mandatory for federally regulated financial institutions**, with phased implementation beginning in October 2024, based on the classification of the institutions and the disclosure items. Federally regulated financial institutions include all Canadian banks, insurance companies, and federally incorporated or registered trust and loan companies. The financial institutions will be expected to gather information from clients concerning climate change-related risks and emission levels, and to evaluate these. (April 2022)
- The Canadian federal government has announced its intention **to require large corporations to disclose climate-related financial information** through amendments to the Canada Business Corporations Act (CBCA). While small and medium-sized enterprises will not be subject to this obligation, the government is considering ways to encourage voluntary disclosures for these businesses (starting in October 2024)

Sources : “2023 Status Report” (TCFD), various publicly available information sources such as Ministry of the Environment, and European Commission websites

As of January 2025

Status of various countries' TCFD initiatives (3/3)

In Japan, disclosures in securities reports are becoming mandatory, and activity toward recommending information disclosures can also be seen in China

Japan

The revised Corporate Governance Code requests listed companies to disclose information in line with TCFD

- The Ministry of Economy, Trade and Industry released its “TCFD Guidance 3.0[*1]”, which encourages corporate disclosures based on the TCFD recommendations, as well as providing an explanation of the finalized TCFD report (December 2018)
- The Ministry of the Environment released its “Practical guide for Scenario Analysis”, which includes case examples and methodology for companies to use as reference when conducting scenario analysis (revised every March starting from 2019)
- The TCFD Consortium was established by founders including Professor Kunio Ito of Hitotsubashi University Graduate School (May 2019)
- ”Green Investment Guidance 2.0[*2]” was developed, which provides an explanation of interpreting TCFD recommendation-based information disclosures from an investor perspective. The Guidance is mentioned at the TCFD Summit (October 2021)
- The Financial Services Agency **revised the Corporate Governance Code**, which also mentions sustainability and the TCFD. **As a supplementary principle, in order to enhance information disclosures, prime market-listed companies are requested to make disclosures of information based on the TCFD recommendations.** As of 2022, prime market-listed companies[*3] are required to continue to submit a “Corporate Governance Report” once per year (June 2021)
- As a result of the recommendation in the June 2022 report of the Working Group on Corporate Disclosure of the Financial System Council and the public commentary held in December 2022, proposed amendments to Cabinet Office Ordinances, etc., related to disclosure of corporate affairs were announced and put into force. **A new column for entering sustainability-related information in line with TCFD recommendations was established for securities reports, etc.** (January 2023)
- The TCFD Consortium **published "Transition Plan Guidebook"** summarizing international trends regarding transition plans, the positioning of these plans within other frameworks and guidelines for companies on how to develop them (August 2024)
- The Sustainability Standards Board of Japan (SSBJ) has been developing disclosure standards and released a draft in March 2024. The draft **mandates the disclosure of GHG emissions and the impact of climate change on business operations in securities reports**. It is expected to be phased in for companies listed on the Tokyo Stock Exchange's Prime Market starting from the fiscal year ending in March 2027, with implementation based on market capitalization. (Since March 2024)

China

Translation of the TCFD recommendations and Guidance moves forward with the aim of adopting the TCFD framework

- There is investigation on how to include the TCFD framework in China’s environmental reporting guidelines, and China has shown its intent to make TCFD compliance mandatory for all listed companies in 2020 (January 2018)
- Joint pilot project launched in cooperation with the UK government, with a progress report issued for the second year (May 2020)
- **Industrial and Commercial Bank of China (ICBC) translated five documents aimed at adopting and implementing the TCFD framework in China; the documents include the TCFD recommendations and guidance**.The translation of even more documents is planned in the future(Jan’21)
- A plan to introduce sustainability and climate-related disclosure standards by 2027 has been announced. The mandatory disclosure will be gradually implemented for listed companies, with the process expected to be completed **by 2030. A draft of the guidance was published in December 2024**. (Since March 2024)

As of January 2025

Sources : “2023 Status Report” (TCFD), various publicly available information sources such as Ministry of the Environment, and European Commission websites

(Reference) Global TCFD recommendation disclosures situation

Looking at the trends from 2022 to 2023, the percentage of companies disclosing in line with the TCFD recommendations is on a rise

TCFD-Aligned Disclosures by Fiscal Year for 2022-2023

Governance

- **Board of Directors Oversight System for Climate-Related Risks and Opportunities**
- **Management's role in assessing and understanding climate-related risks and opportunities**

Strategy

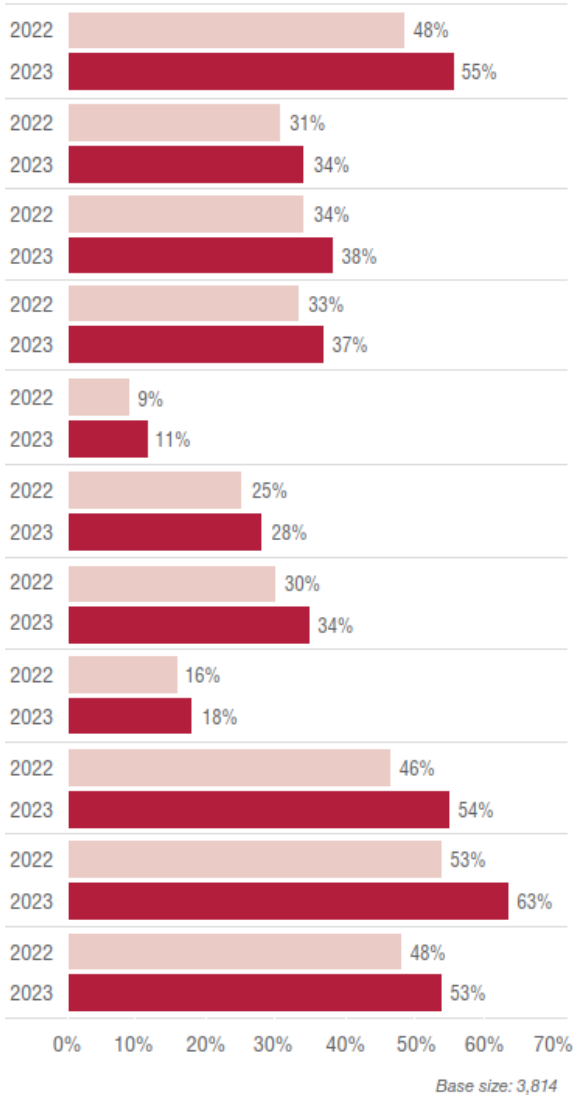
- **Short/medium/long-term climate change risks and opportunities**
- **The impact of climate-related risks and opportunities on your organization's business, strategy and financial planning**
- **Resilience of strategies based on consideration of various climate-related scenarios**

Risk Management

- **Process for screening and assessing climate-related risks**
- **Processes for managing climate-related risks**
- **Integrating processes to identify, assess and manage climate-related risks with comprehensive risk management**

Metrics and Targets

- **Indicators used to assess climate-related risks and opportunities**
- **GHG of Scope 1, 2 and applicable Scope 3**
- **Goals and performance against targets used to manage climate-related risks and opportunities**

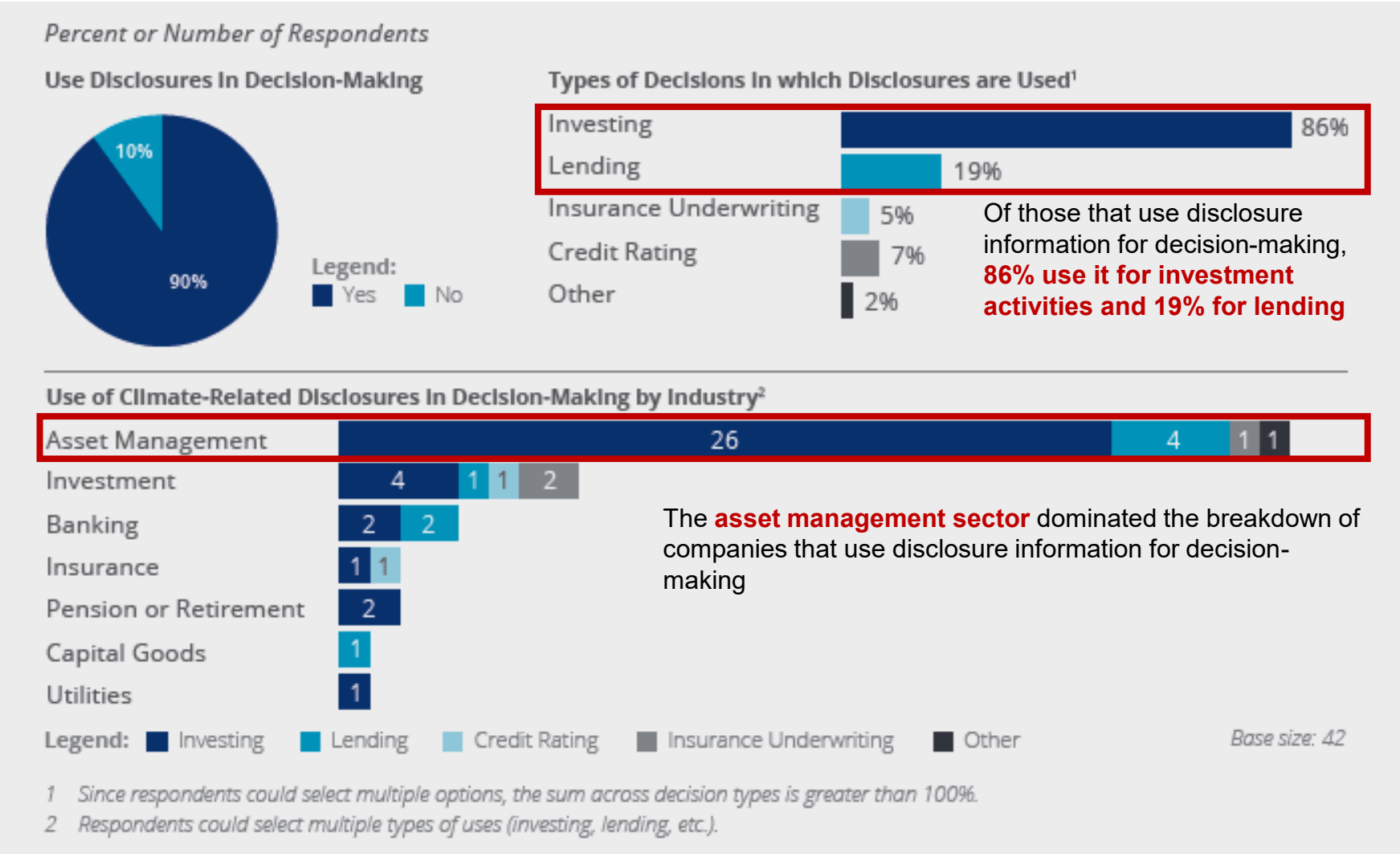


Source : TCFD, *Task Force on Climate-related Financial Disclosures 2024 Status Report*

(Reference) Use of Climate-related Disclosures in the Financial sector

Multiple companies in asset management has answered that climate-related information is used for decision making in investment activities and lending

Use of climate-related disclosures in decision-making



Source : TCFD, *Task Force on Climate-related Financial Disclosures 2022 Status Report*

ISSB, a subsidiary of IFRS, released the final draft of its disclosure standards in June 2023. Climate-related disclosures require more advanced and detailed disclosure, including details of scenario analysis assumptions/implementation methods, Scope 3 emissions and such

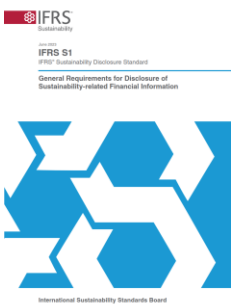
Standard overview

- The IFRS Foundation established the International Sustainability Standards Board (ISSB) in November 2021 with the aim of formulating international standards (global baselines) that contribute to improving the consistency and comparability of corporate sustainability disclosures.
- In June 2023, ISSB published the final draft of the IFRS Sustainability Disclosure Standards (S1: General Requirements for Disclosure of Sustainability-related Financial Information, S2: Climate-related Disclosures)

Application schedule

- Both S1 and S2 standards will be applied from January 2024, and the IFRS Foundation recommends that regulatory authorities in each country apply them. It is expected that regulatory authorities in each country will develop sustainability disclosure rules using both standards as a baseline, and companies will be required to make disclosures in line with the rules of the country/region to which they belong.

S1 General Requirements for Disclosure of Sustainability-related Financial Information



Requires disclosure of all sustainability-related risks and opportunities that are important for evaluating corporate value

- Requires sustainability disclosure according to four core competencies (governance, strategy, risk management, metrics and targets), based on TCFD recommendations
- **Requires disclosure of material sustainability-related risks** other than climate-related (S2)
- Requires disclosure financial statements simultaneously in the same report, and also requires consistency and connection between financial statements and sustainability information.
- Requires disclosure of at least one comparative year

S2 Climate-related Disclosures

Requests disclosure of climate-related risks and opportunities important for evaluating corporate value

- Climate-related disclosures are required along with four core competencies (governance, strategy, risk management, metrics and targets), based on TCFD recommendations
- Requires more advanced and detailed information disclosure than the TCFD, including details of scenario analysis assumptions/implementation methods, disclosure of Scope 3 emissions, and detailed usage status of carbon offsets
- As industry-specific disclosure requirements, disclosure items are set for 11 industries and 68 industries, and disclosure is requested to be considered in line with the same items

April 23rd 2024, the ISSB announced that biodiversity, ecosystems and ecosystem services as well as human capital will be set as the main themes for the next two years. It is expected that moving forward, detailed disclosure designs for themes other than climate change will also progress

Source : IFRS “IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information” “IFRS S2 Climate-related Disclosures”
“ISSB to commence research projects about risks and opportunities related to nature and human capital”

In Europe, the CSRD has been adopted, requiring the disclosure of sustainability information. In addition to requiring information disclosure in accordance with the double materiality principle, it also introduces third-party assurance obligations

Standard overview

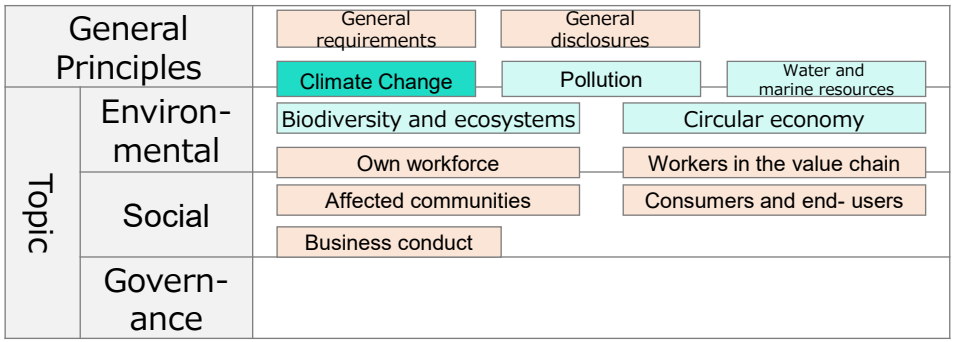
- The European Commission published the final text of the Corporate Sustainability Reporting Directive (CSRD) on December 16, 2022, as a new directive regarding corporate sustainability information disclosure
- This proposal aims to update and strengthen the issues in the NFRD, improve the sufficiency, reliability, comparability and accessibility of sustainability information, and provide more useful information for report users
- The CSRD requires companies to report using the European Sustainability Reporting Standard (ESRS), developed by the European Financial Reporting Advisory Group (EFRAG). The first ESRS (general principles (2 types), topic-specific standards (10 types)) was finalized on July 31, 2013.

Application schedule

- The schedule for reporting differs depending on the size of the company, starting from January 2024 for listed companies with 500 or more employees and starting from January 2025 for large companies other than those listed above and it will be gradually applied to listed small and medium-sized enterprises from January 2026.

The first set of European sustainability reporting standards(ESRS)

Consists of a total of 12 standards, including general principles and topic-specific standards. Introducing disclosure requirements in accordance with the double materiality principle and third-party assurance obligations



- In accordance with the principle of **double materiality**, companies are required to disclose sustainability-related risks that affect them as well as the social and environmental impacts of their business activities
- The introduction of a mandatory third-party assurance by an independent party is also required

ESRS E1 Climate Change Disclosure

Consists of nine disclosure items. Request for disclosure of GHG emissions, etc. including transition plan and Scope 3

＜ESRS E1 Disclosure items＞

E1-1 Transition plan for climate change mitigation

E1-2 Policies related to climate change mitigation and adaptation

E1-3 Actions and resources in relation to climate change policies

E1-4 Targets related to climate change mitigation and adaptation

E1-5 Energy consumption and mix

E1-6 **Gross Scopes 1, 2, 3 and Total GHG emissions**

E1-7 GHG removals and GHG mitigation projects financed through carbon credits

E1-8 Internal carbon pricing

E1-9 Anticipated financial effects from material physical and transition risks and potential climate-related opportunities

Source: European Commission "Corporate sustainability reporting", EFRAG "ESRS E1 Climate Change"

The U.S. Securities and Exchange Commission (SEC) has proposed rule changes to improve and standardize climate-related information disclosure. In addition to requiring Scope 3 disclosure in important cases, SEC has also introduced third-party assurance obligations

Standard overview

- The Corporate Sustainability Due Diligence Directive (CSDDD) was officially adopted by the EU Council on May 24, 2024. This directive would come into effect 20 days after its publication in the EU Official Journal and will be implemented within two years through national legislation by each member state
- It mandates due diligence (DD) for companies regarding negative human rights and environmental impacts across their "chain of activities" (value chain)

Application schedule

- The schedule for the application of due diligence obligations varies depending on the size and number of employees of the company. For non-EU companies, those with annual net sales of €1.5 billion or more within the EU will be subject to the directive starting January 2027. Other applicable companies* will begin to apply the directive based on their sales figures, either in January 2028 or January 2029

Overview of disclosure requirements

Issues subject to DD obligations	• **Negative Environmental Impacts** : Violations of obligations and prohibitions in international frameworks related to environmental degradation, biodiversity, mercury and chemical handling, ozone layer protection and waste movement • **Negative Human Rights Impacts** : Violations of rights defined in international human rights treaties and conventions, as well as infringements on prohibitions set by these agreements
The content of DD	1. Establishment of DD policies and risk management systems 2. Identification and assessment of actual or potential negative human rights and environmental impacts, prioritizing based on severity and likelihood 3. Prevention, mitigation, or cessation of actual or potential negative impacts 4. Stakeholder engagement 5. Establishment and operation of grievance mechanisms 6. Monitoring the effectiveness of DD policies and measures 7. Public disclosure of due diligence efforts
The scope of DD	The value chain of applicable businesses, including the activities of upstream and downstream business partners. However, for downstream, activities related to "disposal" and those of indirect business partners are excluded from DD obligations

Requirements regarding transition plans

The definition of transition plans for climate change mitigation is common, but it is necessary for the plans and execution to align with CSDDD

- Business models and strategies must align with the transition to sustainable economy and the achievement of climate neutrality as defined by the Paris Agreement and regulations, while also being consistent with limiting global warming to 1.5°C. Additionally, they are required to be updated every 12 months and to provide an explanation of progress

Elements to be included in transition plans

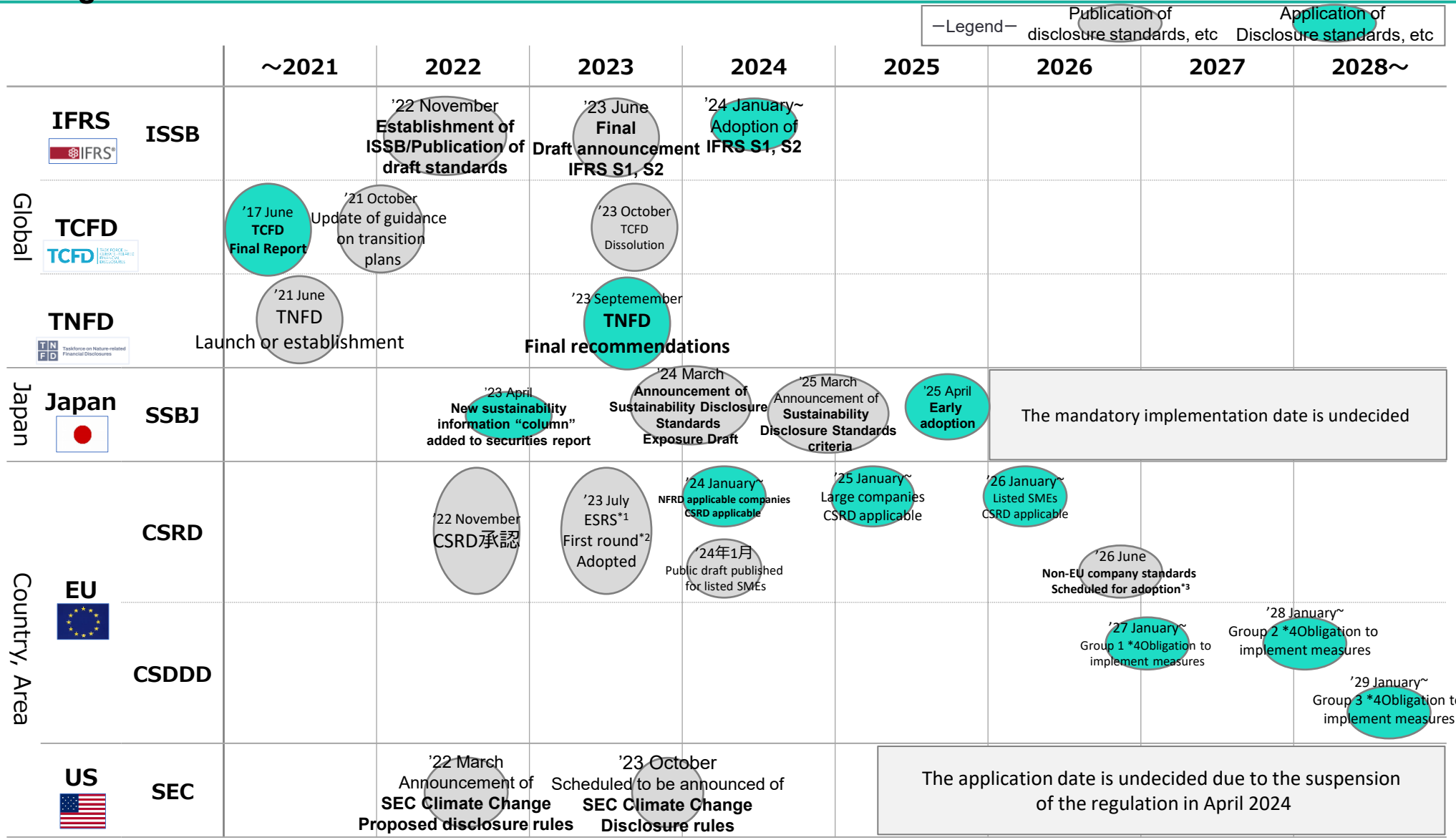
1. Science-based, time-bound targets for 2030 and 2050, with 5-year intervals (including GHG emission reduction targets for Scope 1, 2, and 3 for key categories)
2. Decarbonization measures and actions to achieve targets
3. Explanation and quantification of investments and funding supporting the implementation of the transition plan
4. Roles and responsibilities of management and supervisory bodies related to the transition plan

*Applicable companies are EU companies with "more than 1,000 employees and annual global net sales exceeding €450 million in the most recent fiscal year," or "the ultimate parent company of a corporate group that meets the above threshold on a consolidated basis in the most recent fiscal year." For non-EU companies, it applies to those with "annual net sales exceeding €450 million within the EU in the previous fiscal year" or "the ultimate parent company of a corporate group that meets the above threshold on a consolidated basis in the previous fiscal year"

Source : EU"Directive - EU - 2024/1760 - EN - EUR-Lex (europa.eu)", etc.

(Reference) Relationship with TCFD recommendations in disclosure framework: ISSB/CSRD/SEC application start schedule

Climate change disclosure standards are being issued and considered one after another by ISSB, CSRD in Europe, and SEC in the United States, and 2023/2024 may be a turning point for climate change information disclosure



*1: Sustainability reporting standards *2: General requirements and topical standards *3: The original adoption deadline was set for '24June, but it was decided to postpone it to '24 February. Sector-specific standards, along with the standards for non-EU companies, are scheduled to be adopted in '26 June

*4: Group 1 includes EU companies with over 5,000 employees and global net sales exceeding 1.5 billion euros, and non-EU companies with over 1.5 billion euros in net sales in the EU. Group 2 includes EU companies with over 3,000 employees and global net sales exceeding 900 million euros, and non-EU companies with over 900 million euros in net sales in the EU. Group 3 includes all other companies subject to CSDDD

CDP questions also comply with TCFD recommendations, and some question items are related to TCFD recommendations

Governance		Strategy		Risk Management		Metrics and Targets	
Disclose the governance around climate-related risks and opportunities		Disclose the actual and potential impacts of climate-related risks and opportunities on businesses, strategy, and financial planning where such information is material		Disclose how identifies, assesses, and manages climate-related risks		Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material	
a) Describe the board's oversight of climate-related risks and opportunities	4.1.2	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	2.1 3.1 3.1.1 3.6 3.6.1	a) Describe the organization's processes for identifying and assessing climate-related risks	2.1 2.2.1 2.2.2 2.2.5 2.2.6 2.2.8 2.2.9	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	7.52 7.54 7.54.1 7.54.2
b) Describe management's role in assessing and managing climate-related risks and opportunities	4.3	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	3.1.1 3.6.1 5.1.2 5.2 5.3.1 5.3.2 5.14 5.14.1	b) Describe the organization's processes for managing climate-related risks	2.1 2.2.1 2.2.8 2.2.9	b) Disclose Scope 1, Scope 2, and if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks	7.6 7.7 7.8 7.8.1 12.1 12.1.1 12.1.3 12.3
		c) Based on considerations of various climate-related scenarios, including the 2° C or below scenario, explain the resilience of the organization's strategy	5.1 5.1.1 5.1.2	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management	2.1 2.2.1	c) Describe the targets used by the organization to manage climate-related risks and opportunities, and performance against targets	7.53 7.53.1 7.53.2 7.53.4 7.54 7.54.1 7.54.2

Source：CDP HP

Significance of Scenario Analysis (1)

Information disclosure using scenario analysis is recommended for evaluating the impact made by climate-related risks and opportunities; 1.5°C scenarios are becoming more complete and are useful for companies to consider their decarbonization strategies

Usefulness of scenario analysis

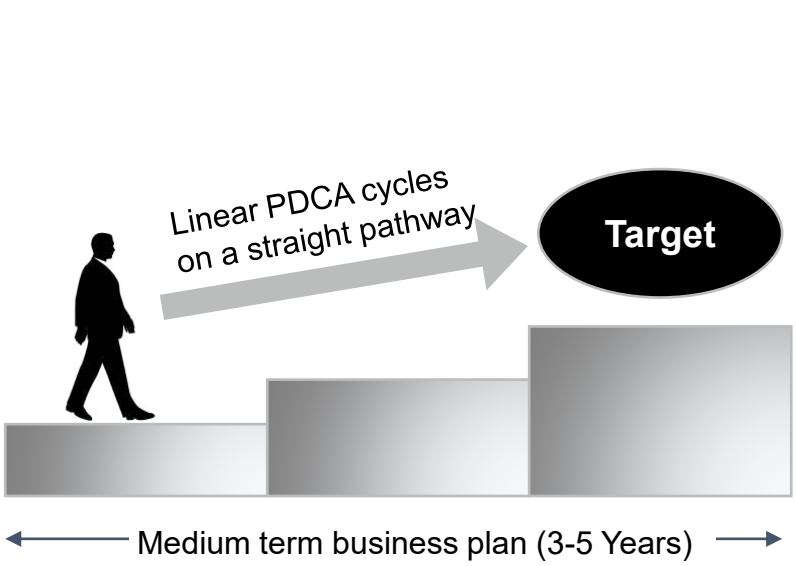
- Scenario analysis is a useful method for organizations to use to strategically address issues that are long-term and have a high level of uncertainty
- **Disclosures** should **also include premises for key scenarios in industries where climate change-related risks are a concern.** Scenario analysis requires ability / manpower, but it also holds benefits for organizations

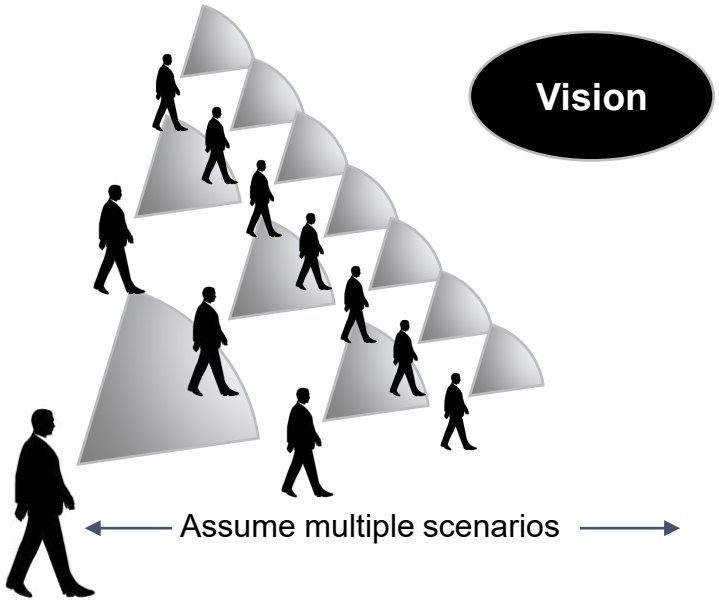
Target	Scenario groups that may be applied
Transition risks	• IEA WEO NZE／IEA WEO APS／IEA WEO STEPS • NGFS Current Policies／Delayed Transition／Net Zero 2050 • Deep Decarbonization Pathways Project（the target of 2° C is achieved） • IRENA REmap（the renewable energy ratio is doubled by 2030） • Greenpeace Advanced Energy [R]evolution（the target of 2° C is achieved） • PRI 1.5° C RPS（Required Policy Scenario）、PRI FPS（Forecast Policy Scenario）
Physical risks	• RCP (Representative Concentration Pathways) scenarios employed by IPCC: RCP8.5、RCP6.0、RCP4.5、RCP2.6

Sources : Prepared by the Ministry of the Environment based on the Task Force on Climate-related Financial Disclosures: “Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures”, 2019, pages 25 - 20;
Task Force on Climate-related Financial Disclosures: “Supplementary Guidance - Using scenario analysis for disclosing climate-related risks and opportunities”, 2017, p.21 & 25
The scenarios listed in the IEA WEO have been updated to reflect the most recently published report

Scenario analysis enables strategic planning and internal/external dialogue in response to future uncertainties

In a reasonably foreseeable term…

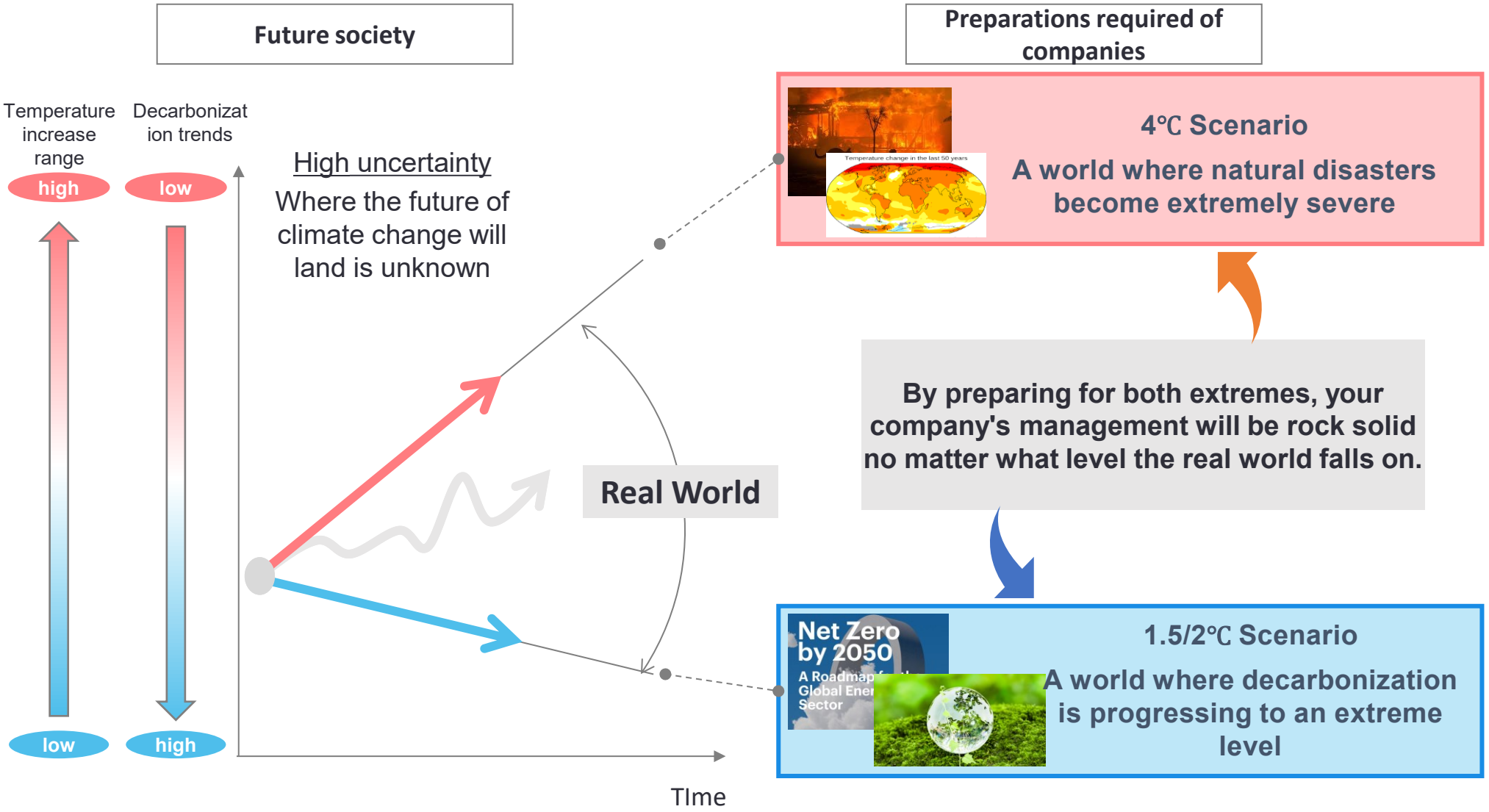




- Business strategy cannot respond to changes in the future
- The discussion never reaches a consensus on future perspectives
- Suspected of lacking business resilience

- Business management can flexibly respond to future change
- The discussion takes places without any subjective viewpoints on future
- Management can demonstrate business resilience

Scenario analysis assumes the two extremes of “a world in which decarbonization is progressing” and “a world in which natural disasters become more severe,” making it possible to build a resilient system that can carry out business no matter which way the world progresses in reality



(Reference) Disclosure contents required by the TCFD recommendations

In the "Metrics and Targets" area in the TCFD recommendations, disclosure of Scope 1, Scope 2, and appropriate Scope 3 GHG emissions is recommended

Recommended disclosures	Governance	Strategy	Risk Management	Metrics and Targets
Areas in detail	Disclose the organization's governance around climate-related risks and opportunities	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material	Disclose how the organization identifies, assesses, and manages climate-related risks	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material
Recommended Disclosures	a) Describe the board's oversight of climate-related risks and opportunities	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	a) Describe the organization's processes for identifying and assessing climate-related risks	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) Describe management's role in assessing and managing climate-related risks and opportunities	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	b) Describe the organization's processes for managing climate-related risks	**b) Disclose Scope 1, Scope 2, and if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks**
		c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management	c) Describe the targets used by the organization to manage climate-related risks and opportunities, and performance against targets

(Definition of applicable Scope 3 emissions)

- The notes to the revised Annex contain the following explanation on disclosure of Scope 3 emissions:
  "**When considering whether to disclose Scope3 GHG emissions, organizations should consider whether such emissions are a significant portion of their total GHG emissions**. For example, see discussion of 40% threshold in the Science Based Targets Initiatives (SBTi's) paper, SBTi Criteria and Recommendations, Ver4.2, Section V, p.10"

Sources : Task Force on Climate-related Financial Disclosures, "Recommendations of the Task Force on Climate-related Financial Disclosures (Final Version)」, 2017 postscript, TCFD "Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures" (October 2021)

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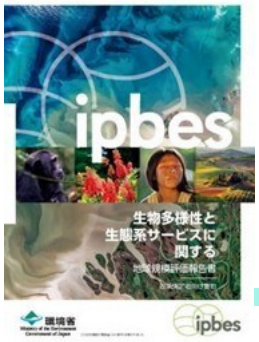
Climate change has been identified as one of the direct causes of biodiversity loss

- All factors causing biodiversity loss are due to changes and effects of human activities
- It is considered natural degradation and biodiversity loss have been and are being caused by direct and indirect drivers
- **Climate change has been identified as one of the direct causes of biodiversity loss**



Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services（IPBES）

IPBES「the global assessment report on BIODIVERSITY AND ECOSYSTEM SERCICES」(2019)

Pointing out

Adomonition

Around
1 million species
already face extinction, many within decades of the 8 million on earth

Indirect drivers

- Demographic and sociocultural
- Economic and technological
- Institutions and governance
- Conflicts and epidemics

5 major Direct drivers

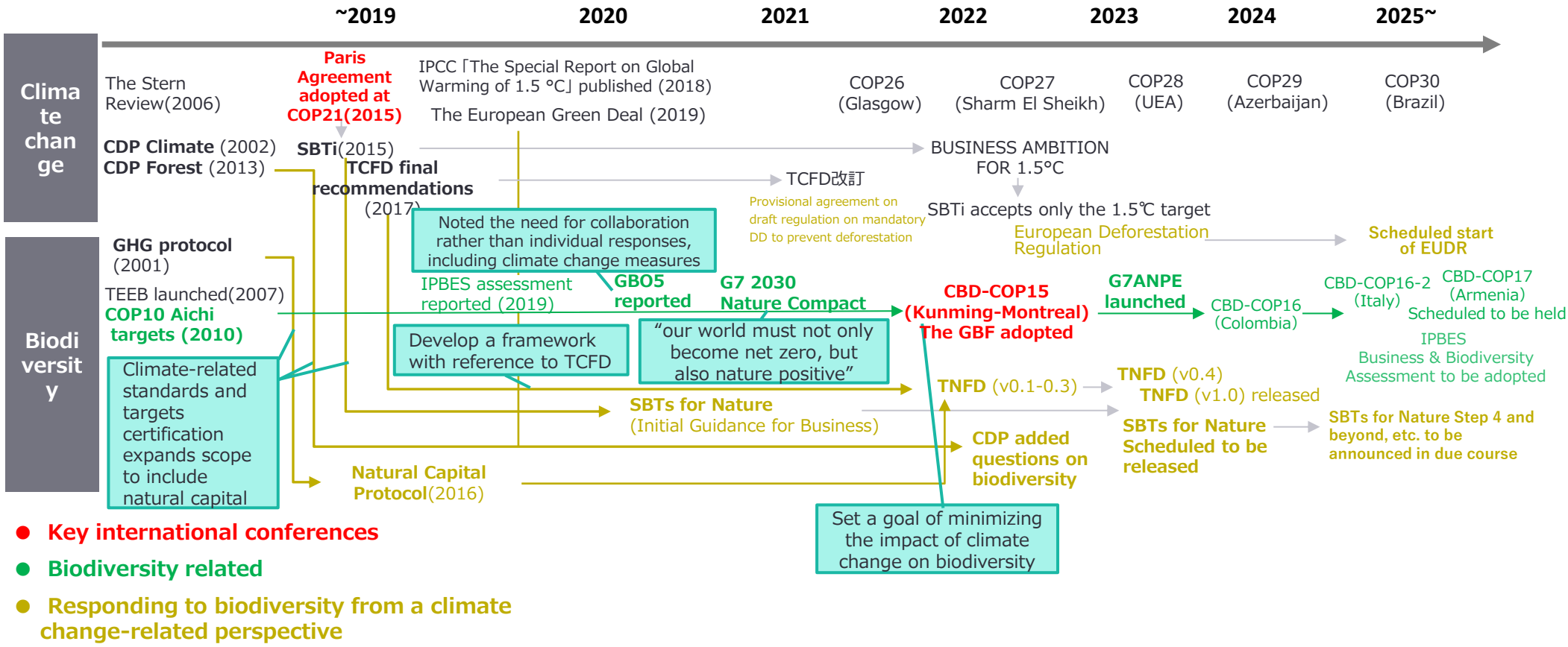
- Land/sea use change
- Direct exploitation
- Climate change
- Pollution
- Invasive alien species

Declines in nature
(Declines in biodiversity)

Source : IPBES, *The global assessment report on BIODIVERSITY AND ECOSYSTEM SERCICES*, 2019

Integrated responses are required, taking climate change-related responses as a starting point, and including natural capital and biodiversity

- **In recent years, the importance of integrating efforts in other areas in relation to climate change has been emphasized**
- From 2019 onwards, **starting from climate change-related issues, synergies with solutions to issues in other areas, including biodiversity, are becoming more active**.
- In particular, interest in biodiversity is increasing



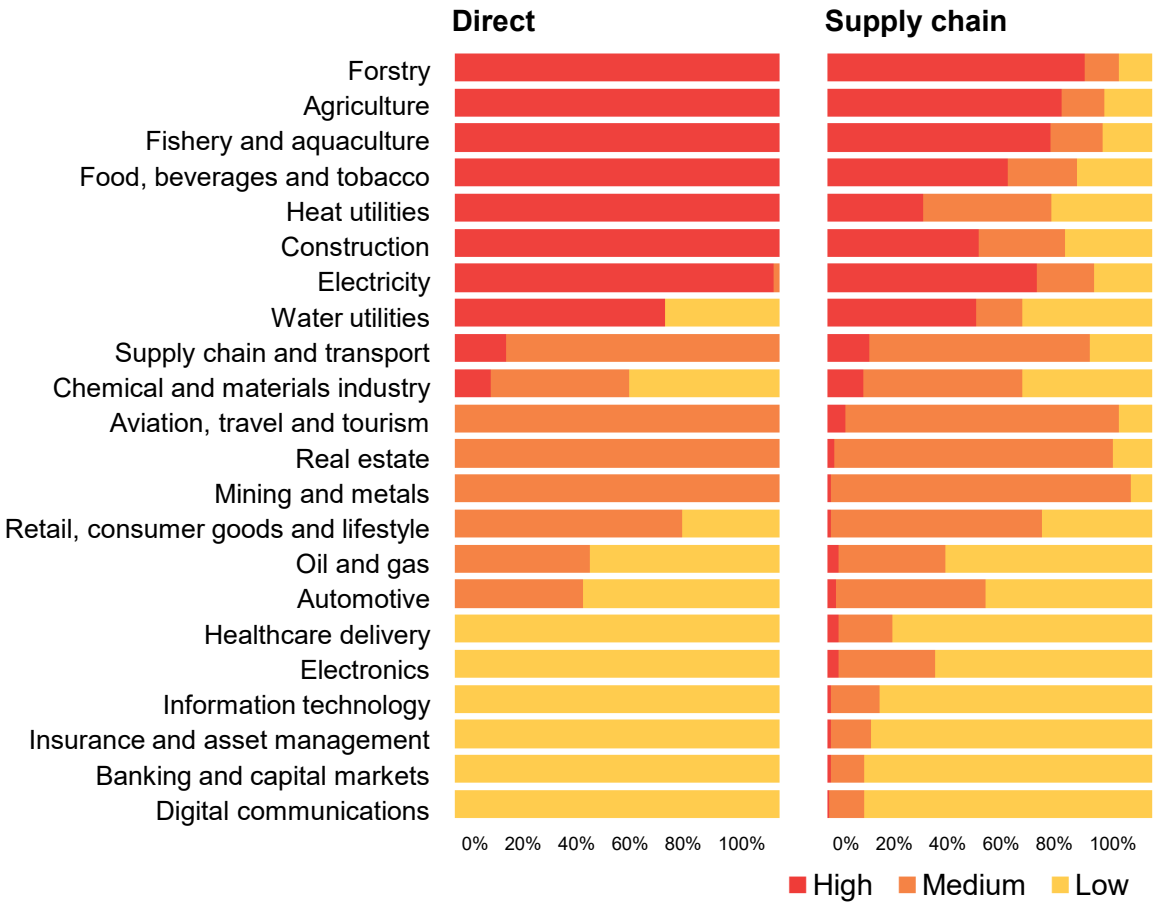
Source : Prepared based on various public information.

Economic activities highly dependent on nature directly or indirectly through their supply chains

Nature Risk Rising:
Why the Crisis Engulfing Nature Matters for Business and the Economy
(World Economic Forum)

- Human societies and economic activities rely on biodiversity in fundamental ways. Research shows that **$44 trillion of economic value generation – more than half of the world's total GDP – is moderately or highly dependent on nature and its services**
- While the risk to primary industries is straightforward to grasp, the consequences for secondary and tertiary industries can also be significant. They may be **highly or moderately dependent on nature, have "hidden dependencies" through their supply chains**
- Learning from and drawing on the apporach of climate change and TCFD efforts may be a crucial mechanism for managing nature-related risks and will **ensure alignment with broader risk-management processes**

Percentage of direct and supply chain GVA with high, medium and low nature dependency, by industry

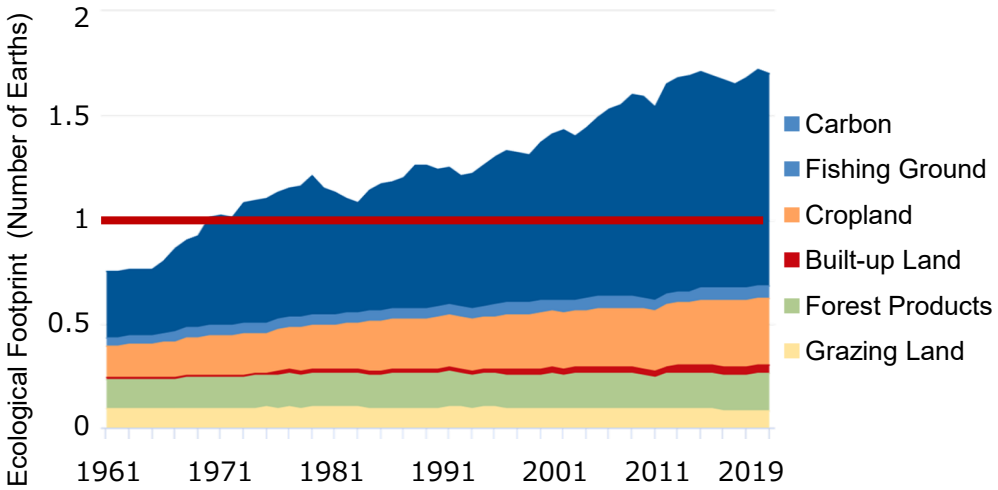


Source : WEF, *Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy* (2020)

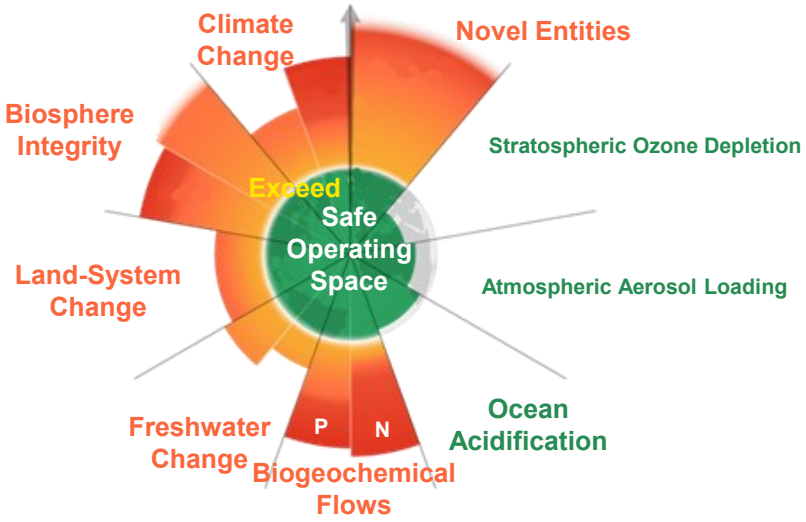
It is revealed that natural capital and biodiversity, which are the premises of current economic and social activities, are being degraded on a global scale, which has become an urgent global issue

- Human society, economy, and financial systems embedded within nature. However, **nature is degrading on a global scale, and biodiversity is decreasing at a speed never seen before in human history**
- **The world's ecological footprint (natural resource consumption)** exceeded the supply of Earth's ecosystem services in the 1970s, **and by 2019, the equivalent of 1.7 Earths' capital were consuming**
- According to the research on planetary boundaries, human society can develop and prosper if human activity stays within the safe operating space for each aspect of Earth's changes. However, if these "boundaries" were exceeded, irreversible changes may occur to the natural resources on which humans depend. **World's economic activities have already exceeded the Earth's limits in six aspects**

Ecological Footprint Trend



Planetary Boundaries 2023



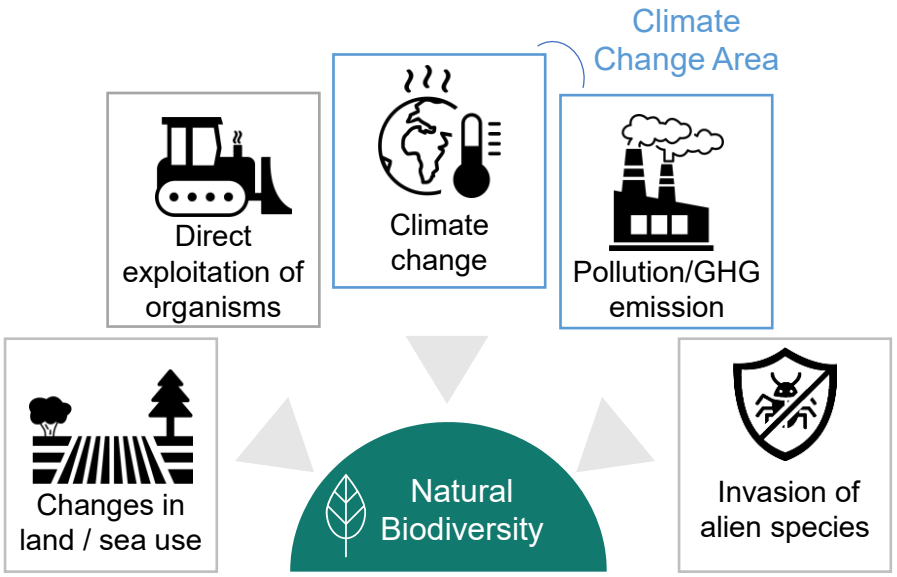
The global ecological footprint in the late 2010s was equivalent to about 1.7 Earths

Six environmental factors on which human depend already exceed the safe space, which is considered to cause irreversible changes

Source : Global Footprint Network, https://data.footprintnetwork.org/?_ga=2.136928496.193966094.1706673868-1931358266.1706537169#/ z (accessed in 2024.1.31)
Stockholm Resilience Centre「Planetary Boundaries」、https://www.stockholmresilience.org/research/planetary-boundaries.html (accessed in 2024.1.31)

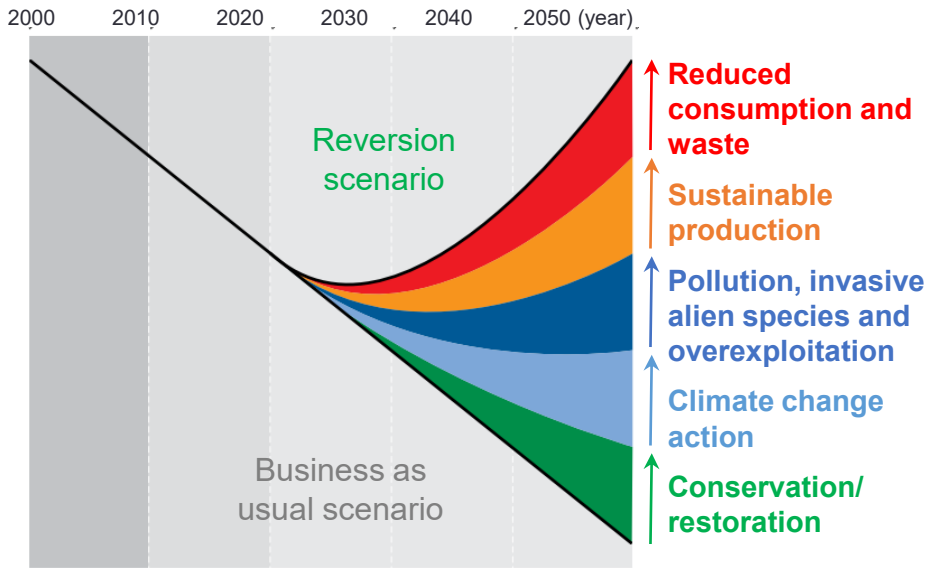
While response to climate change is already one of the actions to take for nature positive, it is important to also combine multiple action areas to address the issues of nature and biodiversity

The five direct drivers of change in nature with the largest global impact



- Drivers that affect nature include direct to indirect ones.
- According to the IPBES report, **five main direct drivers of impacts on biodiversity or ecosystems were listed, including climate change and direct exploitation of organisms**

A portfolio of actions to reduce loss and restore biodiversity



- CBD recommends to achieve nature positive that the biodiversity decline turnaround to reverse by 2030
- According to the UN report, **toward achievement of nature positive, a combination of multiple action areas is required, such as climate change actions and the conservation/restoration of nature**

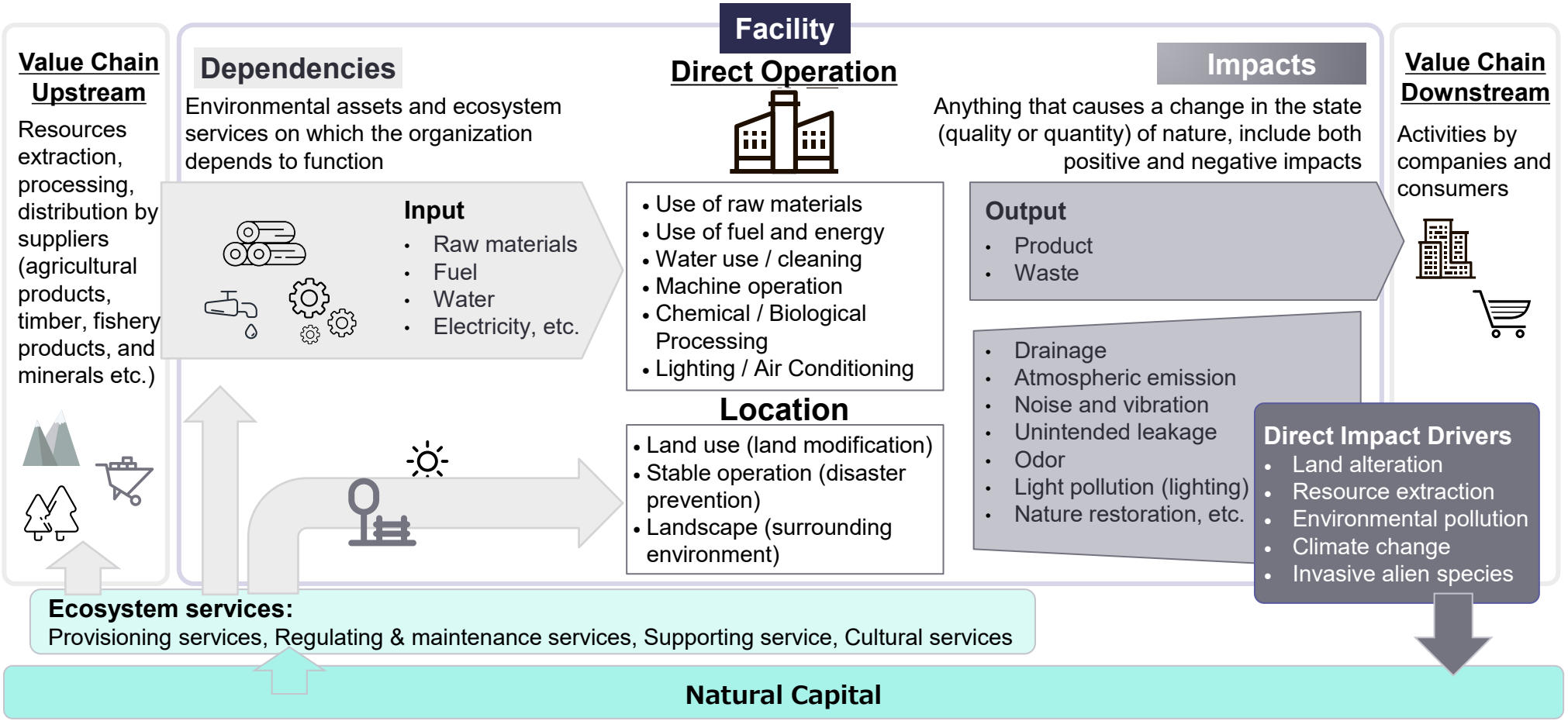
To achieve nature positive, it is important to combine multiple action areas, including climate change

Source : IPBES, *The global assessment report on BIODIVERSITY AND ECOSYSTEM SERVICES* (2019), CBD, *The Global Biodiversity Outlook5* (2020)

Company's dependencies and impacts on nature

For a company to assess and disclose its impacts on nature and biodiversity, it is necessary to understand its interface with nature, which means the reliance on natural capital and its impacts

- Economic and social activities **depend on natural capital** derived from natural sources
- However, business activities by individuals and organizations have **positive or negative impacts** on the state of nature and, consequently, on the flow of ecosystem services

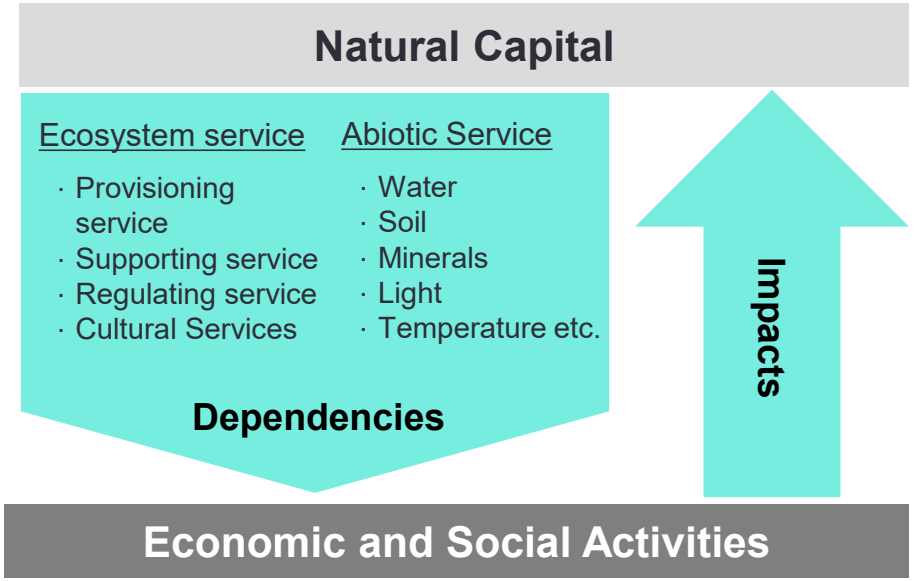


Source : WEF, *The Future Of Nature And Business*, 2020

Companies are required to understand the interface with nature and to manage the risks and opportunities. However, it has been pointed out that companies are not sufficiently prepared for nature-related risks

Business risks and opportunities associated with dependencies

- Changes in production and supply chain disruptions due to water shortages and extreme weather events
- Increased raw material costs to meet the demands of sustainable forest development
- Development and sales of artificial substitutes that reduce the use of natural resources



Business risks and opportunities associated with impacts

- Remediation of environmental pollution, monitoring systems strengthening, operations suspension, permits and permits revocation, and loss of social trust caused by inadequate management
- Changes in consumer preferences for products that reduce waste through the use of recycled materials and renewable materials, or for products with a low environmental impact

Risk: It is necessary to consider nature-related issues as business risks and assess them throughout the value chain

- It is clear that nature-related risks, including climate change, can be financial risks, and **companies need to regard nature as a strategic risk management issue rather than a corporate social responsibility (CSR) issue**
- However, many companies have not been able to assess their impacts on biodiversity in entire value chain including upstream and downstream

Opportunity: Nature-related issues can also be regarded as business opportunities towards the Nature Positive

- Business opportunities arising from the conservation, restoration, and sustainable use of biodiversity include reducing costs and improving operational efficiency by reviewing production processes, generating revenue from new business models, accessing new markets, products, and services, building good relationships with stakeholders, and improving corporate images etc.
- The transformation of socio-economic systems to be nature-positive is expected to **generate $ 10.1 trillion annually in business opportunities and 395 million jobs by 2030**

Sources : CDP, *CDP Climate Change Report 2022* (2023), WEF, *The Future Of Nature And Business* (2020), WWF, *A biodiversity guide for business* (2022)

Trends in international standards and assessment organizations on biodiversity

In addition to responses to climate change, international standards and evaluation organizations are already moving to address nature-related issues, guide and regulate company activities.

- In addition to the Disclosure Framework, **international standards and evaluation organizations have also incorporated responses to biodiversity referred to the climate change version**
- **The importance of synergies between climate change and biodiversity has been noted** in recent years at United Nations conferences and in the EU

Information Disclosure

TCFD Final Recommendations (2017)

TNFD (2023)

IFRS S1・S2 (2023)

- As the natural capital version of the TCFD, the development was started. It is **based on the TCFD framework**, and the approach to analyze companies' dependences and impacts on natural capital and biodiversity is proposed
- In line with the convergence of sustainability-related disclosure standards under IFRS, the oversight responsibility of the TCFD was transferred to the ISSB (IFRS Foundation). In addition, following IFRS S1 and S2, **a research project on biodiversity, ecosystems, and ecosystem services (BEES) was initiated.**

GHG Protocol (2001)

Natural Capital Protocol (2016)

SBT (2015)

SBTs for Nature (2023)

CDP Climate(2002) Forest (2013)

Addition of biodiversity Questions (2022)

- Following the GHG Protocol, a standard for accounting and reporting GHG emissions, the Natural Capitals Coalition published the Natural Capital Protocol as an **international framework for natural capital accounting for companies**
- SBT developed SBTs for Nature, **a natural capital version of SBT** that certifies GHG emission reduction targets. Certification is scheduled in around 2024
- CDP requests all disclosing companies (except SMEs) to **answer biodiversity questions.**

International Agreement and Policy

G7 2030 Nature Compact Adopted (2021)

Europe Green Deal (2019)

G7ANPE Establishment (2023)

Regulation on Deforestation-free products (EUDR) (2023)

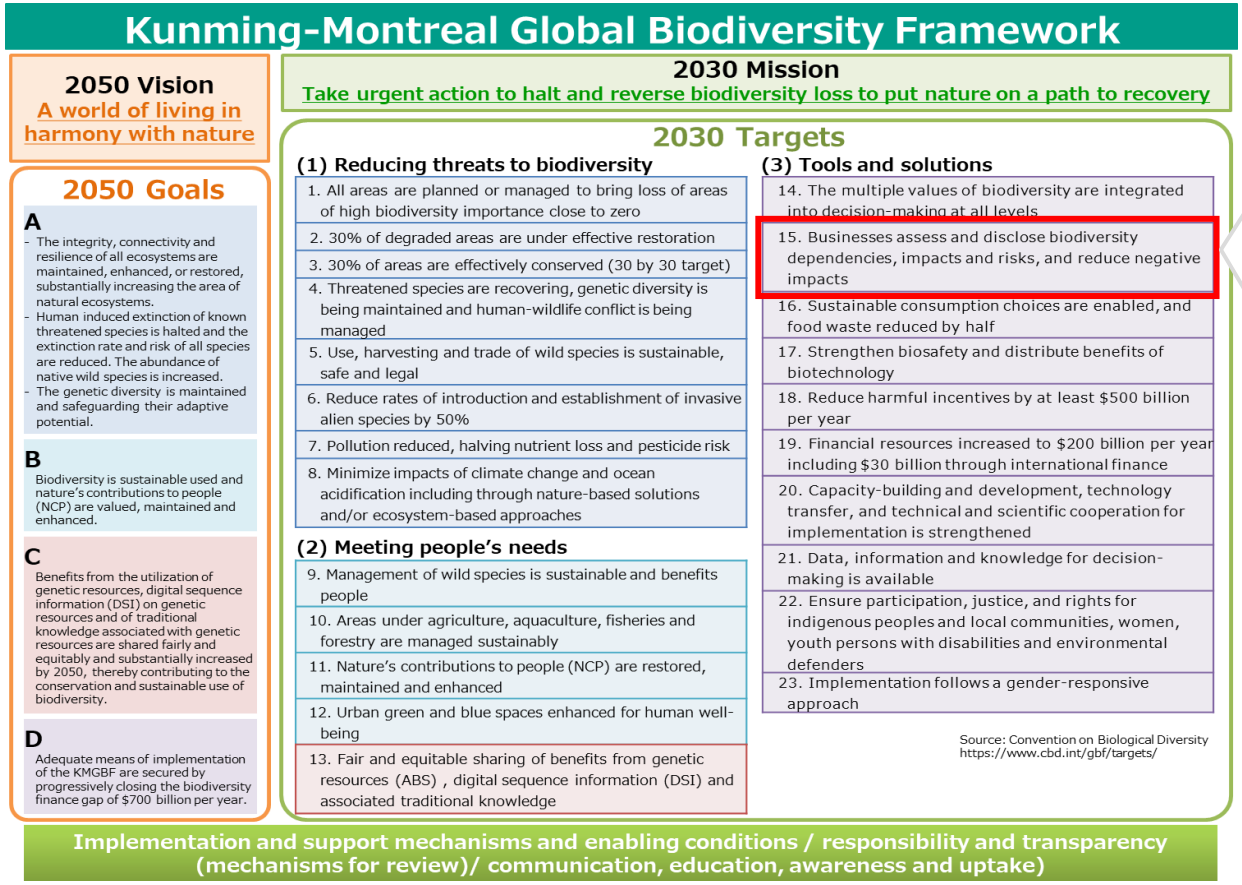
CBD-COP15held GBF Adopted (2022)

- G7 agreed in the 2030 Natural Convention that "**not only the CN but also the NP must be achieved**"
- **G7 Nature Positive Economy Alliance (G7ANPE) was established** as a forum for sharing knowledge and building information networks toward the achievement of nature-positive economy
- The GBF which adopted at CDP-COP15 **set the target of Business Impact Assessment and Disclosure**
- **From the perspective of climate change mitigation and biodiversity conservation, the EU developed the EUDR with the aim of controlling deforestation and forest degradation caused by consumption and production within the EU**

Source : Prepared based on various public information.

Kunming-Montreal Biodiversity Framework has set a mission to take urgent action towards Nature Positive in 2030, as well as targets for assessment and disclosure of impacts

- In Kunming-Montreal Biodiversity Framework adopted at the 15th Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP15) held in December 2022, toward 2030 Mission, the idea of **"halt and reverse biodiversity loss to put nature on a path to recovery"** was presented
- Items that require **companies to respond and disclose are also included** in the targets for coexistence with nature and nature positive



Target 15

Take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions:

a. **Regularly monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity,** including with requirements for all large as well as transnational companies and financial institutions along their operations, supply and value chains, and portfolios;

b. **Provide information needed to consumers to promote sustainable consumption patterns**

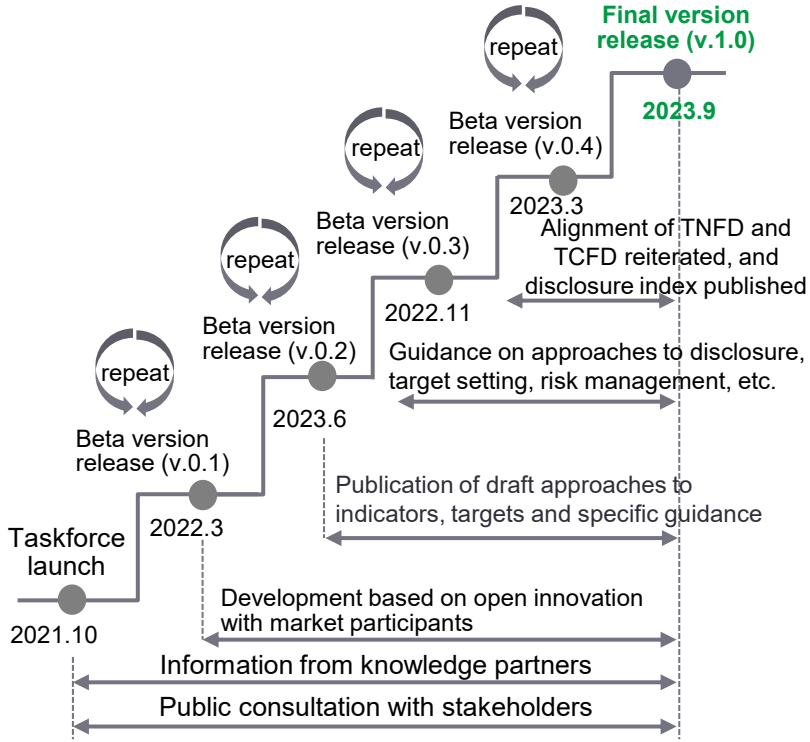
Source : CBD, *Nations Adopt Four goals, 23 targets for 2030 In Landmark UN Biodiversity Agreement* (2022)

The Taskforce on Nature-related Financial Disclosures (TNFD) was launched to address nature-related issues and promote related disclosure, and the final recommendations were made public in September 2023

- An international initiative, **Taskforce Nature-related Framework of Disclosure (TNFD), was launched in 2021** to develop a framework to assist companies and organizations in managing and disclosing natural and biodiversity crises and risks
- **The final TNFD recommendations and accompanying additional guidance were published in September 2023**, with four beta releases over a two-year period since 2021, and with feedback received and pilot testing repeated. Sector-specific guidance is being released sequentially

What is TNFD?	An international initiative launched to develop a framework for companies and financial institutions to visualize their dependence on the natural environment and to assess, manage, and report their impacts on the natural environment and ecosystems.
Founding Entity	United Nations Environment Programme Finance Initiative (UNEP FI), United Nations Development Programme (UNDP), World Wide Fund for Nature (WWF), Global Canopy (UK environmental NGO)
Purpose of TNFD	Disclosure recommendations and guidance will enable companies and financial institutions to integrate nature's perspective into their decision-making and support the transformation of the global economy from a nature-negative to a nature-positive economy in line with the international biodiversity framework.
TNFD Recommendations and Guidance	Final disclosure recommendations and accompanying additional guidance published in September 2023, after four beta releases. Sector-specific guidance is being released sequentially
Principle of the development for TNFD framework	· Usefulness in the market · Based on scientific evidence · Responding to nature-related issues · Purpose orientation · Integrative and adaptive · Integrating climate change and natural responses · Globally comprehensive

Schedule of development and publication



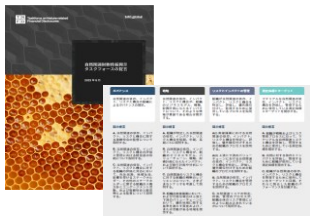
Source : TNFD, *Recommendations of the Taskforce on Nature-related Financial Disclosures* (2023)

The TNFD recommendations provide four pillars (similar to TCFD) and fourteen recommendations, referred to the framework developed by the TCFD to address climate change

■ 11 items carried over from the TCFD
■ 3 new additional items in TNFD

TNFD Recommendations

- The TNFD is a disclosure recommendation based on the TCFD
- **The 11 items recommended by the TCFD have been carried over**, and three items for nature-related matters have been added.
- **Additional elements**
  - **Engagement**
  - **Important nature-related issues and locations of sensitive areas**
  - **Value chain**



Governance	Strategy	Risk & impact management	Metrics & targets
Disclose the organisation's governance of nature-related dependencies, impacts, risks and opportunities.	**Disclose the effects of nature-related dependencies, impacts, risks and opportunities on the organisation's business model, strategy and financial planning where such information is material.**	**Describe the processes used by the organisation to identify, assess, prioritise and monitor nature-related dependencies, impacts, risks and opportunities.**	**Disclose the metrics and targets used to assess and manage material nature-related dependencies, impacts, risks and opportunities.**
A. Describe the board's oversight of nature-related dependencies, impacts, risks and opportunities.	A. Describe the nature-related dependencies, impacts, risks and opportunities the organisation has identified over the short, medium and long term.	A. (i) Describe the organisation's processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its direct operations.	A. Disclose the metrics used by the organisation to assess and manage material nature-related risks and opportunities in line with its strategy and risk management process.
B. Describe management's role in assessing and managing nature-related dependencies, impacts, risks and opportunities.	B. Describe the effect nature-related dependencies, impacts, risks and opportunities have had on the organisation's business model, value chain, strategy and financial planning, as well as any transition plans or analysis in place.	A. (ii) Describe the organisation's processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its upstream and downstream value chain(s).	B. Disclose the metrics used by the organisation to assess and manage dependencies and impacts on nature.
C. Describe the organisation's human rights policies and engagement activities, and oversight by the board and management, with respect to Indigenous Peoples, Local Communities, affected and other stakeholders, in the organisation's assessment of, and response to, nature-related dependencies, impacts, risks and opportunities.	C. Describe the resilience of the organisation's strategy to nature-related risks and opportunities, taking into consideration different Scenarios.	B. Describe the organisation's processes for managing nature-related dependencies, impacts, risks and opportunities.	C. Describe the targets and goals used by the organisation to manage nature-related dependencies, impacts, risks and opportunities and its performance against these.
	D. Disclose the locations of assets and/or activities in the organization's direct operations and, where possible, upstream and downstream value chain(s) that meet the criteria for priority locations.	C. Describe how processes for identifying, assessing, prioritising and monitoring nature-related risks are integrated into and inform the organization's overall risk management processes.	

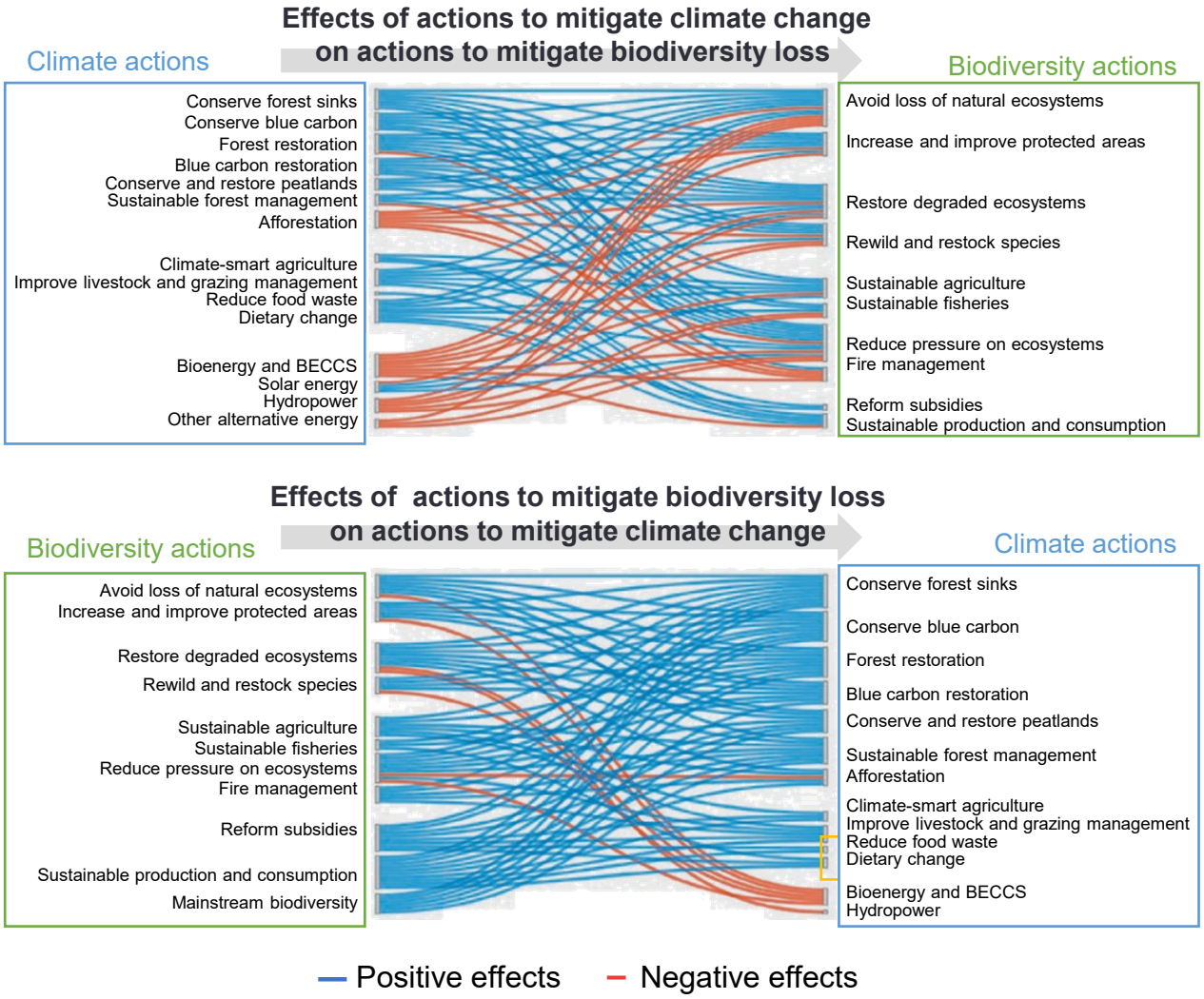
Source : TNFD, *The TNFD Recommendations TNFD in a Box*, (2023)

Notes for addressing both climate change and nature-related issues

In addressing both climate change and nature-related issues, action needs to be taken considering the synergies and trade-offs, and the effects of measures can be enhanced through synergies

- It is pointed out that climate change mitigation and biodiversity conservation measures can be mutually beneficial (**co-benefit relation**) or have adverse effects (**trade-off relation**), according to the report of the IPCC-IPBES co-sponsored workshop
- It is suggested that when comparing impacts on both, **measures to address biodiversity have a stronger reciprocal relationship** with measures to address climate change

It is important to maximize the effects of measures while minimizing the trade-off relationship while considering both climate change and biodiversity perspectives



Sources : IGES, *IPBES-IPCC Co-Sponsored Workshop on Biodiversity and Climate Change Report: Translation and Commentary by IGES*

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Overall picture of scenario analysis

In addition to the six steps of scenario analysis stipulated by the TCFD recommendations, we explain how to incorporate scenario analysis into strategy and execution.

1 Governance establishment

Integrate scenario analysis into strategic planning and/or enterprise risk management processes.
Assign oversight to relevant board committees/subcommittees.
Identify which internal (and external) stakeholders to involve and how.

Get management and operation divisions Involved!

2 Evaluation of risk importance

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

What are the current and anticipated organizational exposures to climate-related risks and opportunities?
Do these have the potential tobe material in the future? Are stakeholders concerned?

Pick and choose from your industry and company viewpoint!

3 Definition of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

What scenarios (and narratives) are appropriate, given the exposures? Consider input parameters, assumptions, and analytical choices. What reference scenario(s) should be used?

Clearly imagine a future world under certain assumptions!

4 Business impact evaluation

Impact on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

Evaluate the potential effects on the organization's strategies and financial position under each of the defined scenarios.
Identify key sensitivities.

Try not to seek too much accuracy!

5 Definition of countermeasures

Responses might include
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities.
What adjustments to strategic/financial plans would be needed?

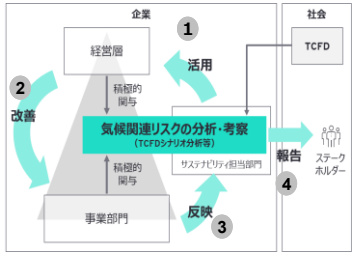
Do not narrow down! Take multiple scenarios into account!

6 Documentation and information disclosure

Document the process; communicate to relevant parties: Be prepared to disclose key inputs, assumptions, analytical methods, outputs, and potential management responses

Disclose information from readers' viewpoint!

Incorporate into strategy and execution



1. Utilization in management
2. On-site improvement
3. Reflection in analysis/discussion
4. External reporting

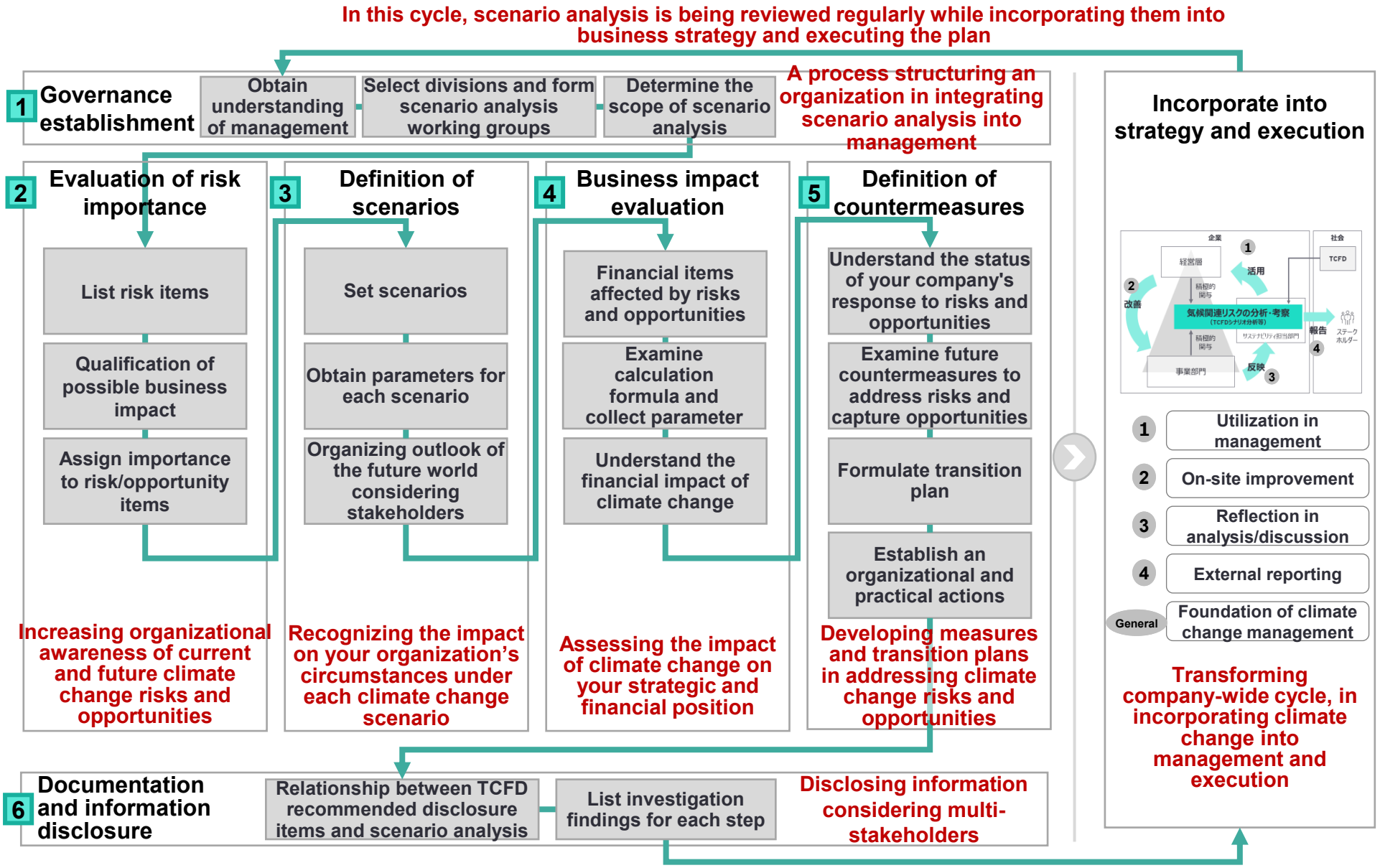
General: Foundation of climate change management

Build a company-wide change cycle!

(Notes in red: Points to consider in each step were added after the support program)

Sources : The Task Force on Climate-related Financial Disclosures, "Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate Related Risks and Opportunities", June 2017.

Scenario analysis follows a journey of 1-6 and "incorporation into strategy and execution"

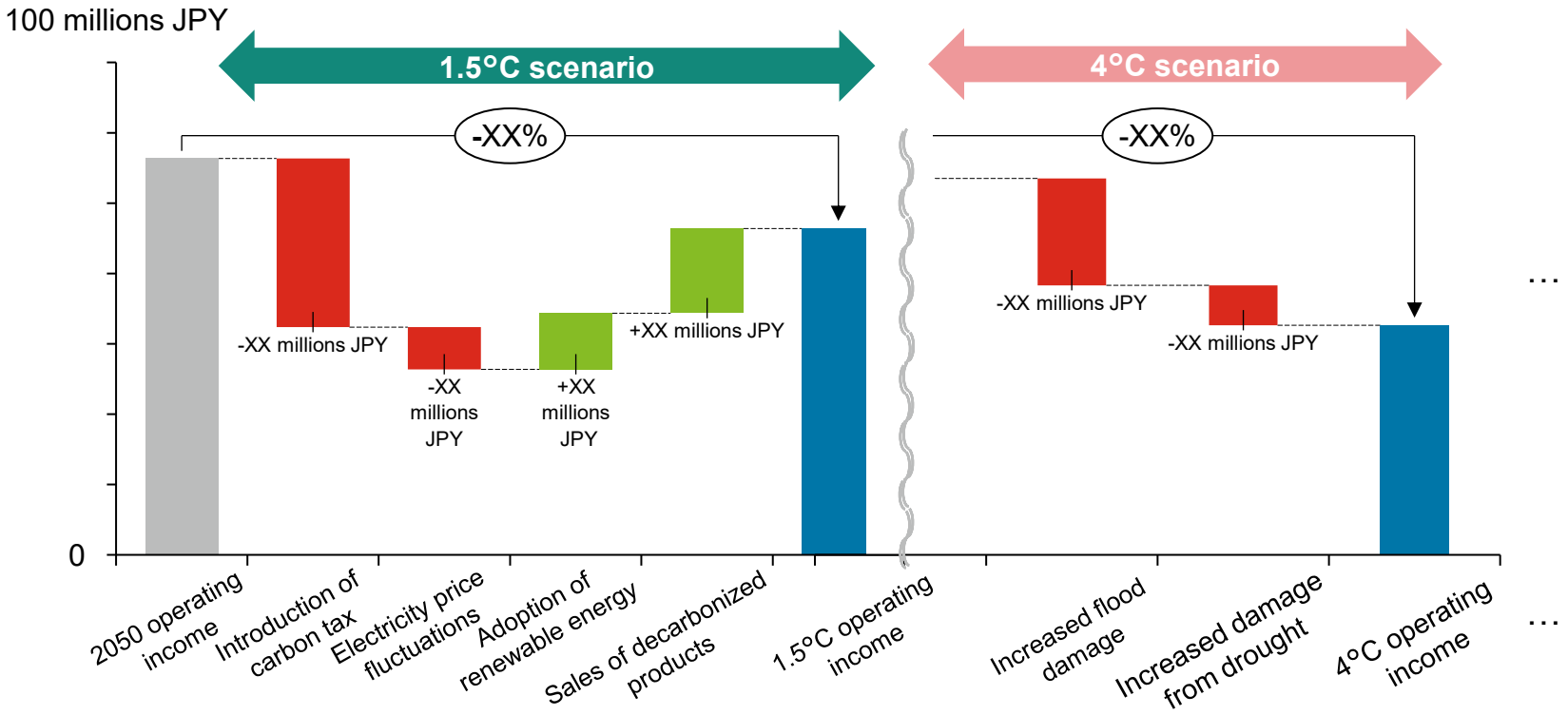


Source : Added procedures through support project based on technical supplement related to scenario analysis ("TCFD Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities" (2017.6))

Overview of Scenario analysis

”Scenario analysis” is the analysis of the impact of climate change on the company based on a set scenario; by quantifying impact, it can lead to understanding of specific impacts and to effective disclosures

[Scenario analysis: Sample evaluation of impact on business]



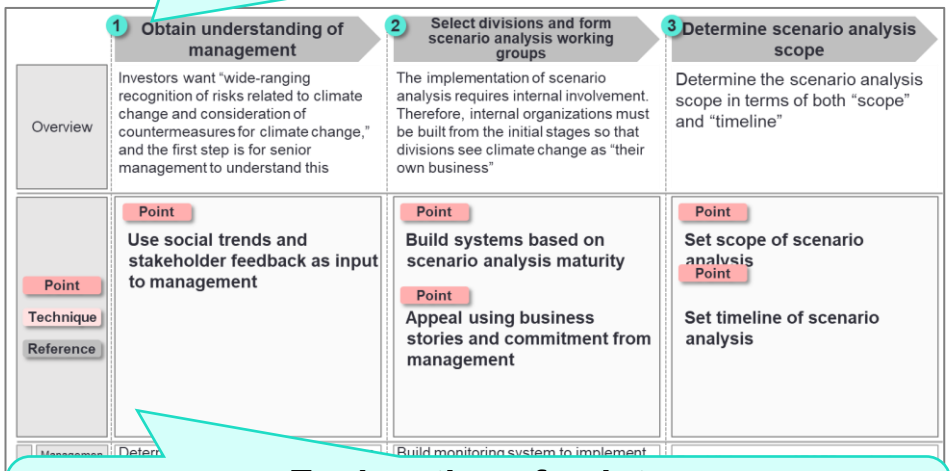
Understand the degree of impact climate change will have on the current business outlook trajectory (future management goals/plans)

- ✓ Scenario analysis is conducted as a process where **the materiality of climate change risks is evaluated, a set of scenarios are selected, and then the impact on business is evaluated**
- ✓ Of the various STEPs, **it is particularly important** to use business impact evaluation (STEP 4) to **understand the financial impact of climate change**
- ✓ **It is a key to take a step-by-step approach** in quantifying financial impacts, such as starting with items that have a significant impact, such as carbon tax

We describe scenario analysis procedures and the different levels for companies based on their prior experience with conducting scenario analysis

TCFD scenario analysis procedures

Explanation of practical steps
Explains the necessary steps for conducting scenario analysis



Explanation of points
Explains key points and points that may be tricky when conducting scenario analysis

＋ Description of the different levels for implementing gradual initiatives based on companies' prior experience

	"First time" companies	Direction for continuing companies
Assumed targets	✓ Companies conducting scenario analysis for the **"first time"** (for example, companies in their first year of scenario analysis)	✓ Companies conducting scenario analysis for the **"first time"**, but which are **already working on initiatives related to climate change to some degree** ✓ Companies **that have already implemented scenario analysis** (for example, companies in their second year of scenario analysis)
Direction for "gradual" initiatives	✓ Sure and steady implementation with awareness of the key points of practice, in line with the direction for "First time" companies ✓ Try starting to implement the "points for continuing companies" as much as possible	✓ Move on to the next step of "direction for continuing companies" and use this to increase the sophistication of decarbonized management ✓ Use disclosures and dialogue with investors to enhance analysis and presentation of evidence
Reference slide	✓ Mainly refer to the "Basics" slides listed on the upper right **Basics** Develop ment	✓ See both "Basics" and "Development" slides listed on the top right **Basics** **Develop ment**

Direction of scenario analysis (1/2)

Scenario analysis needs to be carried out continuously and promoted step by step

			Direction of a “first time ”company	Direction of a continuously undertaking company
STEP1 Governance development	Gaining understanding from management	Page. 2-10	☐ **Management agrees** to conduct scenario analysis	(same as on the left)
	Division selection, scenario analysis, and working group composition	Page. 2-10	☐ **An organizational system exists to cooperate** with business divisions **in scenario analysis**	☐ **An organizational system exists to cooperate** with business divisions are responsible for **executing scenario analysis**.
	Determining the scope of scenario analysis	Page. 2-15	☐ The scope and time axis for scenario analysis have been identified	☐ **The scope and time frame of scenario analysis has expanded from the beginning**
STEP2 Risk severity assessment	Listing risk items	Page. 2-19	☐ List risks and opportunities related to the target business with reference to other companies in the same industry/sector	☐ Identify and list **risks and opportunities unique to your company** by referring to information common to the same industry/sector
	Qualifying possible business impact	Page. 2-26	☐ **Qualitatively express risks and opportunities with reference to other companies in the same industry/sector**	☐ **Qualitatively express** risks and opportunities **unique to your company** by referring to information common to the same industry/sector
	Qualifying possible business impact	Page. 2-27	☐ **Assess the importance of risks and opportunities with reference to other companies in the same industry/sector**	☐ The importance of risks and opportunities can be **specified by involving business departments and external experts**
STEP3 Definition of scenarios	Setting up the scenario(s)	Page. 2-34	☐ Select multiple scenarios that include **1.5℃** with reference to external scenarios	☐ Refer to external scenarios, select multiple scenarios that include **1.5℃,** and draw your own scenario that fits your business
	Obtaining future information on related parameters	Page. 2-40	☐ **Collect parameters related to each scenario**	(same as on the left)
	Organizing the world view with stakeholders in mind	Page. 2-45	☐ The worldview for each scenario has been explained in detail, and **a consensus has been formed within the company**	☐ The worldview for each scenario can be explained in detail and **has been discussed with external experts**

Direction of scenario analysis (2/2)

Scenario analysis needs to be carried out continuously and promoted step by step

			Direction of a “first time ”company	Direction of a continuously undertaking company
STEP4 Evaluating business impact	Financial items affected by risks and opportunities	Page. 2-50	☐ Understand financial items affected by risks and opportunities	(same as on the left)
	Considering calculation formula and collecting parameters	Page. 2-51	☐ Calculate the business impact of important risks **quantitatively (qualitatively if difficult)**, even on a trial basis	☐ For important risks, calculate the business impact quantitatively (qualitatively if difficult), even on a trial basis, **even if it was initially qualitative**
	Understanding the financial impact of climate change	Page. 2-58	☐ Understand the gap with as-is business process regarding business impact ☐ Business units are satisfied with the method and amount of business impact calculation ☐ In sectors where climate change is important, business impact is calculated using the target years of 2030 and 2050	☐ Understand the gap with as-is business process regarding business impact ☐ Management and external experts are are satisfied with the method and amount of business impact calculation ☐ In sectors where climate change is important, business impact is calculated using the target years of 2030 and 2050.
STEP5 Defining counterm easures	Understanding the status of your company's response to risks and opportunities	Page. 2-71	☐ Risks that need to be addressed have been identified ☐ Understand your company's current response to important risks	☐ Risks that need to be addressed have been identified ☐ Understand your company's current response to important risks
	Considering countermeasures to deal with risks and capture opportunities	Page. 2-73	☐ **Policies for future countermeasures** against important risks **have been determined**	☐ **Specific measures for future responses** to important risks **have been determined**
	Developing a transition plan	Page. 2-76	☐ A transition plan has been created that aligns with the company's emissions reduction plan	☐ In line with the company’s **yearly emissions reduction plan**, a transition plan has been created that includes annual emissions reductions and **activities** and **investment** plans to achieve them
	Building an internal system and starting concrete actions	Page. 2-80	☐ A rough roadmap has been created for implementing future countermeasures and scenario analysis	☐ A roadmap and organizational structure have been established for implementing future countermeasures and scenario analysis
STEP6 Document ation and disclosure	Describes the relationship between TCFD recommended disclosure items and scenario analysis	Page. 2-85	☐ Describes the relationship between TCFD disclosure items and scenario analysis ☐ Contains **the results of scenario** analysis for each step regarding important risks ☐ **Your company's response policy** for risks has been described	☐ Describes the relationship between TCFD disclosure items and scenario analysis ☐ Concerning important risks, the results of scenario analysis for each step can be described **quantitatively as much as possible** ☐ **Your company's response policy and specific measures** for risks are described.
	Preparation and presentation of disclosure materials	Page. 2-86	☐ Appropriate disclosure medium has been selected	(same as on the left)

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"Governance establishment" steps

What kind of system is required to integrate scenario analysis into management?

1 Ensure governance is in place

Integrate scenario analysis into strategic planning and/or enterprise risk management processes.
Assign oversight to relevant board committees/subcommittees.
Identify which internal (and external) stakeholders to involve and how.

Get management and operation divisions Involved!

2 Assess materiality of climate-related risks

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

What are the current and anticipated organizational exposures to climate-related risks and opportunities?
Do these have the potential tobe material in the future? Are stakeholders concerned?

Pick and choose from your industry and company viewpoint!

3 Identify and define range of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

What scenarios (and narratives) are appropriate, given the exposures? Consider input parameters, assumptions, and analytical choices. What reference scenario(s) should be used?

Clearly imagine a future world under certain assumptions!

4 Evaluate business impacts

Impact on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

Evaluate the potential effects on the organization's strategies and financial position under each of the defined scenarios.
Identify key sensitivities.

Try not to seek too much accuracy!

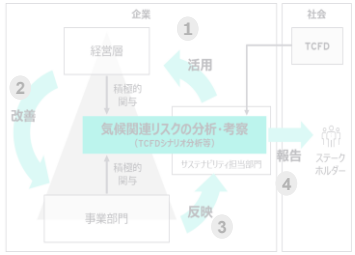
5 Identify potential responses

Responses might include
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities.
What adjustments to strategic/financial plans would be needed?

Do not narrow down! Take multiple scenarios into account!

corporate into strategy and execution



1. Utilization in management
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General: Foundation of climate change management

Build a company-wide change cycle!

6 Documentation and disclose

Document the process; communicate to relevant parties: Be prepared to disclose key inputs, assumptions, analytical methods, outputs, and potential management responses

Disclose information from readers' viewpoint!

(Notes in red: Points to consider in each step were added after the support program)

"Governance establishment" steps

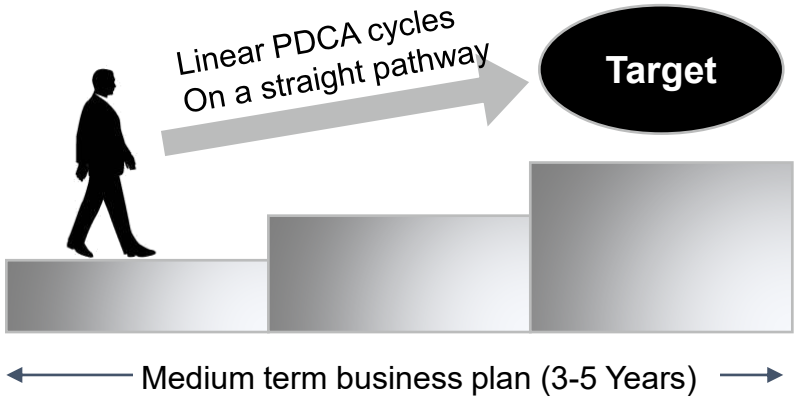
Establishing governance should begin with obtaining the understanding of management, and should be done based on forming working groups that involve divisions and fostering a common understanding of TCFD

	1 Obtain understanding of management	2 Select divisions and form scenario analysis working groups	3 Determine scenario analysis scope
Overview	Investors want "wide-ranging recognition of risks related to climate change and consideration of countermeasures for climate change," and the first step is for senior management to understand this	The implementation of scenario analysis requires internal involvement. Therefore, internal organizations must be built from the initial stages so that divisions see climate change as "their own business"	Determine the scenario analysis scope in terms of both "scope" and "timeline"
Point / Technique / Reference	**Point** **Use social trends and stakeholder feedback as input to management**	**Point** **Build systems based on scenario analysis maturity** **Point** **Appeal using business stories and commitment from management**	**Point** **Set scope of scenario analysis** **Point** **Set timeline of scenario analysis**
Roles: Management	Determine climate change risks in own company	Build monitoring system to implement scenario analysis	Establish scope of TCFD analysis
Roles: Divisions	Identify climate change risks in each division	Ensure resources (people, things, money, information)	Consider scope/timeline according to business lineup
Roles: Department in charge of TCFD	Understand climate change risks and appeal to management	Select related divisions, consider roles and participation	Gather and organization basic information on TCFD

1 Gain management's understanding

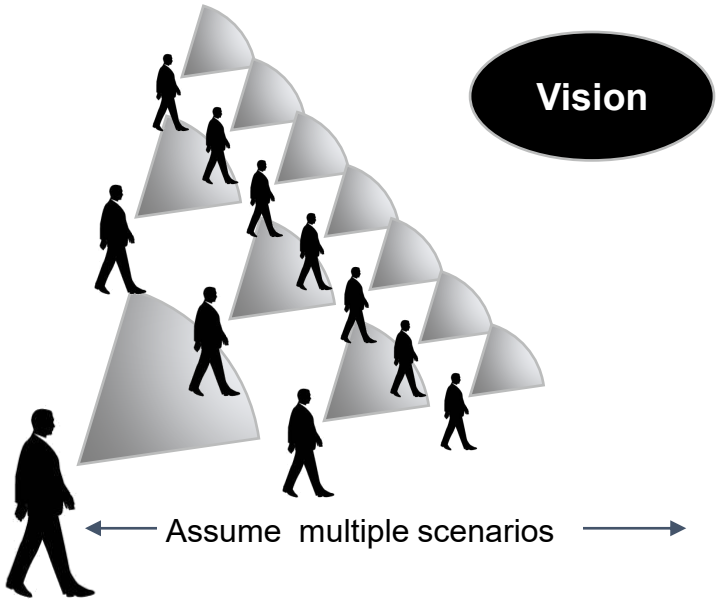
Companies conduct scenario analysis regularly (recognition of a broad range of risks and identification of potential responses). It is crucial for management to understand that investors expect companies to conduct scenario analysis on climate change.

In a reasonably foreseeable term…



- Business strategy cannot respond to changes in the future
- The discussion never reaches a consensus on future perspectives
- Suspected of lacking business resilience

In a longer term, where outcomes are highly uncertain, and possibly promising…



- Business management can flexibly respond to future change
- The discussion takes places without any subjective viewpoints on future
- Management can demonstrate business resilience

1 Obtain understanding of management > **Point** Use social trends and stakeholder feedback as input to management

Use climate change trends along with actual stakeholder demands as input as a method of obtaining cooperation from management

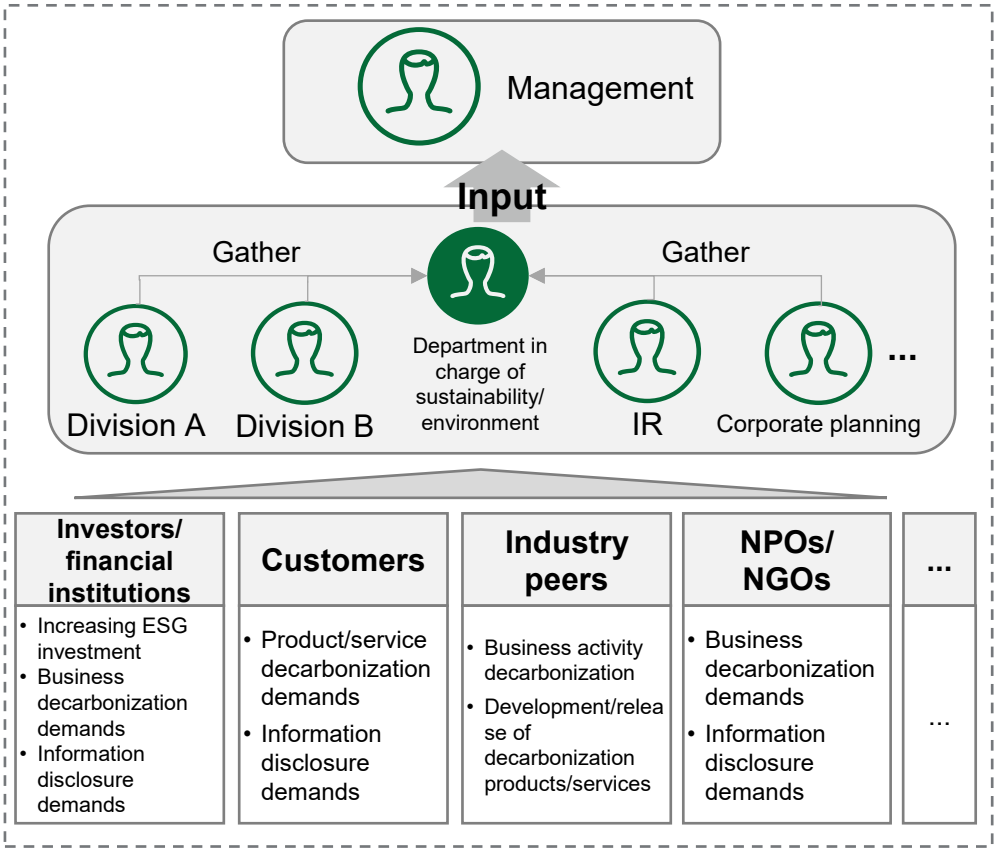
Input: Climate change trends

- Use documents and reports such as TCFD Practical Guides, and use global climate change trends, the need to respond to climate change, and the effectiveness of scenario analysis as input to management
- Another option is to participate in study sessions held by experts

Reference: 2023 Study Session on Disclosing Climate-Related Financial Information and Nature-Related Financial Information for Businesses
https://www.env.go.jp/earth/datsutansokeiei.html

Input: Actual stakeholder demands

- Actual stakeholder demands do not reach management; gather this information internally and use it as input to management
- It is important to use such means as expert study sessions to provide input to management and convince them that responding to climate change **may have an impact on corporate value**

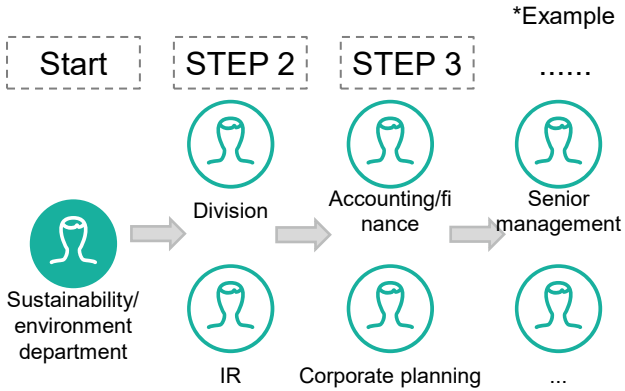


2 Select divisions and form scenario analysis working groups

The implementation of scenario analysis requires internal involvement. Therefore, internal organizations must be built from the initial stages so that divisions see climate change as “their own business”

Pattern A

Involve required departments during scenario analysis implementation process

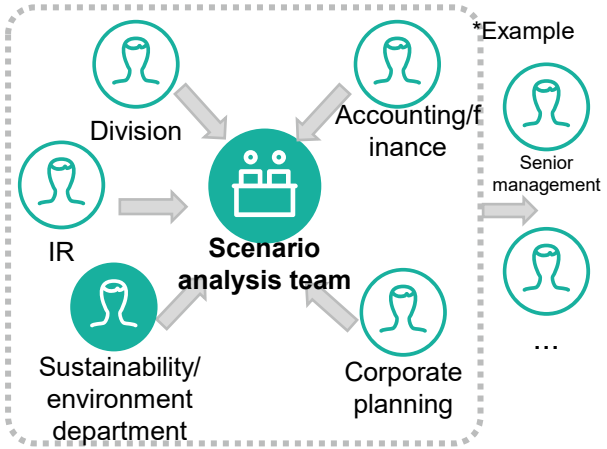


Pros
- ✓ Easy to start
- ✓ Minimal burden on each department

Cons
- ✓ Requires internal coordination during scenario analysis process
- ✓ Long process from sustainability/environment department to senior management

Pattern B

Begin scenario analysis after creating internal team



Pros
- ✓ Internal coordination already done, so each department would be cooperative
- ✓ Departments work together, making it easier for feedback to reach senior management

Cons
- ✓ Takes time to start
- ✓ Higher burden, as each department must participate

Roles

Sustainability/ environment department	• Take the initiative in scenario analysis • Request information provision • Report on analysis results
Management	• Instruct related departments to cooperate • Monitor scenario analysis status • Approve analysis results • Reflect analysis results in management strategies
Corporate planning	• Provide information on management plan, target progress, etc. • Reflect analysis results in management strategies
IR	• Provide advice/information based on investor feedback, etc.
Division	• Review and discuss during each scenario analysis step • Reflect analysis results in business plans
Accounting/finance	• Provide finance/accounting information

2 Select divisions and form scenario analysis working groups > Point Establishing an organization suitable for the maturity level of scenario analysis

Operation divisions should also take the lead and be involved in the scenario analysis process.In the initial stages, it is assumed that operation divisions will provide interviews/data regarding the analysis results from ESG/sustainability-related departments

	Structure for conducting scenario analysis	How operation divisions are involved	Positions in the operation division that are involved
Companies undertaking scenario analysis for the first time	✓ Departments or other units responsible for ESG/sustainability will take the lead in conducting scenario analysis and interviews with operation divisions	✓ Provide data to those conducting scenario analysis ✓ Provide feedback on analysis results (for analysis conducted by other divisions)	✓ Not specified ✓ However, the responsible parties within the operation division should understand the significance and overview of scenario analysis
Companies continuing to conduct scenario analysis	✓ ESG/sustainability-related departments perform a secretarial role ✓ Operation divisions conduct scenario analysis/intra-divisional interviews	✓ Provide data to those conducting scenario analysis ✓ Conduct scenario analysis for related target areas ✓ Intra-divisional interviews	✓ Positions closest to decision making processes should be involved, as it will be necessary to involve operation division members in tasks such as data collection and promoting countermeasures

2 Selecting divisions and forming scenario analysis working groups > Point Story telling by each business unit and engaging executives

The following use cases exist as examples for involving operation divisions for companies that have implemented scenario analysis. Effectively leveraging management's commitment and using narratives suited to each division/department are useful strategies, and daily communication of information within the company will also help promote understanding

Narratives for each operation division

- It may be good to put the focus on **how the company as a whole can reduce its CO2 emissions through the contributions of various areas such as products and procurement,** rather than concentrating only on reducing emissions from processes. Framing it in such a way could promote greater participation from each operation division.
- Since each operation division is connected, **we can motivate them by having each operation division consider strategies they can implement and come up with a storyline** for what to do. The important thing is **showing what they can do as a business**, and not being limited to environmental measures.

Effectively leveraging management's commitment

- We communicate with operation divisions in the following manner: "we are planning to discuss the results we reviewed based on external data at the management committee, **so if there is anything that you as a division think should be corrected, please let us know**".
- The backing of **management's commitment** allows us to use the momentum to involve operation divisions
- **While centered on the reduction targets set for the entire company**, the project involves related departments, executives involved in sustainability promotion, and conference bodies.

- There are many other issues besides climate change, and some might argue that those issues should be addressed first. However, we emphasize that **there is a need for us to focus on measures against climate change, as this is something that is required of us as a company**.
- Having **management position climate change measures as a priority issue** enables us to gain operation divisions' understanding that this is an important issue for the company.

Strengthening communication of information within the company

- We started **communicating information within the company** about the TCFD recommendations from the beginning stage of their implementation, so there was no sense of resistance internally as our staff was already aware of them.
- **When it became time to proceed with the scenario analysis, each division responded quickly by assigning members to the scenario analysis team.**

3 Determine the scope of scenario analysis

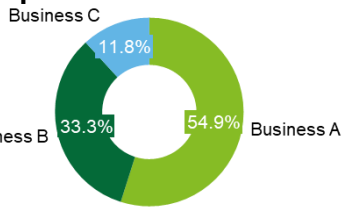
Determine the scope of scenario analysis in terms of both “target” and “time horizon”

Choose target for analysis

Item	Options for Scenario Analysis Scenario (Example)	
Region	**Domestic**	**Overseas**
Scope of Operations	**Some businesses**	**All businesses**
Corporate scope	**Only for the scope of consolidated financial statements**	**Entire supply chain**

Identify scope of business based on sales composition ratio

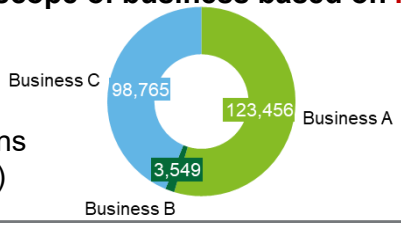
Sales composition (%)



For overseas business, let's start with X, which has a wealth of data

Identify scope of business based on relevance to climate change

CO2 emissions (tCO2)



For overseas business, let's start with X, which has a wealth of data

Identify the scope based on difficulty of data collection

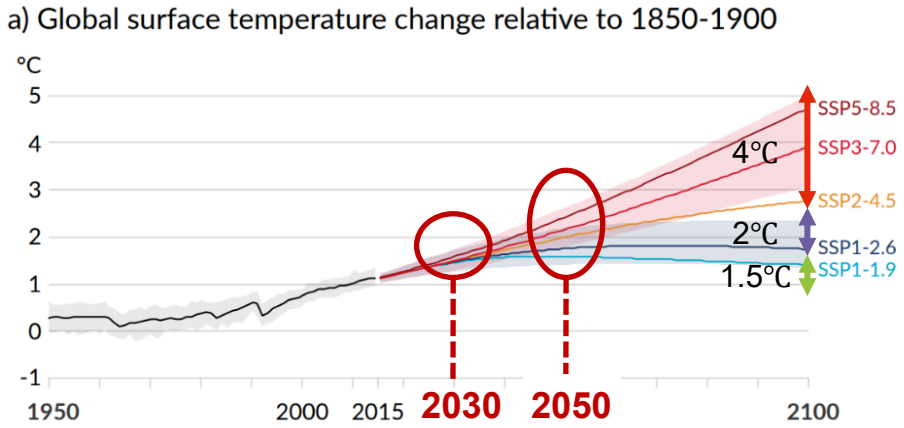
	CO2 emissions (tCO2)
Foreign branch X	Abundant internal data
Foreign branch Y	No internal data
Foreign branch Z	No internal data

For overseas business, let's start with X, which has a wealth of data

By making selections based on “sales composition,” “relevance to climate change,” “difficulty of data collection,” etc., analysis can be performed in line with the business model

Choose time horizon to conduct scenario analysis

Forecast of global average surface temperature



How to decide the time axis

	Benefits	Disadvantage
2050	• **Physical risks are emerging** • Enables analysis in line with **societal decarbonization trends (carbon neutrality by 2050)**	• There’s a distance from the **time horizon for business planning**, and **getting management / people inside the company involved** may be difficult
2030	• **Abundant data available for reference** • **Relatively easy to link with business plans**	• **Possibility that the impact of physical risk is small and that the impact on the company will be low**

*For companies in sectors which are significantly impacted by climate change, conducting analysis for 2030 as well as 2050 is also considered effective

Select the year for analysis from perspectives such as the business plan period, status of involving people inside the company, degree of impact from physical risks on the company

Source : AR6 WG I Figure SPM.29（IPCC）、IEA, “ETP2017”、UNEP “The Emission Gap Report 2015”

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Assess materiality of climate-related risks:

What are the current and anticipated organizational exposures to climate-related risks and opportunities?

1 Ensure governance is in place

Integrate scenario analysis into strategic planning and/or enterprise risk management processes.
Assign oversight to relevant board committees/subcommittees.
Identify which internal (and external) stakeholders to involve and how.

Get management and operation divisions involved!

2 Assess materiality of climate-related risks

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

What are the current and anticipated organizational exposures to climate-related risks and opportunities?
Do these have the potential tobe material in the future? Are stakeholders concerned?

Pick and choose from your industry and company viewpoint!

3 Identify and define range of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

What scenarios (and narratives) are appropriate, given the exposures? Consider input parameters, assumptions, and analytical choices. What reference scenario(s) should be used?

Clearly imagine a future world under certain assumptions!

4 Evaluate business impacts

Impact on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

Evaluate the potential effects on the organization's strategies and financial position under each of the defined scenarios.
Identify key sensitivities.

Try not to seek too much accuracy!

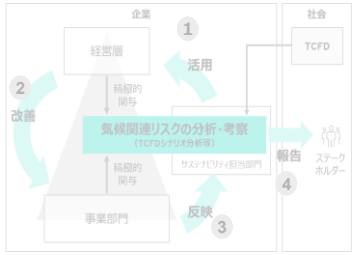
5 Identify potential responses

Responses might include
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities.
What adjustments to strategic/financial plans would be needed?

Do not narrow down! Take multiple scenarios into account!

Incorporate into strategy and execution



1. Utilization in management
2. On-site improvement
3. Reflection in analysis/discussion
4. External reporting

General: Foundation of climate change management

Build a company-wide change cycle!

6 Documentation and disclose

Document the process; communicate to relevant parties: Be prepared to disclose key inputs, assumptions, analytical methods, outputs, and potential management responses

Disclose information from readers' viewpoint!

(Notes in red: Points to consider in each step were added after the support program)

Sources : The Task Force on Climate-related Financial Disclosures, "Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate Related Risks and Opportunities", June 2017.

"Evaluation of risk importance" steps

Create a list of risk items, qualitatively indicate possible business impacts, and then evaluate risk importance

		1 List risk items	2 Qualitatively indicate possible business impacts	3 Assign importance to risk/opportunity items
Overview		List risk/opportunity items related to applicable businesses	Qualitatively express possible business impacts with regard to listed risk/opportunity items	Determine importance, based on the size of business impact if risk/opportunity occurs
Point / Technique / Reference		**Point** **Identification of risks/opportunities, both common to industry/sector and unique to own company** **Technique** Identify risk/opportunity items common to all companies • Identify risk/opportunity items common to industry/sector • Identify risk/opportunity items unique to own company	-	**Point** **Evaluation of "likelihood of occurrence"** **Technique** "Likelihood of occurrence" evaluation method **Point** **Granularity of risk importance evaluation**
Roles	Management	-	-	Review importance of risk/opportunity items
	Division	Review risk/opportunity items based on business lineup	Qualitatively express risk/opportunity items	Evaluate importance of risk/opportunity items based on business lineup
	Department in charge of TCFD	Identify risk/opportunity items based on documents, etc.	Qualitatively express risk/opportunity items	Evaluate general importance of risk/opportunity items

1 List risk items

List risk and opportunity categories for targeted business areas

External reports
(Industry-specific reports such as SASB Standard, WBCSD Scenario Analysis Guide, etc.)

TCFD Recommended Disclosures

CDP responses from competitors

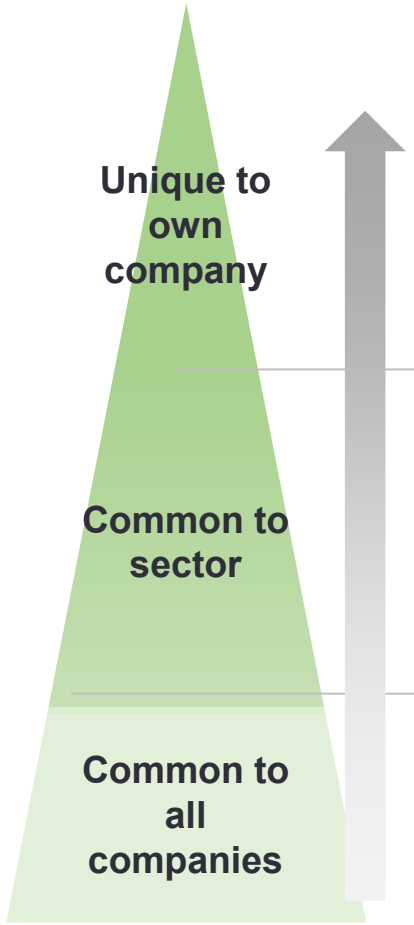
Other external information
(CDP responses, etc.)

Classification	Risks and Opportunities Related to Climate Change (Examples)	
Transition Risk / Opportunity	Policy Regulation	Carbon price
		Carbon emissions targets/policies in each country
		Energy-saving policy
		Fossil fuel subsidies
		Subsidies for renewable energy, etc.
	Market	Changes in the energy mix
		Changes in energy demand
		Changes in important products/prices
	Technologies	Diffusion of renewable energy and energy-saving technologies
	Reputation	Changes in customer reputation
		Changes in investor's reputation
Physical Risk / Opportunity	Chronic	Increase in average temperature
		Changes in rainfall and weather patterns
		Rising sea level
	Acute	Increasing severity of extreme weather conditions

Image

1 List risk items > Point Identification of risks/opportunities, both common to industry/sector and unique to own company

Risks/opportunities can be classified into three categories (“common to all companies,” “common to sector,” and “unique to own company,”) so risks/opportunities can be comprehensively identified by conducting analysis in order starting from the bottom



Type of risk/opportunity	Identification approach
Unique to own company	• Identify risks/opportunities unique to own company by analyzing own company characteristics and existing strategies, based on various frameworks
Common to sector	• Refer to reports/guidance by sector and disclosure information released by industry peers, and identify risks/opportunities impacting own company’s sector
Common to all companies	• Refer to TCFD guidance, and identify risk/opportunity items that could impact all companies

Analysis example: Automotive parts manufacturer

Risks		Opportunities
Transition	Physical	
Sales (country/region) • Reduced price competitiveness of products due to border carbon tax **Sales (customers)** • Increased raw material costs due to switch to eco-friendly materials	**Manufacturing (process, country/region)** • Reduced production capability due to water shortages	**Technology** • Increased sales of related technologies following increase in hydrogen energy demand • Expansion into agriculture sector using owned technologies
• Reduced sales of internal combustion engine products due to stricter regulations on fuel consumption and exhaust gas • Lost opportunities due to delayed response in developing electric vehicles	• Reduced production capability due to supply chain disruption	• Increased demand for related parts following advances in the development of electric vehicles • Reduced energy costs due to production process improvements
• Increased costs due to introduction of carbon tax • Increased heating and electricity costs due to use of renewables	• Operations stopped/limited due to disaster at own company’s site • Increased heating and electricity costs due to higher average temperature	• Reduced heating and electricity costs due to energy-saving equipment • Reduced heating and electricity costs due to use of renewables

1 List risk items > Point Identification of risks/opportunities, both common to industry/sector and unique to own company > Technique
Identify risk/opportunity items common to all companies

TCFD guidance lists general risk/opportunity items that could have a financial impact on companies

Category	Subcategory	Sub-subcategory
Transition risks	Policies/ regulations	• Higher GHG emission costs • Stricter obligation to report emissions • Legal restraints on existing products/services • Litigation
	Technology	• Replacement of existing products/services with lower carbon items • Failure to invest in new technologies • Cost of transitioning to low-carbon technologies
	Market	• Changes in customer behaviors • Market signal uncertainty • Higher raw material costs
	Reputation	• Changing consumer preferences • Criticism of specific sectors • Greater concerns among stakeholders, negative feedback
Physical risks	Acute	• Increased severity of extreme weather events, such as cyclones and floods
	Chronic	• Changes in rain patterns, extreme fluctuations in weather patterns • Higher average temperature • Rise in sea level

Category	Subcategory	Sub-subcategory
Opportunities	Resource efficiency	• Use of efficient means of transportation (modal shift) • Use of efficient production and distribution processes • Use of recycling • Relocation to highly efficient buildings • Reduction in amount of water used and consumed
	Energy sources	• Use of low-emission energy sources • Use of support policy incentives • Use of new technologies • Participation in carbon emissions rights market • Switchover to distributed energy sources
	Products/ services	• Development/expansion of low-emission products and services • Development of climate adaptability and insurance risk solutions • Development of new products and services through research and development and innovation • Ability to diversify business activities • Changing consumer preferences
	Market	• Access to new markets • Use of public sector incentives • Access to new resources
	Resilience	• Participation in renewable energy programs and use of energy-efficiency measures • Alternative/diversified resources

1 List risk items > Point Identification of risks/opportunities, both common to industry/sector and unique to own company > Technique Identify risk/opportunity items common to industry/sector (1/2)

Identify risk/opportunity items common to sector, by referencing risk/opportunity items disclosed in TCFD disclosures and CDP responses from industry peers, etc.

Risk items for companies in the “machinery” field of the industrials sector

-Legend- Risk items common to sector

				Benchmark company									
				Company A		Company B		Company C		Company D		Company E	
Category	Subcategory	Sub-subcategory	Specific impact	TCFD	CDP	TCFD	CDP	TCFD	CDP	TCFD	CDP	TCFD	CDP
Transition	Policies/ regulations	Higher GHG emission costs	Increased cost to procure energy due to introduction of carbon tax	●	-	-	●	●	●	-	●	-	●
		Stricter greenhouse gas emission regulations	New/higher costs for introducing renewables and energy saving	-	-	-	●	●	-	●	-	-	●
			Reduced sales following restrictions on selling devices due to stricter refrigerant regulations	-	●	-	-	-	-	-	-	-	-
		Development of decarbonization energy policies	Reduced sales following lower demand for devices due to lower thermal power generation	-	●	-	●	●	-	●	-	-	-
	Technology	Development of new decarbonization technologies	New costs for developing hydrogen technologies	-	-	-	●	-	-	-	-	-	-
			Lost sales opportunities due to delayed development of hydrogen technologies, etc.	●	-	-	-	-	●	-	-	-	-
	Market	Changes in demand for products/services due to changes in customer behavior	Reduced sales following lower demand for equipment involved in the production/consumption of fossil fuels	●	-	-	-	-	●	-	●	-	●
		Higher energy costs	Increased production costs due to higher energy costs	-	-	-	●	-	-	-	-	-	-
		Sharp rise in raw material prices	Increased production costs due to sharp rise in raw material prices	-	-	-	-	●	-	-	-	-	-
	Reputation	Change in reputation among stakeholders with regard to climate change response	Decrease in corporate value and lost sales opportunities if climate change response is deemed insufficient	-	●	-	-	-	-	●	-	-	-
Physical	Acute	More frequent/severe abnormal weather	Lost sales opportunities following reduced production capability due to disaster at own company’s site	-	●	●	●	●	●	●	-	●	●
			Lost sales opportunities following reduced production capability due to supply chain disruption	-	●	●	-	●	●	-	-	●	-
	Chronic	Higher average temperature	Increased costs due to higher use of air conditioning	-	●	-	-	-	●	-	-	●	-
			Increased costs and lost sales opportunities due to lower labor productivity	-	-	-	●	-	-	-	-	-	-
		Droughts	Reduced production capability due to industrial water shortages	-	-	-	-	-	-	-	-	-	●

1 List risk items > Point Identification of risks/opportunities, both common to industry/sector and unique to own company > Technique Identify risk/opportunity items common to industry/sector (2/2)

Identify risk/opportunity items common to sector, by referencing risk/opportunity items disclosed in TCFD disclosures and CDP responses from industry peers, etc.

Opportunity items for companies in the machinery field of the industrials sector

-Legend- Risk items common to sector

				Benchmark company									
				Company A		Company B		Company C		Company D		Company E	
Category	Subcategory	Sub-subcategory	Specific impact	TCFD	CDP	TCFD	CDP	TCFD	CDP	TCFD	CDP	TCFD	CDP
Opportunities	Products / services	Increased demand for new technologies contributing toward decarbonization	Increased sales due to higher demand for hydrogen-related technologies	●	-	●	●	-	-	-	●	●	-
			Increased sales due to higher demand for CO2 capture technologies	●	-	●	-	-	-	-	-	-	-
			Increased sales due to higher demand for equipment compatible with biomass and other alternative fuels	-	-	●	-	●	●	-	-	-	-
			Increased sales due to higher demand for equipment compatible with electrification	●	-	●	-	-	-	-	-	-	-
		Increased demand for existing technologies contributing toward decarbonization	Increased sales of related equipment due to higher demand for gas-fired power generation	-	●	-	-	-	-	-	-	-	-
			Increased sales due to higher demand for equipment (regulated power supplies, energy storage technologies) compatible with energy supply/demand stabilization following expanded use of renewables	-	-	-	-	-	-	●	-	-	
			Increased sales due to higher demand for energy-saving devices and highly efficient devices	-	-	-	-	●	-	-	-	●	-
		Increased demand for products contributing toward enhanced resilience	Increased sales due to higher demand for distributed power generation equipment and emergency power supply equipment	-	-	●	-	●	-	-	-	-	-
		Increased demand for products for disaster recovery	Increased sales due to higher demand to maintain/replace equipment damaged in disasters	-	-	-	-	-	-	-	-	-	●

1 List risk items > Point Identification of risks/opportunities, both common to industry/sector and unique to own company > Technique Identify risk/opportunity items unique to own company

Use a framework for analyzing competitive environments and strategies to identify risks/opportunities “unique to own company” by identifying own company’s characteristics and determining how climate change would impact these characteristics

Own company’s characteristics
Utilize framework for analyzing competitive environments and strategies and refer to own company’s business strategies

×

Climate change
Refer to general risk/opportunity items listed in TCFD guidance, etc.

=

Risks/opportunities unique to own company

Key questions

Competitive environment/strategy framework

- Supply chain analysis
  - Procurement...
  - Manufacturing...
  - Sales...
  - Development...
- 5 force analysis
  - Competition...
- ...

Own company’s characteristics

Identify own company’s characteristics as answers to key questions

- Characteristic A
- Characteristic B
- Characteristic C
- ⋮

Own company’s business strategies

Business strategies

Medium-term management plan	Strategy/Policy D
Long-term management plan	Strategy/Policy E
...	...

×

Transition risks

- Policies/ regulations
- Market
- Technology
- Reputation

Physical risks

- Acute
- Chronic

Opportunities

- Resource efficiency
- Energy sources
- Products/ services
- Market
- Resilience

=

Risks/opportunities unique to own company

Investigate and identify impact of climate change on own company’s characteristics

- **Risk A** (Characteristic A × Policies/regulations)
- **Risk B** (Characteristic B × Technology)
- **Risk C** (Characteristic C × Acute)
- **Opportunity D** (Policy D × Products/services)
- ⋮

1 List risk items > Point Identification of risks/opportunities, both common to industry/sector and unique to own company > Technique Identify risk/opportunity items unique to own company: Case studies

Risks/opportunities “unique to own company” must be identified even in actual disclosure, and analysis is crucial for increasing management resilience

	Key questions	Own company’s characteristics		Climate change		Risk/opportunity examples
Procurement	• Any characteristics unique from industry peers in source country/region or procured items?	**Much copper procured**	×	**Market** (Difficulty procuring raw materials)	=	**Reduced sales due to impact on operations caused by difficulty procuring raw materials following higher demand for copper** (Company A [automotive parts manufacturer])
Manufacturing	• Any characteristics unique from industry peers in manufacturing processes or country/region?	**Much water used in manufacturing processes**		**Chronic** (Changes in weather patterns)		**Reduced production capability due to water shortages** (Company B [automotive parts manufacturer])
Sales	• Any characteristics unique from industry peers in sales target country/region or customers?	**High sales in Europe**		**Policies/regulations** (Stricter GHG emission regulations)		**Reduced price competitiveness of products due to border carbon tax** (Company C [automotive parts manufacturer])
Technology (Development)	• Any technologies unique from industry peers? Any plans for future development?	**High investment in hydrogen technology development**		**Products/services** (New product/service development)		**Increased sales of related technologies following increase in hydrogen energy demand** (Company D [automotive parts manufacturer])

2 Qualification of possible business impact

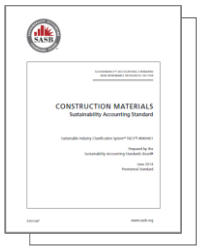
From the list of risk and opportunity items, qualitatively describe the potential impact on business

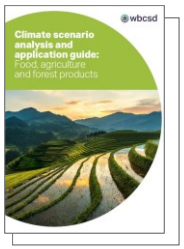
Image

	Business Impact		
	Discussion: Risks	Discussion: Opportunities	Asse ssme nt
Carbon emission targets/policies of each country (Carbon tax)	Plant operating costs may increase due to the application of carbon taxes by governments of various countries	Quick responses such as shifting to use low-carbon energy could make it possible to limit energy cost increases	Large
Carbon emission targets/policies of each country	Production costs may rise due to rising costs of raw materials	Quick responses to anticipated future regulations could make it possible to limit production cost increases	Large
Changes in the energy mix	Electricity fees may rise and manufacturing costs may increase due to higher rates of reusable energy Costs may increase due to significant reductions in CO2 emissions for manufacturing plants	Expanding investment and increasing the use of renewable energy may lead to greater revenue from enhanced production capability	Large
Changes in important products/prices	Production costs of key products may rise due to requirements to display the carbon footprint of manufactured products, including in the textile industry	Options may increase for new materials, new products, and new services adapted to a circular economy, resulting in increased sales	Large
Changes in customer behavior	As more consumers and stakeholders make purchasing decisions based on environmental impact, delayed action may lead to loss of customers and decreased sales There is a risk of increased costs for presentation of risks such as use of hazardous substances and supply chain risks	By responding to changes in purchasing trends and expanding its line of environmentally friendly products, such as functional clothing that uses less energy and products utilizing recycled materials, GUNZE can maintain its market superiority and connect these to increased revenue	Large
Changes in investor's reputation	Failing to keep pace with the apparel industry's standard-setting for energy, water, and material use may lead to increased costs for addressing potential reputation damage and decreased sales	Meeting sustainability requirements could lead to deeper relationships with customers, employees, regulators, and interest groups, which could lead to increased revenue	Medi um

It is important to consider not only the company's risks but also its opportunities

Separate the risks and opportunities and examine them





CDP responses from competitors

External reports and other external information

Describe the possible impact in a narrative manner through discussions with related parties within the company, based on the company ‘s business model, etc. If the analysis is to be conducted in the second round, it may be a good idea to include external stakeholders in the discussion.

Discuss with internal stakeholders

3 Assign importance to risk/opportunity items

Determine the materiality by looking at the magnitude of the business impact for each risk and opportunity

Business impact	Risks and opportunities tied to business impact	
Large	• Carbon price • Changes in important products/prices	• Policies and regulations of each country • Changes in rainfall and weather conditions
Medium	• Changes in the energy mix • Changes in the reputation of customers and investors	
Small	• Energy-saving policy • Fossil fuel subsidies • Subsidies for renewable energy, etc. • Energy demand • Improving efficiency	• Diffusion of renewable/energy-saving technologies • Rising sea levels • Increasing in severity of extreme weather conditions

Image

Compare each risk and opportunity item from the perspective of the **size of the business impact**

Example: **Rate risks and opportunities that impact in a wide range, and those that relate to important goods as "Large."**
Rate those that have no impact on the business as "small" and for others rate them as "medium."

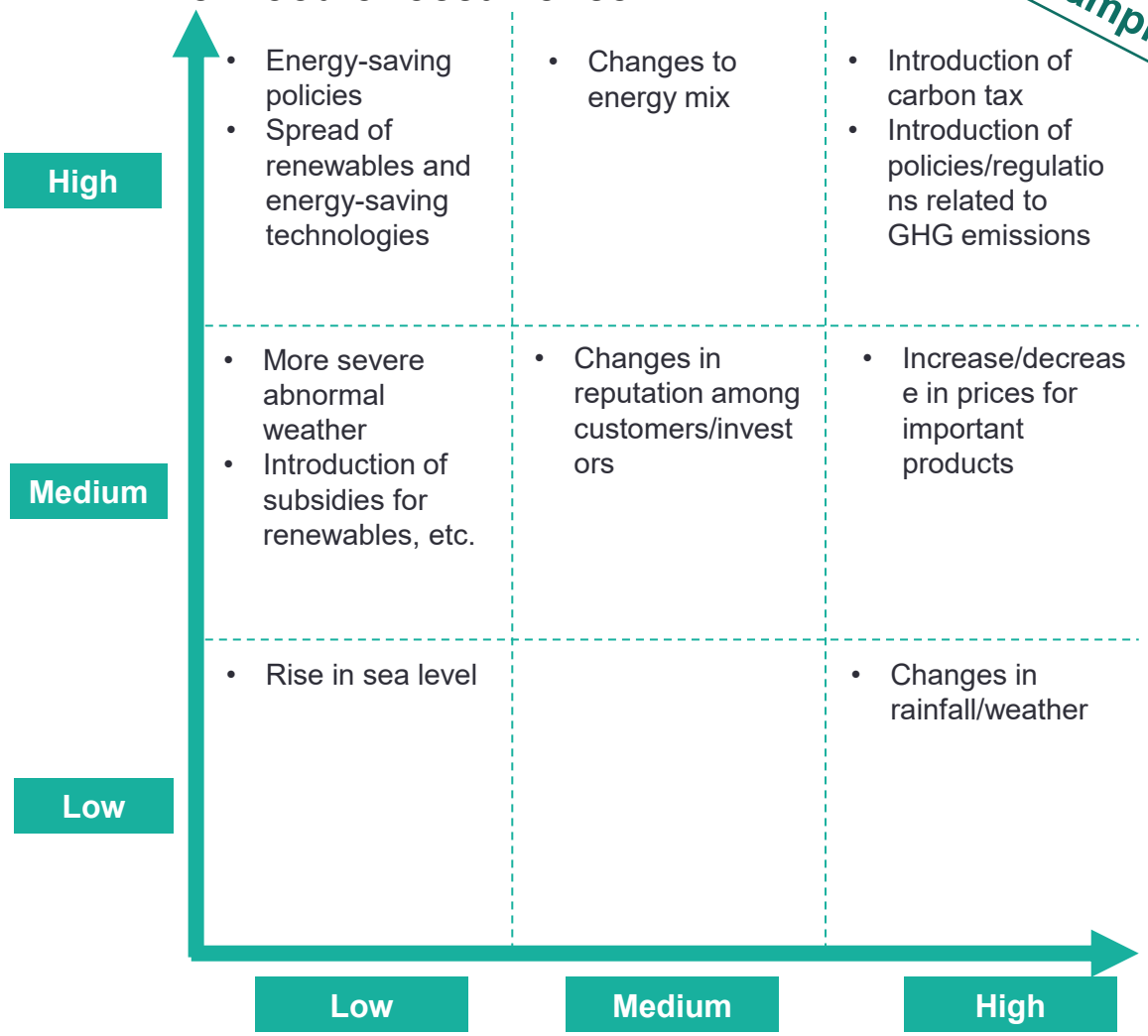
Example of Analysis (Changes in important Products)

Since raw materials account for a large proportion of the cost of sales, the business impact may be "large."

3 Assign importance to risk/opportunity items > Point Evaluation of “likelihood of occurrence”

“Likelihood of occurrence” of risks/opportunities can be added to the evaluation axis along with the size of business impact, in order to more accurately determine the impact of climate change on own company, and formulate countermeasures

Example



In addition to the “size of business impact” for own company, also compare each risk/opportunity item from the perspective of **“likelihood of occurrence”**

Example: **“Likelihood of occurrence” is high** for **carbon taxes already introduced in multiple countries/regions**.

*Refer to the next page for details on how to evaluate “likelihood of occurrence”

Analysis example (increase/decrease in important products)

A carbon tax is already being introduced in multiple countries/regions, and will be introduced even in Japan under the Basic GX Policy, so the **likelihood of occurrence would be “high”**

3 Assign importance to risk/opportunity items > Point Evaluation of “likelihood of occurrence” > Technique How to evaluate “likelihood of occurrence”

One option is to rank and calculate average “likelihood of occurrence” and “degree of impact” values for the risk/opportunity items of each company based on CDP responses from benchmark companies, and use this to evaluate own company’s risk

Rank risk/opportunity items based on CDP responses from benchmark companies

Set ranks for each level of “likelihood of occurrence”*1 and “degree of impact (business impact)” found in climate-related risk/opportunity items in C2.3 and C2.4 CDP Climate Change responses

(Ranking example)

Rank (Set independently)	Likelihood of occurrence (Listed in CDP)
1	Low or extremely low likelihood
2	Likelihood around 50%
3	Certainty higher than 50%
4	High likelihood
5	Extremely high likelihood
6	Almost certain

Rank (Set independently)	Degree of impact (Listed in CDP)
1	Low
2	Low-medium
3	Medium
4	Somewhat high
5	High

Calculate average scores of benchmark companies

Tabulate results using ranks set for “likelihood of occurrence” and “degree of impact” for each given as a risk/opportunity in competitor responses, and calculate (each company’s) average scores

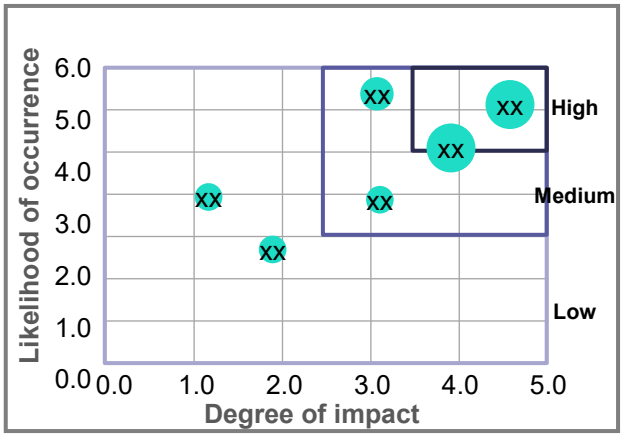
(Average score calculation example)

Category	Item	Responding companies	Likelihood of occurrence	Degree of impact
Regulation	Increased cost due to introduction of carbon pricing	8	4.7	3.5
Regulation	Increased burden due to stricter regulations on energy saving, GHG emissions, etc.	5	5.2	4.2
Market	Reduced demand following climate change	4	4.0	4.0
Legal	Stricter environmental compliance	5	4.0	3.0
Market	Reduced sales if response to changes in customer behavior is insufficient	7	4.6	4.7
Reputation	Reduced reputation among investors and financial institutions due to insufficient climate change response	3	6.0	2.5

Set “likelihood of occurrence” and “degree of impact” based on calculated average values

Map risk/opportunity items based on average scores for “likelihood of occurrence” and “degree of impact.” Define importance (high, medium, low) based on ranks on both axes.

(Average score and item mapping example)



(Example of defining importance)

- “High”: Average score of “likelihood of occurrence” is 4 or higher, and average score of “degree of impact” is 3.5 or higher
- “Medium”: Average score of “likelihood of occurrence” is 2 or higher, and average score of “degree of impact” is 2.5 or higher
- “Low”: Other than the above

*1: This is referred to as “likelihood” in CDP responses, but is referred to as “likelihood of occurrence” here for convenience

3 Assign importance to risk/opportunity items > Point Example categories for materiality assessment of risks

Assessing materiality of risks after categorizing them by differences in products (by sector) and affected supply chains (by supply chain) enables an analysis that is convincing to management

Example (1)

Materiality assessment of risks by sector

Image

Risk Item	Materiality assessment of risks by sector		
	X	Y	Z
Risk A	Large	Medium	Small
Risk B	Small	Small	Large
Opportunity C	Large	Medium	Medium
Opportunity D	Medium	Large	Large

Example (2)

Materiality assessment of risks by supply chain

Image

Risk Item	Materiality assessment of risks by supply Chain			
	Procurement	Transportation	Sales	・・・
Risk A	Large	Large	Small	Medium
Risk B	Small	Small	Large	Large
Opportunity C	Large	Medium	Medium	Small
Opportunity D	Medium	Large	Large	Large

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Identify and define range of scenarios

What scenarios (and narratives) are appropriate, given the exposures?

1 Ensure governance is in place

Integrate scenario analysis into strategic planning and/or enterprise risk management processes.
Assign oversight to relevant board committees/subcommittees.
Identify which internal (and external) stakeholders to involve and how.

Get management and operation divisions involved!

2 Assess materiality of climate-related risks

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

What are the current and anticipated organizational exposures to climate-related risks and opportunities?
Do these have the potential tobe material in the future? Are stakeholders concerned?

Pick and choose from your industry and company viewpoint!

3 Identify and define range of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

What scenarios (and narratives) are appropriate, given the exposures? Consider input parameters, assumptions, and analytical choices. What reference scenario(s) should be used?

Clearly imagine a future world under certain assumptions!

4 Evaluate business impacts

Impact on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

Evaluate the potential effects on the organization's strategies and financial position under each of the defined scenarios.
Identify key sensitivities.

Try not to seek too much accuracy!

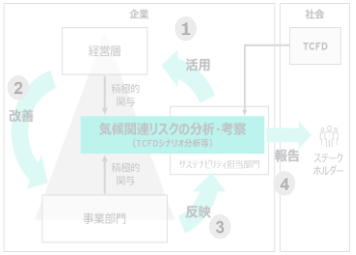
5 Identify potential responses

Responses might include
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities.
What adjustments to strategic/financial plans would be needed?

Do not narrow down! Take multiple scenarios into account!

Incorporate into strategy and execution



1 Utilization in management
2 On-site improvement
3 Reflection in analysis/discussion
4 External reporting
General Foundation of climate change management

Build a company-wide change cycle!

6 Documentation and disclose

Document the process; communicate to relevant parties: Be prepared to disclose key inputs, assumptions, analytical methods, outputs, and potential management responses

Disclose information from readers' viewpoint!

(Notes in red: Points to consider in each step were added after the support program)

Sources : The Task Force on Climate-related Financial Disclosures, "Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate Related Risks and Opportunities", June 2017.

"Definition of scenarios" steps

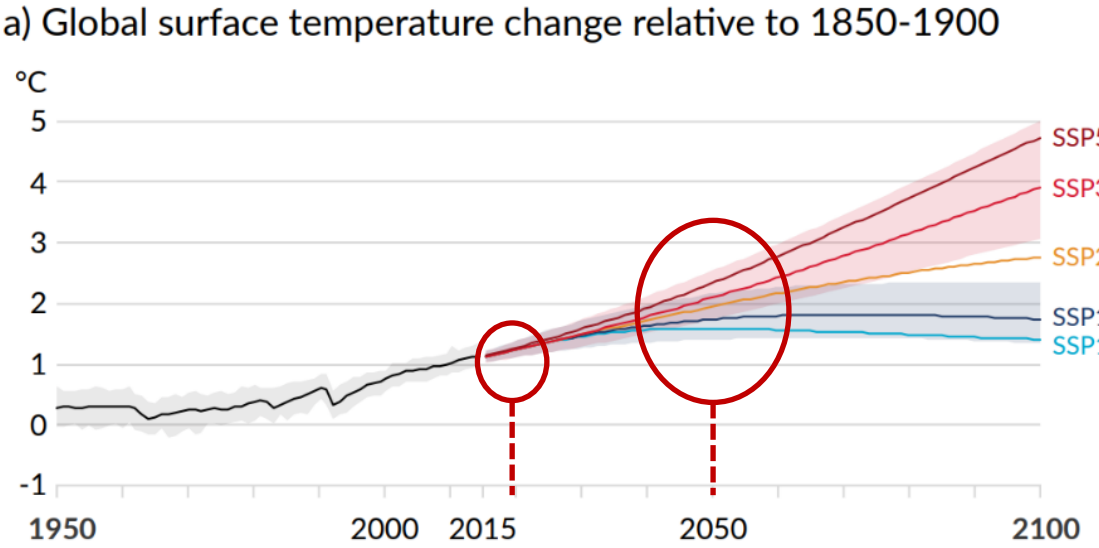
Defining scenarios requires taking a perspective of the world based on scenarios/parameters that have already been released, and fostering a common internal understanding of the impact that changes in the external environment would have on own company

	1 Set scenarios	2 Obtain future information on related parameters	3 Develop a perspective of the world focused on stakeholders
Overview	In order to respond to an uncertain future, select multiple temperature range scenarios, including the 2°C or less (1.5°C) scenario	Obtain objective future information on parameters related to risk/opportunity items, and describe the impact on own company in more detail	[If required] Clarify a perspective of the world surrounding own company (including future stakeholder and investor behavior) based on future information, incorporate external perspectives, and form a consensus within the company
Point / Technique / Reference	**Point** **Select multiple scenarios, taking the characteristics of each scenario into consideration** **Reference** Global temperature increase in each WEO2023 scenario • 1.5°C scenario **Point** **Select unique scenarios based on own company's business characteristics** **Technique** Steps for building unique scenarios	**Reference** • Example transition risk/opportunity parameters • Example physical risk/opportunity parameters	**Point** **Reconcile perspective of the world with related departments**
Roles: Management	-	-	Determine climate-related risks/opportunities for own company based on perspective of the world
Roles: Division	Confirm impact of each scenario on business lineup	Organize parameters related to business lineup	Reconcile perspective of the world based on scenarios, with future forecast by divisions
Roles: Department in charge of TCFD	Select (multiple) scenarios required for analysis	Organize/obtain parameters required for analysis	Organize/describe perspective of the world based on scenarios

1 “Definition of scenarios” steps

We will select scenarios from multiple temperature ranges, including the below 2ºC (1.5°C) scenario, in order to respond to an uncertain future

[Predicted global surface temperature change]
(Difference with the 1850 – 1900 average)



2020: +approx. 1.09°C
(2011-2020 average)

SSP5-8.5 : +3.3～5.7℃ (approx. 4.4℃)
High-level reference scenario without introducing climate policies under fossil fuel-dependent development

SSP3-7.9: +2.8 – 4.6°C (approx. 3.6°C)
Mid- to high level reference scenario in which climate countermeasures are not adopted due to confrontational stances toward development between different regions
Large volume of emissions besides CO2, such as aerosols

SSP2-4.5: +2.1 – 3.5°C (approx. 2.7°C)
Climate countermeasures are adopted, and development is neutral. Emission levels are largely on par with the upper limit of aggregated “Nationally Determined Contributions (NDCs)” for each country. The temperature increase compared to pre-industrial levels by the end of the 21st century is approx. 2.7°C (best estimate)

SSP1-2.6: +1.3 – 2.4°C (approx. 1.8°C)
There is sustainable development, and climate countermeasures are adopted to keep the temperature increase to below 2°C compared to pre-industrial levels. Net zero CO2 emissions is expected to be achieved by the latter half of the 21st century

SSP1-1.9: +1.0 – 1.8°C (1.4°C)
There is sustainable development, and climate countermeasures are adopted to keep the increase in temperature (median value) by the end of the 21st century mostly to approx. 1.5°C (there may be cases where it exceeds it slightly) or below compared to pre-industrial levels. Net zero CO2 emissions is expected to be achieved by the mid-21st century

- ✓ **Up to 2030, the 2°C and 4°C scenarios have mostly the same level of temperature change. Starting in 2030, the gap between the scenarios widens**
- ✓ **The equilibrium climate sensitivity (ECS) for 2100 has a likely range of 2.5 – 4°C and a very likely range of 2 – 5°C, and a median value of 3°C**
- ✓ **If current trends continue, global warming will exceed 1.5°C and 2°C within the 21st century if emissions of CO2 and other greenhouse gases are not significantly reduced within the next few decades**

Source : AR6 WG I Figure SPM.29 (IPCC), Ministry of the Environment

1 Set scenarios > **Point** Select multiple scenarios based on characteristics of the each scenario

It is important to consider the characteristics and parameters of each scenario and select a scenario that suits your company's industry and situation, investor movements, and domestic and international policy trends

Scenario/temperature range	IEA WEO (World Energy Outlook)	SSP (Shared Socioeconomic Pathways)					PRI IPR (Inevitable Policy Response)	NGFS (Network for Greening the Financial System)
	• Lists medium- to long-term energy market forecasts ✓ Lists future information (quantitative/qualitative) related to energy	• Socioeconomic scenario based on recent policies and the socioeconomic environment ✓ Lists the macroeconomic information scenarios are based on for each scenario					• Scenario for climate-related policies that are likely to be implemented in the short term ✓ Lists qualitative and quantitative forecasts for climate-related policies ✓ FPS scenarios also include some forecasts for natural policies	• A common climate scenario for central banks and financial supervisors ✓ Scenarios are divided into temperature zones, technological development, and speed of policy response
		SSP1	SSP2	SSP3	SSP4	SSP5		
RCP8.5 (4°C)	—	—	—	—	—	○	—	—
RCP6.0	—	○	○	○	○	○	—	• Current Policies (3°C+, Hot house world)
RCP4.5	• STEPS (2.5°C, Stated Policies Scenario)	○	○	○	○	○	—	• NDCs (2.6°C, Nationally Determined Contributions, Hot house world)
RCP3.4	—	○	○	○	○	○	—	—
RCP2.6	• APS (1.7°C, Announced Pledges)	○	○	○	—	△ Partial achievement	• FPS (1.8°C, Forecast Policy Scenario) • FPS + Nature (FPS added nature related policies)	• Delayed Transition (1.6°C, Disorderly) • Below 2°C (1.6°C, Orderly)
RCP1.9 (Under 1.5°C)	• NZE (1.4°C, Net Zero Emissions by 2050)	○	—	—	—	—	• RPS (1.5°C, Required Policy Scenario)	• Divergent Net Zero (1.4°C, Disorderly) • Net Zero 2050 (1.4°C, Orderly)

*RCP stands for Representative Concentration Pathways. The subsequent values are the radiative forcing values (for example, RCP 2.6 indicates a radiative forcing increase of 2.6W/m2 by the end of the 21st century compared to pre-industrial levels)

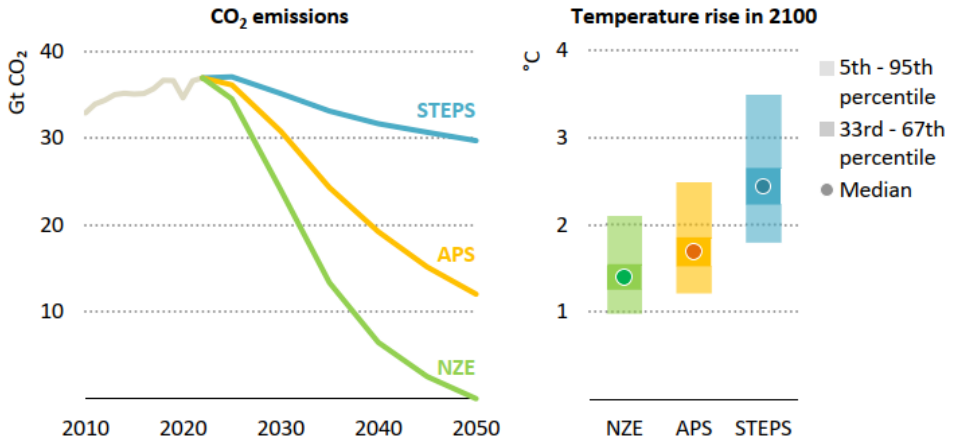
○ : Climate models corresponding to RCPs exist
△ : Some portions lacking models

Source : IEA website、Riahi et al. (2017) https://doi.org/10.1016/j.gloenvcha.2016.05.009 、PRI wAebsite、NGFS website

1 Set scenarios > Point Concept of scenario selection > Reference information Global temperature increase under WEO2023 scenarios

Three main scenarios are being evaluated: NZE, which is the IEA's normative scenario calculated backwards from specific results, and APS and STEPS, which are exploratory scenarios designed without targeting specific results

Global temperature rise in each WEO 2023 scenario



※The maximum temperature is introduced with a 50% probability

Assumption

- ✓ **Temperature rise in 2100 will be 2.4°C in STEPS, and 1.7°C in APS**
- ✓ **Temperature rise in the NZE scenario peaks below 1.6°C around 2040 and then falls to around 1.4°C in2100**
- ✓ Matching and modeling energy demand and supply across multiple countries and regions, considering a very wide range of fuel and energy technologies, including those currently available as well as those determined to be approaching industrialization

Type of scenario

The Stated Policies Scenario (STEPS) — Exploratory

- ✓ "Stated Policies Scenario
- ✓ The temperature rise in 2100 will be 2.5°C
- ✓ Realistically examines the current policy situation and indicates the direction of the energy system in the absence of new policies
- ✓ Based on detailed sector-by-sector review of the policies and measures that are in place or under development in variety of areas. Also assesses relevant regulatory, market, infrastructure and financial constraints. goals

The Announced Pledges Scenario (APS) — Exploratory

- ✓ "Announced Pledges Scenario"
- ✓ The temperature rise in 2100 will be 1.7°C
- ✓ All climate change commitments are accounted, including NDC and long-term net zero targets. Assumes all targets are met on-time.
- ✓ Expanded the analysis to consider the impact on countries that have not made ambitious long-term commitments when cost reductions in clean energy technologies are accelerated

Net Zero Emissions by 2050 Scenario (NZE) — Prescriptive

- ✓ "Net zero emission scenario"
- ✓ The temperature rise in 2100 will be 1.4°C
- ✓ With a rapid increase in clean energy policies and investments, leading developed countries will reach net zero faster than others
- ✓ Meet key elements of the UN Sustainable Development Goals for energy: achieving universal access to energy and significantly improving air quality by 2030

Source : IEA World Energy Outlook 2023

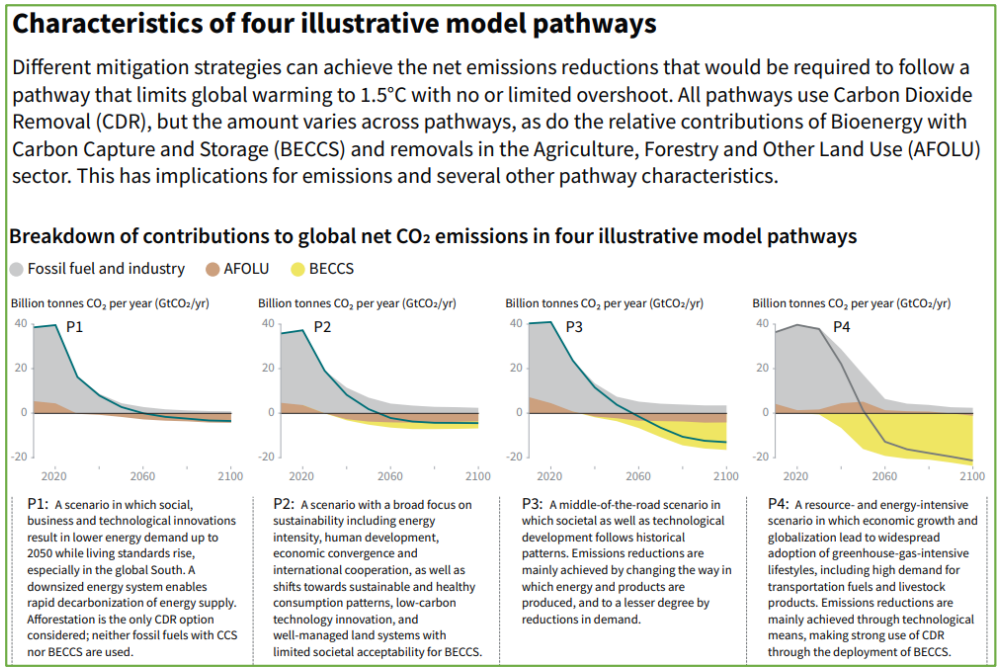
1 Set scenarios > Point Concept of scenario selection > Reference information 1.5℃ scenario

The Paris Agreement indicated that efforts will be pursued to keep the global average temperature increase well below 2˚C and to keep it at 1.5˚C compared to pre-industrial levels

Impact difference between 2˚C and 1.5˚C scenario (Examples)

	1.5˚ C scenario	2°C scenario
Sea level rise by 2100	Rise of 26 – 77cm	Rise of 30 – 93cm
Biological species loss	Insects：6% decrease Plants：8% decrease Vertebrates：4% decrease	Insects:18% decrease Plants:16% decrease Vertebrates:8% decrease
Disappearance frequency of sea ice in the Arctic Ocean during summer	Once in 100 years	Once in 10 years
Decrease ratio of catches	1.5 million tons	3.0 million tons
Impacts on coral reef	Approximately 70% – 90% dies	Mostly annihilated

Greenhouse gas emissions pathways to 1.5˚C



- **Examples of 4 representative pathways (P1 to P4) are listed**

P1: Low energy demand. No use of CCS
P2: Wide focus on sustainability
P3: Middle of the road scenario (business as usual)
P4: Expected use of CCS

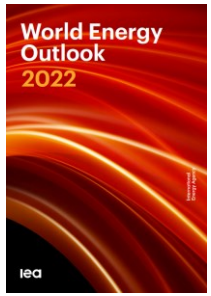
Source : Global Warming of 1.5°C (IPCC) https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM_version_report_LR.pdf

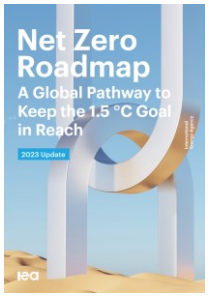
1 Set scenarios > **Point** Select unique scenarios based on own company's business characteristics

Develop "unique scenarios" from analysis based on "public scenarios" released by international organizations, etc., to allow for analysis that incorporates elements with enormous impact based on strategic planning and decision-making

Public scenarios

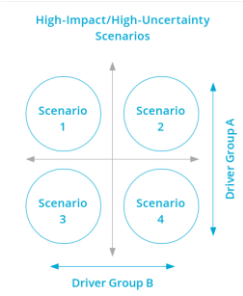
Scenarios developed by international organizations, etc. that indicate changes in GHG emissions and energy sources, as well as changes to socioeconomic conditions for each scenario





Unique scenarios

Unique scenarios based on own company's concerns (Each scenario consists of four quadrants with two main factors with significant impact on own company as the axes)



	Public scenarios	Unique scenarios
Pros	• Allow you to use information on major macro main factors (demographics and energy demand forecasts, emissions routes, carbon budgets, assumptions on specific policies and technologies, etc.) to **quickly begin conducting analysis** • Allow you to **identify areas requiring additional examination** • Can serve as **a foundation for creating** customized **unique scenarios**	• Can be **customized** based on risks/opportunities deeply connected to own company, and on **major drivers or uncertainties impacting strategic planning and decision-making**
Cons	• Created for research/policy planning, **not for the purpose of analyzing climate-related risks/opportunities at the company/sector level**. • **Often not possible to obtain quantitative benchmarks** meaningful for evaluating risk at the company level. • **Assumptions must be evaluated** with regard to scenario feasibility, economic cost, and energy conversion/technologies/policies	• Requires **organizational efforts over several years** • **Requires ensuring sufficient transparency** for scenario and process details (investors and other external stakeholders tend to find "unique scenarios" to be less transparent and comparable than "public scenarios")

Source : Created by MOE based on "Guidance on Scenario Analysis for Non-Financial Companies" (TCFD)

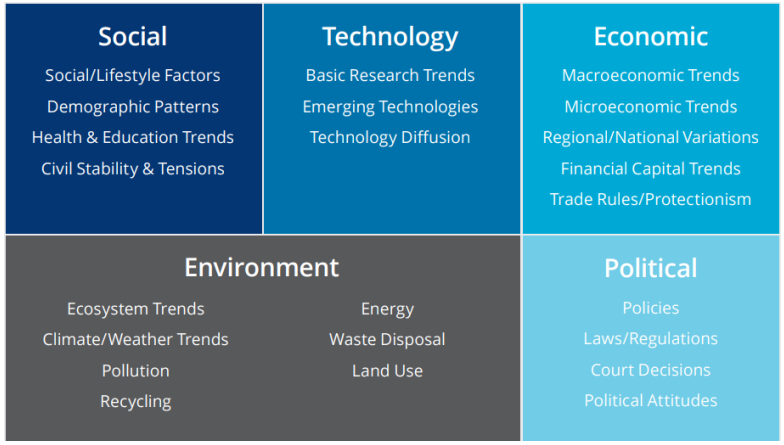
1 Set scenarios > Point Select unique scenarios > Technique Steps for building unique scenarios

TCFD guidance describes the steps for building scenarios, and it is recommended to create four scenarios in which two “driving main factors” with a high impact/importance and uncertainty are set as the axes

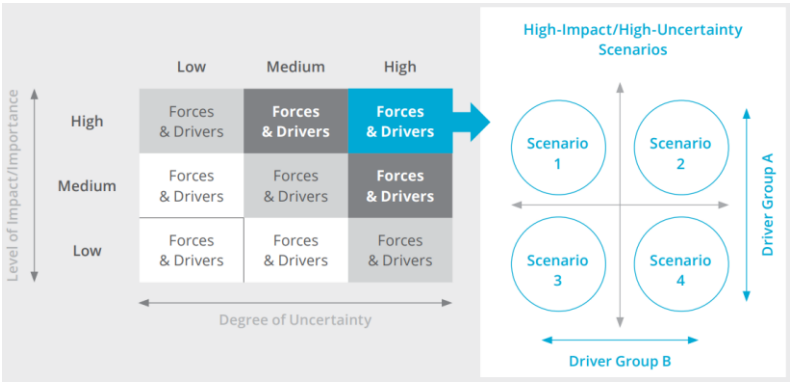
TCFD steps for building scenarios

1	Evaluate external environment	Identify own company’s climate risks/opportunities (during risk importance evaluation)
2	Define issues	Identify main factors impacting strategy planning and decision-making related to climate risks/opportunities that have been identified
3	Identify driving main factors	Identify “driving main factors” with a high impact/importance and uncertainty, and create four scenarios
4	Create outlines for each of the four scenarios	Create outlines for each of the four scenarios that indicate how driving main factors could change, and how own company will be impacted
5	Quantify scenarios	Add quantitative information to each qualitatively described scenario

- Introduce “STEEP analysis” as an example of how to identify main factors



- Evaluate the impact/importance and uncertainty of each main factor
- It is recommended to create four scenarios by setting two “driving main factors” evaluated “high” in both areas as the two axes



Source : Created by MOE based on “Guidance on Scenario Analysis for Non-Financial Companies” (TCFD)

2 Obtain parameters for each scenario

Obtain objective forecast of risk and opportunity item`s parameters and identify the effects on the company in detail

List of Risks and Opportunities

【Step2：Significance assessment of risks/opportunities】

Image

Climate-related risks and opportunities in Nishitetsu Group's bus business

Type			Evaluation	Risks	Opportunities
Transition Risk	Policy	Carbon tax	Large	-Increased costs due to introduction of a carbon tax	-Decreased fuel procurement costs due to introduction of EV buses, etc.
		Regulations	Large	-Costs incurred for addressing demands to transition to EV buses, etc. -Difficult to continue business if these cannot be addressed	-Preemptive investment/introduction made possible through implementation/strengthening of policies and subsidy programs to promote the spread of EV buses
	Technologies	Spread of low-carbon technologies	Large	-Increased procurement costs for EV buses, etc. -Increased operation costs such as storage battery management costs and replacement costs -Increased maintenance costs for EV buses, etc. -Increased hard infrastructure construction costs for fueling facilities, etc.	-Lower prices for EV buses, etc., and the capacity to travel long distances lead to lowered vehicle procurement costs and barriers toward introduction -Reduced fuel procurement costs due to improved fuel efficiency from lighter vehicles -Increased sales due to the introduction of mixed passenger-cargo transportation -Revenue source secured through leveraging storage battery for energy management, etc.
		Development of next-generation technologies	Large	-Costs incurred for introducing automated driving technology -Increased maintenance costs for automated vehicle fleet	-Reduced costs from the spread of automated driving technology curbing fuel and personnel needs -Increased sales due to active use of public transportation due to the spread of MaaS and AI on-demand services, etc.

3-55

Parameters list

【Step3：Identify and define range of scenarios】

Image

Definitions of various worldviews based on scientific evidence from IEA and other sources

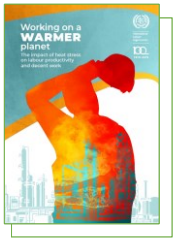
*Exchange rate: 1 USD = 110 JPY (based on the Sept. 1, 2021 rate)
*Items in blue are items for which 2℃ parameters were used due to the 1.5℃ parameters not being available

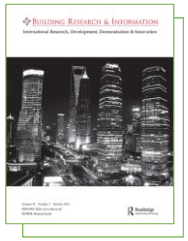
Key items	Assumed parameter	Parameter area	Unit	BAU	2030		2050		Source
					4℃	1.5℃	4℃	1.5℃	
Carbon emissions targets/policies in each country	Carbon tax (Carbon border adjustment mechanism)	Developed countries	Yen/tCO2	-	-	14,300	-	27,500	IEA WEO2020 IEA NZE2050 4℃ scenario is assumed to be the same as the current level
	Spread of environmentally friendly vehicles (EV/FC buses)	World	%	-	2%	23%	6%	79%	IEA WEO2020 IEA NZE2050
Changes in the energy mix	Percentage change in price of fuel	World	%	-	21%	-5%	48%	-35%	IEA WEO2020 IEA NZE2050
	Electricity prices	Japan	Yen/MWh	23,760	22,880	25,410	19,360	25,850	IEA WEO2018
Development of next-generation technologies	Changes in numbers of private automobile users / bus users due to decarbonization	World	%	-	-	-	-	20-50%	IEA NZE2050 4℃ scenario is assumed to be the same as the current level
Increasing severity of extreme weather conditions	Rate of change in instances of rainfall continuing for 12 hours or more	Japan (Hokkaido, Northwestern Kyushu)	%	-	40%	15%	40%	15%	"Vision for Flood Control Planning that takes Climate Change into Account: Recommendations" (Technical Study Group on Flood Control Planning that takes Climate Change into Account)

3-58 * IEA (International Energy Agency): The IEA was established in 1974, after the first oil crisis, as an autonomous organization within the framework of the OECD. Its executive office is located in Paris. It has earned a high international reputation for its expertise in all aspects of energy policy.

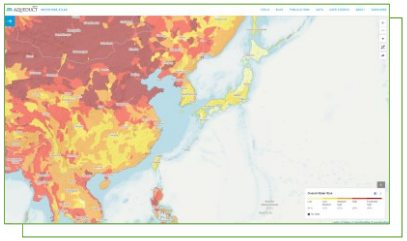
It is important to obtain objective forecast information on parameters from

Scenario Report
(IEA WEO (World Energy Outlook), IEA ETP (Energy Technology Perspectives) etc.)





External reports
(Industry-specific reports, academic papers, etc.)



Climate Change Impact Assessment Tools
(Physical Risk Map, Hazard Map, etc.)

⇒See Appendix chapter 2 for examples of parameters

Source : Projects supported by the Ministry of the Environment

2 Obtain parameters for each scenario > Reference information Transition risk/opportunity parameter example ①

For transition risks/opportunities, the IEA have partially released parameter data for NZE (1.4°C), APS (1.7°C), STEPS (2.4°C, business as usual) scenarios, and parameter data such as the following is available

Parameter （ex.）	Parameter information that allows comparison of multiple scenarios
Carbon Price （2030・2050）	**Table B.2** ▷ CO_2 prices for electricity, industry and energy production in selected regions by scenario ✓ **NZE (1.4°C) scenario** for developed countries • 2030 **140** USD/tCO2 • 2050 **250** USD/tCO2 ✓ **APS (1.7°C) scenario** for countries that have pledged net zero emissions by 2050 • 2030 **135** USD/tCO2 • 2050 **200** USD/tCO2 ✓ **STEPS scenario (2.4°C, business as usual)** for developed countries (EU) • 2030 **120** USD/tCO2 • 2050 **129** USD/tCO2
System power emission factor （2030・2050）	**Table A.5c: World economic and activity indicators** **Table A.5b: World economic and activity indicators** **Table A.5a: World economic and activity indicators** ✓ **NZE (1.4°C) scenario** for global • 2030 **186** g-CO2/kWh • 2050 **-4** g-CO2/kWh ✓ **APS (1.7°C) scenario** for global • 2030 **255** g-CO2/kWh • 2050 **36** g-CO2/kWh ✓ **STEPS scenario (2.4°C, business as usual) for global** • 2030 **303** g-CO2/kWh • 2050 **131** g-CO2/kWh

USD (2022, MER) per tonne of CO_2	2030	2040	2050
Stated Policies Scenario			
Canada	130	150	155
Chile and Colombia	13	21	29
China	28	43	53
European Union	120	129	135
Korea	42	67	89
Announced Pledges Scenario			
Advanced economies with net zero emissions pledges*	135	175	200
Emerging market and developing economies with net zero emissions pledges**	40	110	160
Other emerging market and developing economies	-	17	47
Net Zero Emissions by 2050 Scenario			
Advanced economies with net zero emissions pledges	140	205	250
Emerging market and developing economies with net zero emissions pledges	90	160	200
Selected emerging market and developing economies (without net zero emissions pledges)	25	85	180
Other emerging market and developing economies	15	35	55

	2010	2021	2022	Net Zero Emissions by 2050 Scenario 2030	2035	2040	2050	CAAGR (%) 2022 to: 2030	2050
Indicators									
CO_2 intensity of electricity generation (g CO_2 per kWh)	528	464	460	186	48	3	- 4	-11	n.a.

	2010	2021	2022	Announced Pledges Scenario 2030	2035	2040	2050	CAAGR (%) 2022 to: 2030	2050
Indicators									
CO_2 intensity of electricity generation (g CO_2 per kWh)	528	464	460	255	143	87	36	-7.1	-8.7

	2010	2021	2022	Stated Policies Scenario 2030	2035	2040	2050	CAAGR (%) 2022 to: 2030	2050
Indicators									
CO_2 intensity of electricity generation (g CO_2 per kWh)	528	464	460	303	230	184	131	-5.1	-4.4

⇒See Main Part 2-54 for examples for calculating the impact of carbon tax introduction
⇒See Appendix chapter 2 for examples of parameters

Source : IEA “World Energy Outlook 2023”

2 Obtain parameters for each scenario > Reference information Transition risk/opportunity parameter example ②

For transition risks/opportunities, the IEA have partially released parameter data for NZE (1.4°C), APS (1.7°C), STEPS (2.4°C, business as usual) scenarios, and parameter data such as the following is available

Parameter（ex.）	Parameter information that allows comparison of multiple scenarios
Crude Oil Price（2030・2050）	**Table 3.5 ▷ Global liquids demand and supply by scenario** (mb/d) ✓ **In the NZE (1.4°C) scenario,** globally • 2030 **42** USD/barrel • 2050 **25** USD/barrel ✓ **In the APS (1.7°C) scenario,** globally • 2030 **74** USD/barrel • 2050 **60** USD/barrel ✓ **In the STEPS (2.4°C, business as usual)** • 2030 **85** USD/barrel • 2050 **83** USD/barrel
Percentage of renewable energy in power mix（2030・2050）	**Table A.1c: World energy supply** **Table A.1b: World energy supply** **Table A.1a: World energy supply** ✓ **In the NZE (1.4°C) scenario,** globally • 2030 **29** % • 2050 **71** % ✓ **In the APS (1.7°C) scenario,** globally • 2030 **23** % • 2050 **52** % ✓ **In the STEPS (2.4°C, business as usual) scenario,** globally • 2030 **18** % • 2050 **31** %

			STEPS		APS		NZE	
	2010	2022	2030	2050	2030	2050	2030	2050
Road transport	36.5	41.3	41.1	35.5	37.6	15.9	29.1	1.6
Aviation and shipping	9.9	10.6	13.5	17.2	12.5	9.0	10.5	2.1
Industry	17.2	20.6	23.3	25.5	21.4	17.8	20.3	14.3
Buildings and power	12.4	11.4	9.5	6.7	8.6	4.1	6.1	0.5
Other sectors	11.1	12.6	14.0	12.5	12.4	7.9	11.4	5.7
World oil demand	87.1	96.5	101.5	97.4	92.5	54.8	77.5	24.3
Liquid biofuels	1.2	2.2	3.0	4.5	4.8	7.0	5.6	5.4
Low-emissions hydrogen-based fuels	-	-	0.0	0.2	0.2	3.6	0.7	6.0
World liquids demand	88.4	98.7	104.5	102.1	97.5	65.4	83.7	35.7
Conventional crude oil	67.4	62.8	61.3	58.2	54.9	29.8	48.0	15.8
Tight oil	0.7	8.3	11.1	10.2	10.3	6.9	7.6	1.8
Natural gas liquids	12.7	19.0	21.2	19.4	20.1	13.6	16.2	4.4
Extra-heavy oil and bitumen	2.0	3.7	4.4	5.5	3.9	2.5	3.0	1.5
Other production	0.5	0.9	1.0	1.2	0.9	0.3	0.3	0.0
World oil production	83.1	94.8	99.1	94.5	90.2	53.1	75.1	23.5
OPEC share	40%	36%	35%	43%	35%	45%	37%	53%
World processing gains	2.2	2.3	2.4	2.9	2.4	1.6	2.3	0.7
World oil supply	85.3	97.1	101.5	97.4	92.5	54.8	77.5	24.3
IEA crude oil price (USD [2022]/barrel)	103	98	85	83	74	60	42	25

Table A.1c: World energy supply

				Net Zero Emissions by 2050 Scenario (EJ)				Shares (%)			CAAGR (%) 2022 to:	
	2010	2021	2022	2030	2035	2040	2050	2022	2030	2050	2030	2050
Renewables	43	71	75	166	241	306	385	12	29	71	10	6.0

Table A.1b: World energy supply

				Announced Pledges Scenario (EJ)				Shares (%)			CAAGR (%) 2022 to:	
	2010	2021	2022	2030	2035	2040	2050	2022	2030	2050	2030	2050
Renewables	43	71	75	142	195	245	327	12	23	52	8.2	5.4

Table A.1a: World energy supply

				Stated Policies Scenario (EJ)				Shares (%)			CAAGR (%) 2022 to:	
	2010	2021	2022	2030	2035	2040	2050	2022	2030	2050	2030	2050
Renewables	43	71	75	120	150	178	227	12	18	31	6.0	4.0

⇒See Appendix chapter 2 for examples of parameters

Source : IEA “World Energy Outlook 2023”

2 Obtain parameters for each scenario > Reference information Transition risk/opportunity parameter example ③

For transition risks/opportunities, the IEA have partially released parameter data for NZE (1.4°C), APS (1.7°C), STEPS (2.4°C, business as usual) scenarios, and parameter data such as the following is available

Parameter（ex.）	Parameter information that allows comparison of multiple scenarios
Hybrid/EV vehicle manufacturing costs（2030・2050）	See below

Table B.5 ▷ Capital costs for selected technologies by scenario

		Stated Policies		Announced Pledges		Net Zero Emissions by 2050	
	2022	2030	2050	2030	2050	2030	2050
Iron-based steel production (USD/tpa)							
Conventional	340-500	340-450	360-490	380-630	490-690	440-650	590-740
Innovative	n.a	590-770	570-730	590-780	540-700	600-760	570-720
Vehicles (USD/vehicle)							
Hybrid cars	16 800	15 300	15 400	15 200	15 300	15 100	15 200
Battery electric cars	20 500	16 600	14 700	16 100	14 100	15 600	13 700
Batteries and hydrogen							
Hydrogen electrolysers (USD/kW)	1 070-1 640	630-980	530-740	540-710	360-510	420-610	330-470
Fuel cells (USD/kW)	95	65	45	55	35	50	30
Utility-scale stationary batteries (USD/kWh)	315	185	140	180	135	175	130

Notes: kW = kilowatt; tpa = tonne per annum; kWh = kilowatt-hour; n.a. = not applicable. All values are in USD (2022).

Sources: IEA analysis; James et. al. (2018); Thompson, et al. (2018); Financial Times (2020); BNEF (2022); Cole et al. (2021); Tsiropoulos et al. (2018); JATO (2021).

✓ **NZE (1.4°C) scenario,** globally
- 2030 (hybrid) **14,460** USD/vehicle
  (EV) **14,783** USD/vehicle
- 2050 (hybrid) **14,638** USD/vehicle
  (EV) **13,251** USD/vehicle

✓ **APS (1.7°C) scenario,** globally
- 2030 (hybrid) **14,528** USD/vehicle
  (EV) **15,265** USD/vehicle
- 2050 (hybrid) **14,718** USD/vehicle
  (EV) **13,618** USD/vehicle

✓ **STEPS scenario (2.4°C, business as usual),** globally
- 2030 (hybrid) **14,686** USD/vehicle
  (EV) **15,772** USD/vehicle
- 2050 (hybrid) **14,861** USD/vehicle
  (EV) **14,185** USD/vehicle

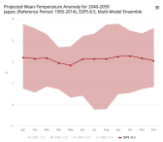
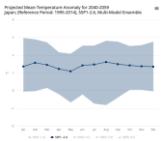
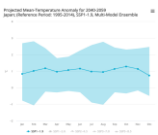
Future costs of hybrid vehicles will increase due to regional fuel economy and emissions regulations

⇒See Appendix chapter 2 for examples of parameters

Source : IEA “World Energy Outlook 2023”

2 Obtain parameters for each scenario > Reference information Physical risk/opportunity parameter example

For physical risks, the World Bank and others have released parameters, and parameter data such as the following is available to obtain

Parameter (ex.)	Parameter data
Increase in Average temperature (2040-2059)	✓ In the **4°C scenario (SSP5-8.5)**, there is an **average** temperature increase of **2.13°C** for Japan between 2040 – 2059 
	✓ In the **2°C scenario (SSP1-2.6)**, there is an **average** temperature increase of **1.40°C** for Japan between 2040 – 2059 
	✓ In the **1.5°C scenario (SSP1-1.9)**, there is an **average** temperature increase of **1.04°C** for Japan between 2040 – 2059 
Rainfall, flow rate and frequency of flooding (Since 2040)	✓ In the **4°C scenario**, Japan at the end of the 21st century will have: • Rainfall: **approx. 1.3 times** • Flow rate: **approx. 1.4 times** • Flood frequency: **approx. 4 times** ✓ In the **2°C scenario**, Japan at the end of the 21st century (from 2040*) will have: • Rainfall: **approx.1.1 times** • Flow rate **approx.1.2 times** • Flood frequency: **approx.2 times**

Average temperature increase (°C)	Jan	Feb	Mar	Apr	May	Jun
Average 2.13	2.21	2.15	2.18	1.95	1.84	2.13
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
	2.14	2.14	2.25	2.28	2.17	2.06

Average temperature increase (°C)	Jan	Feb	Mar	Apr	May	Jun
Average 1.40	1.36	1.57	1.45	1.22	1.09	1.42
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
	1.47	1.61	1.49	1.42	1.37	1.35

Average temperature increase (°C)	Jan	Feb	Mar	Apr	May	Jun
Average 1.04	0.84	1.02	1.18	0.97	1.07	1.16
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
	0.98	0.95	1.14	1.29	1.14	0.74

気候変動シナリオ	降雨量	流量	洪水発生頻度
2℃上昇時	約1．1倍	約1．2倍	約2倍
4℃上昇時	約1．3倍	約1．4倍	約4倍

⇒See Main Part 2-55 for examples for calculating the impact of extreme weather
⇒See Appendix chapter 2 for examples of parameters

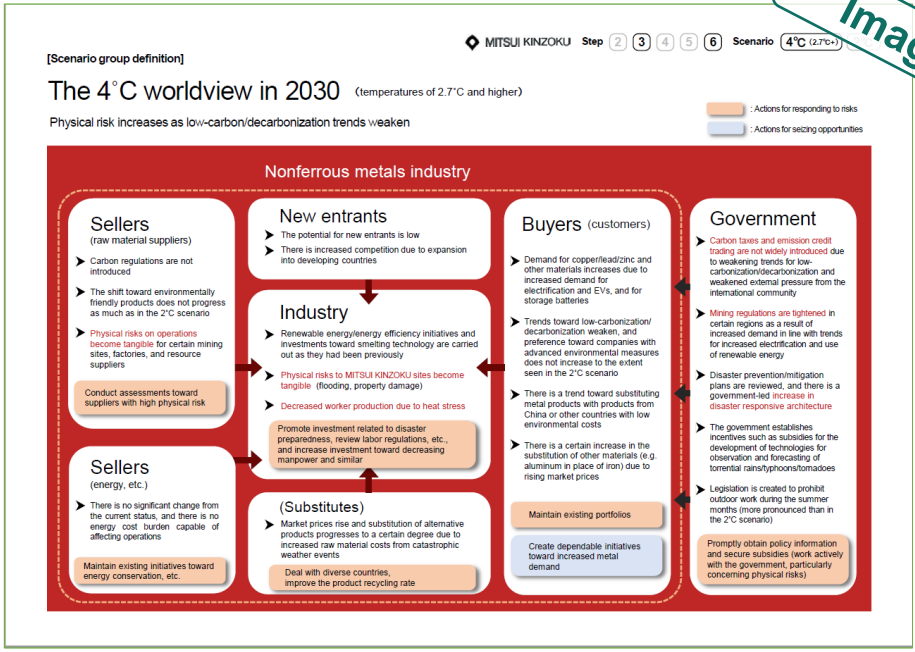
*For 2°C (RCP2.6), the temperature increase is level until around 2040, so it is possible to apply values from after 2040

Sources : The World Bank, “Climate Change Knowledge Portal”, Ministry of Land, Infrastructure, Transport and Tourism, Technical Study Group on Flood Control Planning in Consideration of Climate Change, “Proposal for Flood Control Planning in Consideration of Climate Change” (Revised April 2021)

3 Organizing outlook of the future world considering stakeholders

Based on forecast information, shape the company's worldview such as future stakeholders' performance and work towards achieving internal and external consensus by incorporating the perspectives from outside of company (if needed)

Image



It would be useful to aim for building internal consensus after incorporating the perspectives from outside of company in order to understand comprehensive worldview

Components of the worldview surrounding the company (e.g.)

Government	✓ Legal systems and regulations related to risks ✓ Policies to promote opportunities
Industry	✓ Trends, technologies and tendencies related to climate change that are mainstream in the industry
Buyer (Customers)	✓ Customer trends and tendencies affecting products, businesses, and services we provide
Seller (Suppliers)	✓ Trends affecting raw materials and costs required for business
New comer	✓ Businesses themselves and new entrants who can change supply chains
Substitute product	✓ Substitutes, etc., that could affect the market for the products, businesses, and services provided

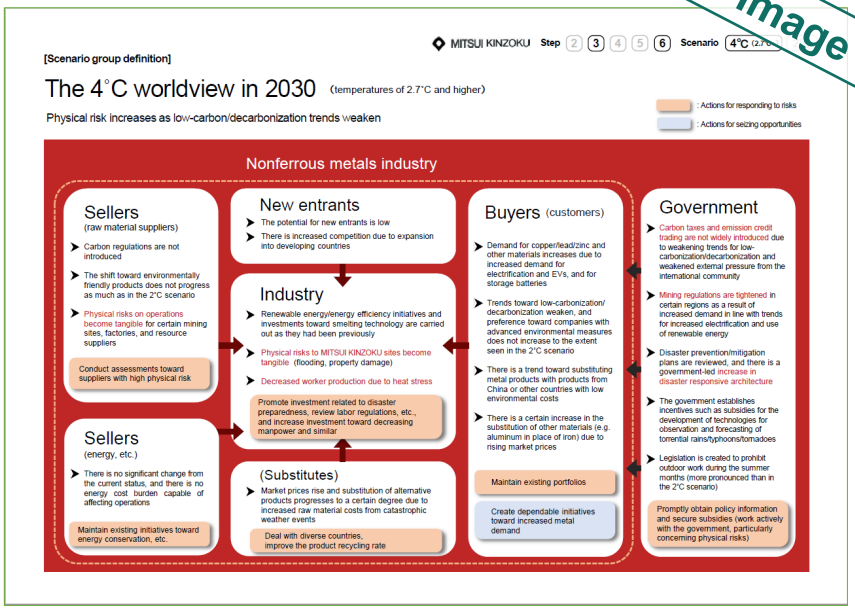
Source : Projects supported by the Ministry of the Environment

3 Organizing outlook of the future world considering stakeholders > Point Aligning outlook of the future world with relevant business units

It is important to have relevant departments recognize climate change risks as their own through discussions based on narrative texts and punch pictures, and to build a worldview that pertains to relevant departments

Worldview (draft) developed by the Scenario Analysis Team

Image



Points in the discussion with each department to coordinate the worldview (Example)

Business Divisions

- ✓ Are there any discrepancies in the worldview, technology, products, etc., related to each business?
- ✓ Is it a worldview that is likely to occur in the future relative to the behavior of the sellers and buyers who interact with us in our day-to-day operations?

Corporate Planning

- ✓ Are there any discrepancies compared with the company's management strategy?
- ✓ Are there any prospects for the future compared to the industry outlook mentioned in our daily operations?

Source : Projects supported by the Ministry of the Environment

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Evaluate business impacts

Evaluate the potential impact of each scenario on the strategic and financial position of the organization

1 Ensure governance is in place

Integrate scenario analysis into strategic planning and/or enterprise risk management processes.
Assign oversight to relevant board committees/subcommittees.
Identify which internal (and external) stakeholders to involve and how.

Get management and operation divisions involved!

2 Assess materiality of climate-related risks

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

What are the current and anticipated organizational exposures to climate-related risks and opportunities?
Do these have the potential tobe material in the future? Are stakeholders concerned?

Pick and choose from your industry and company viewpoint!

3 Identify and define range of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

What scenarios (and narratives) are appropriate, given the exposures?
Consider input parameters, assumptions, and analytical choices. What reference scenario(s) should be used?

Clearly imagine a future world under certain assumptions!

4 Evaluate business impacts

Impact on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

Evaluate the potential effects on the organization's strategies and financial position under each of the defined scenarios.
Identify key sensitivities.

Try not to seek too much accuracy!

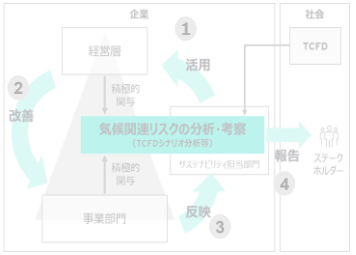
5 Identify potential responses

Responses might include
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities.
What adjustments to strategic/financial plans would be needed?

Do not narrow down! Take multiple scenarios into account!

Incorporate into strategy and execution



1. Utilization in management
2. On-site improvement
3. Reflection in analysis/discussion
4. External reporting

General: Foundation of climate change management

Build a company-wide change cycle!

6 Documentation and disclose

Document the process; communicate to relevant parties: Be prepared to disclose key inputs, assumptions, analytical methods, outputs, and potential management responses

Disclose information from readers' viewpoint!

(Notes in red: Points to consider in each step were added after the support program)

Sources : The Task Force on Climate-related Financial Disclosures, "Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate Related Risks and Opportunities", June 2017.

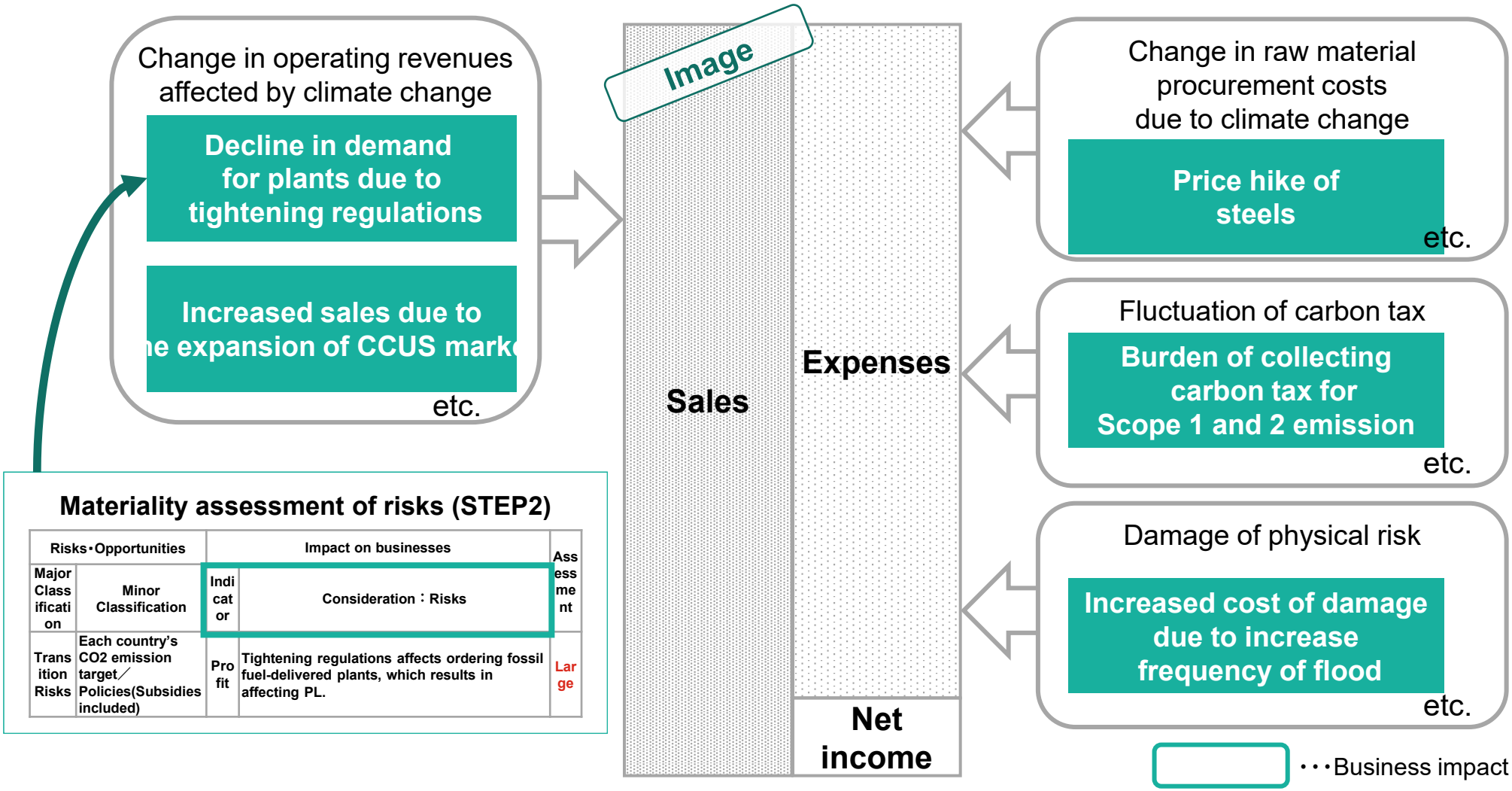
"Business impact evaluation" steps

When evaluating business impact, it is crucial to quantify the financial impact of climate change as much as possible, based on related parameters gathered from both inside and outside

	1 Financial items impacted by risks/opportunities	2 Investigate calculation formulas and gather parameters	3 Determine financial impact of climate change
Overview	List which P/L and B/S financial items would be affected by business impacts caused by climate change	Investigate calculation formulas related to financial items that can be estimated, and estimate the financial impact based on internal information	Determine the level of impact on future business prospects based on estimation results
Point / Technique / Reference	-	**Point** **Estimate using existing data from divisions, etc.** **Reference** • Gather external data • Establish calculation formulas • Handle items that cannot be qualitatively estimated	**Point** **Determine business impact calculation scope** **Technique** Set own company's resulting conditions (financial conditions, CO_2 emissions) **Point** **Calculate business impact based on changes to own company behavior** **Technique** How to express impact calculation **Point** **Calculate cases in/out of alignment with societal scenarios and own company's strategies** **Technique** How to express impact calculation
Roles: Management	-	-	Investigate and determine stance to take based on analysis results
Roles: Division	-	Organize internal data, review calculation results	Confirm gaps between analysis results and division plans, and investigate measures
Roles: Department in charge of TCFD	Confirm financial items impacted by climate change	Gather data from inside/outside company, establish calculation formulas	Gather analysis results, design expression

1 Financial items affected by risks and opportunities

Identify which financial items of P/L and B/S are affected by risks and opportunities



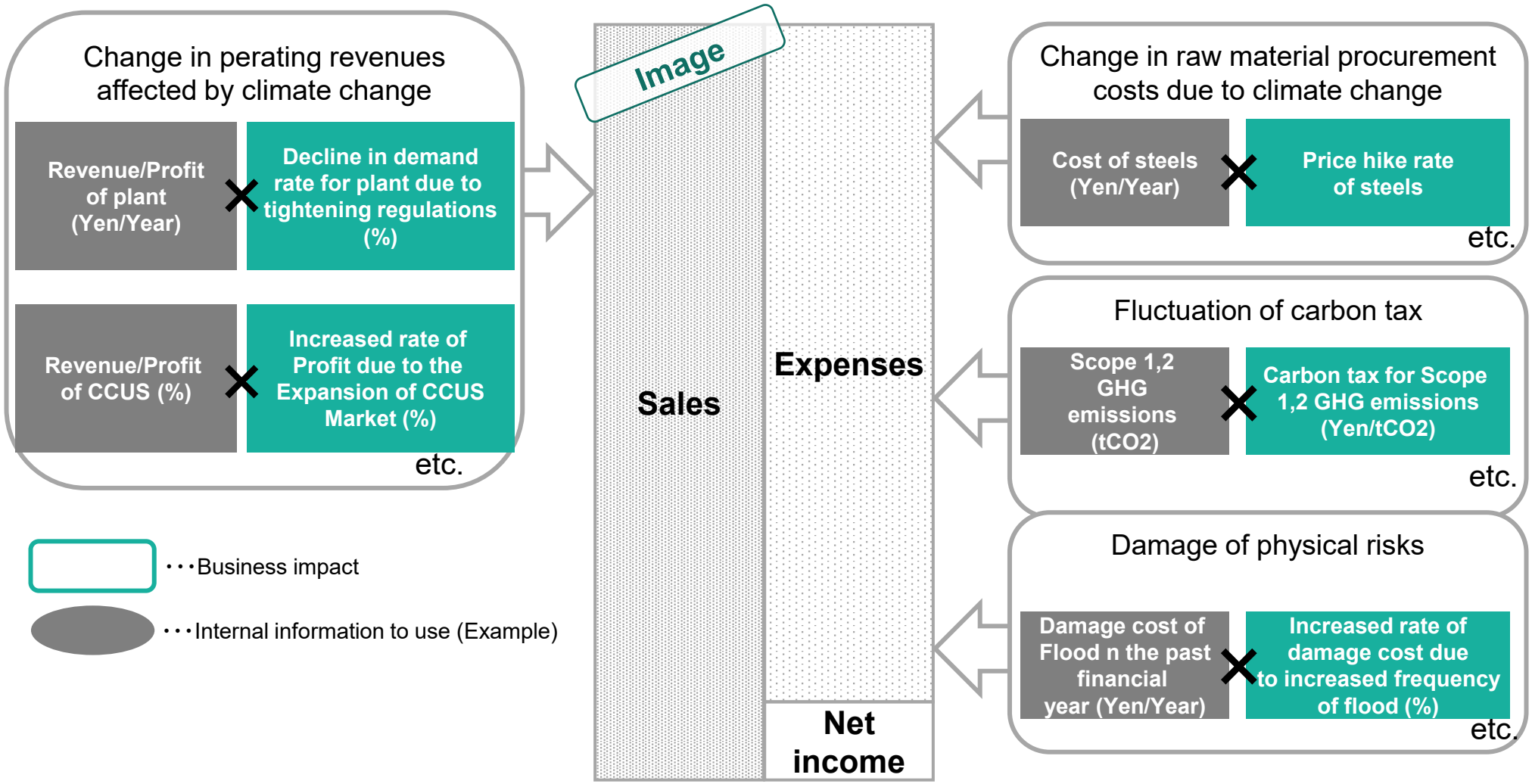
Materiality assessment of risks (STEP2)

Risks・Opportunities		Impact on businesses		Assessment
Major Classification	Minor Classification	Indicator	Consideration：Risks	
Transition Risks	Each country's CO2 emission target／Policies(Subsidies included)	Profit	Tightening regulations affects ordering fossil fuel-delivered plants, which results in affecting PL.	Large

It is crucial to differentiate "Profit" and "Cost" at first (as Fluctuation of profit × Profit ratio = Fluctuation of profit, which also indicates that the impact can be largely be different.)

2 Examine calculation formula and collect parameter

Consider calculation formula for financial indicator that can be estimated, then estimate the financial impact based on internal information



For sectors in which climate change has a significant impact, it will also be effective to conduct analysis as of 2030 in addition to 2050
It is also important to align operation divisions' awareness of the calculation formula (as well as management, etc., for the second round and after)

2 Examine calculation formula and collect parameter > Point Estimate using existing data held by business departments, etc.

By using data that is commonly used by business divisions (e.g., sales information by business/products, operational costs, cost structure, greenhouse gas emissions), it is possible to create estimations close to actual company conditions

	Information available for consideration	Methods for collecting information
Sales Structure	Current and future sales and operating income by business segment (Targets for net sales and operating income)	✓ Refer to the company's **long-term management targets**, etc. ✓ In the absence of relevant information, it is possible to calculate the current value using CAGR (annual growth rate), etc.
	Sales forecasts and targets for related products in the future (By product)	✓ **Hearings from business divisions, corporate planning, etc.** ✓ If owned, also collect **information on future market conditions normally used by relevant departments.**
Cost Structure	Current operating costs (Electricity and fuel prices, electricity and fuel consumption, etc.)	✓ **Hearings from business divisions, corporate planning, etc.**
	Information on the cost structure of raw materials (Number of raw materials used, procurement cost, etc.)	✓ **Hearings from business divisions, procurement divisions, corporate planning, etc.** ✓ If owned, also collect **information on future market conditions normally used by relevant departments.** ✓ **Obtain information on the origin of raw materials that are affected by the origin** of agriculture, forestry, fisheries, fossil fuels, forest resources, etc.
	Current and future GHG emissions (Scope 1 and 2, Scope3 if needed)	✓ Refer to the company's **environment-related targets, etc.**

⇒See next page

2 Examine calculation formula and collect parameter > Reference information Collect external data: data on raw materials

Due to varying regulations and impact of climate change depending on the region, raw materials related to agricultural, forestry and fishery products/fossil fuels/forest resources can be analyzed in detail by obtaining information on their place of origin

List raw materials with different risks depending on their origin and source, such as agricultural, forestry and fishery products/fossil fuels/forest resources

Of the listed raw materials, extract key raw materials

Asses the impact based on the origin and source of identified raw materials

- ✓ For the business risks and opportunities that are subjected to scenario analysis, list the related **raw materials derived from agriculture, forestry and fisheries, fossil fuels, forest resources**
- ✓ Of of the listed raw materials, select those that are “**high in cost** (high procurement cost or procurement amount)”, “**irreplaceable with other raw materials if there is a supply-chain disruption or if there is a change in the yield**” as a material raw material
- ✓ Raw materials are identified. If there are too many places of origins, start the scenario analysis with the area with a **higher procurement cost/ more procurement amount**. **If finding the origin is challenging, one option would be to analyze the areas that are generally considered major.**
- ✓ An impact assessment is conducted after obtaining information on regulations and physical risks at the place of origin of the raw material

2 Examine calculation formula and collect parameter > Reference information Setting calculation formula: Cost increase due to introduced carbon tax

Calculate the increase in the cost from carbon taxes by multiplying carbon tax with CO2 emissions. It is possible to include the change in emission factors for the assumptions of the emissions

Increased expenses from introduction of a carbon tax (100 millions JPY) 1.5℃ 4℃ = Scope1 and 2 * CO2 emissions (tCO2) for the target year × Carbon tax on CO2 emissions (JPY/tCO2)

*Currently Scope1 and 2; it will be effective for sectors significantly impacted by climate change to consider Scope 3, too

Case① No change in the CO2 emission factor for Scope2

(Assumptions)

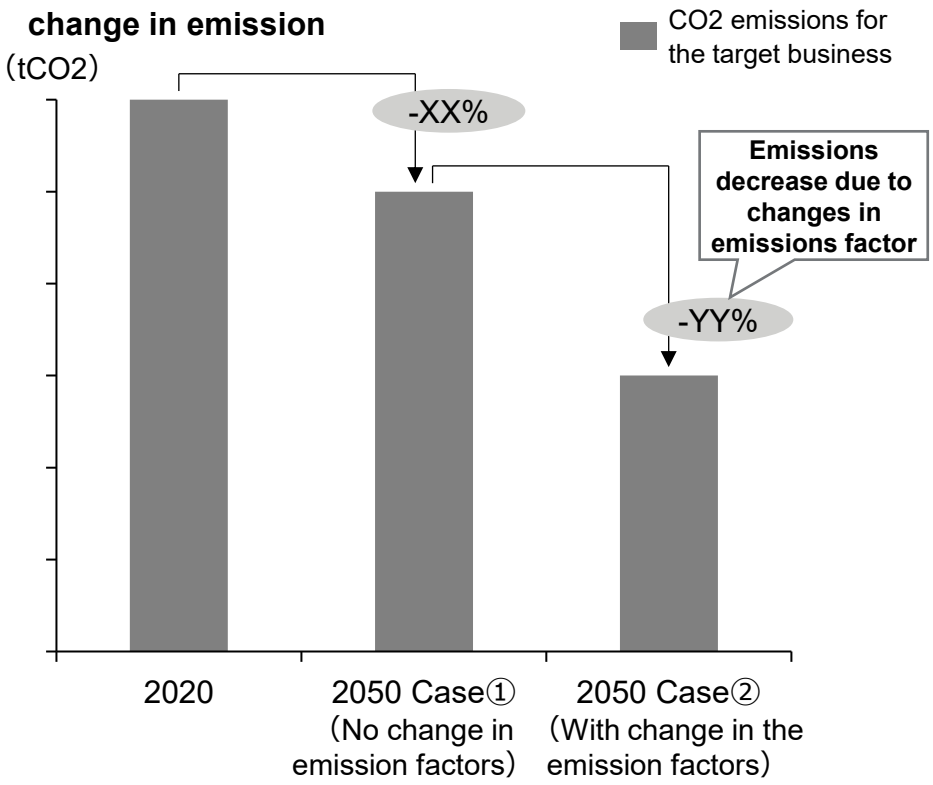
- Emissions are expected to decline by XX% compared to 2020 levels by 2050
- As there will **be no change in the emission factor, the expected CO2 emission reduction will remain as XX%**

Case② With change in the CO2 emission factor for Scope2

(Assumptions)

- Emissions are expected to decline by XX% 2050 compared to 2020 levels by 2050 (same as Case①)
- **As the emission factor for 2050 will decline, the emission factor reduction of YY% will be added to the expected CO2 reduction.** Therefore, the CO2 emission reduction will be (XX%+YY%)

A simulation of the change in emission



⇒See Main Part 2-41 for parameters for carbon tax and emission factors

2 Examine calculation formula and collect parameter > Reference information Setting calculation formula: Cost of damage by severe abnormal weather

For increased costs due to increased incidence of severe weather, it is possible to calculate the amounts of damages using the percentage of increased frequency and the probability of occurrence after calculating the amounts of damages per day from operations being suspended

Amount of damages due to flooding (100 millions JPY) (1.5℃ / 4℃) = Increase in frequency (times) × Probability of occurrence (times) × Total amount of damages due to flooding (**YY** millions JPY)

Amount of damages per day (**XX** millions JPY) = Sales (100 millions JPY) × Operating margin (%) ÷ Number of business days (days) ÷ Number of target sites (sites)

Estimated amount of damages due to flooding for each level

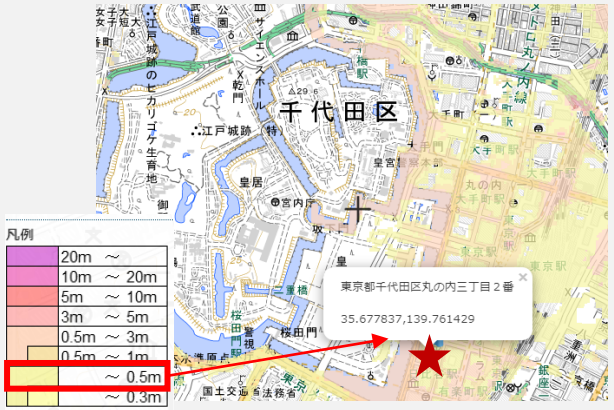
[Example for calculating damages]

Flood depth level (Hazard map)	# of company sites	Maximum # of days operations are suspended	Amount of damages at time of occurrence
5m–10m	1 site	45 days	1 site × amount of damages per day (**XX** millions JPY) × 45 days
3m–5m	2 sites	32 days	2 sites × amount of damages per day (**XX** millions JPY) × 32 days
0.5m–3m	0 sites	20 days	0 sites × amount of damages per day (**XX** millions JPY) × 20 days
0.5–1m	2 sites	12 days	2 sites × amount of damages per day (**XX** millions JPY) × 12 days
Under 0.5m	4 sites	6 days	4 sites × amount of damages per day (**XX** millions JPY) × 6 days

Total the amount of damages due to flooding and calculate the total amount of damages, **YY** millions JPY

(Reference) Utilization of hazard map

It is possible to understand the inundation depth level of your company's bases by referring to hazard map portal sites, etc.



⇒See p2-44 for the parameters of the frequency in floods
⇒See Appendix chapter 2 for examples of a hazard map tool

Source : Hazard map portal site（https://disaportal.gsi.go.jp/）

2 Examine calculation formula and collect parameter > Reference information Setting calculation formula: Increased cost of raw materials

With regards to the increase in the cost of raw material procurement as the climate changes and the yield decreases, it is possible to calculate the increase in the cost by grasping the change in the yield of raw materials in the procurement area

Increase in raw material procurement cost due to climate change (100 million yen) 1.5℃ 4℃ = Procurement cost of the raw material in the business-as-usual scenario of the year subjected to analysis (100 million yen) × Rate of change in costs due to reduced yields in the procurement area (%)

Rate of cost change in each procurement region

Example calculation of the impact due to the increase in cost

Procurement region	Procurement amount (2050)	Procurement cost (2050)	Rate of change in yield	Cost change rate	Cost increase when incurred
Region A	1,000t	XX million yen	▲5%	▲2%	XX million yen × cost change rate (2%)
Region B	2,000t	YY million yen	▲3%	▲1.2%	YY million yen × cost change rate (1.2%)
Region C	1,500t	ZZ million yen	+2%	-	No increase or decrease in cost due to climate change

If possible, **identify cost changes in each procurement region** and calculate cost increases

If there is only data on changes in crop yields, it may be a good idea to calculate the rate of change in cost using price elasticity, etc.

2 Examine calculation formula and collect parameter > Reference information Handling qualitative factors

Regarding qualitative information or information with little scientific basis, measures such as continuous monitoring and interviews with external experts could be methods for evaluation. It is important to identify evaluated/unevaluated risks and clarify the next action

Image

Risk Item	Validity of quantitative estimation of business impact	Review Status
Risk A	**Possible**	**Considered**
Risk B	**Possible**	**Considered**
Risk C	**Impossible** (Qualitative information only)	Considered (qualitative)
Opportunity A	**Impossible** (No scientific data for evidence)	Not Considered
Opportunity B	**Possible**	**Considered**

[Examples of actions for risks that cannot be quantified]

Interview with external experts

- ✓ Interview external experts (ex: from research institutions) for risks and opportunities that could not be calculated experts
- ✓ Store interview as a qualitative information

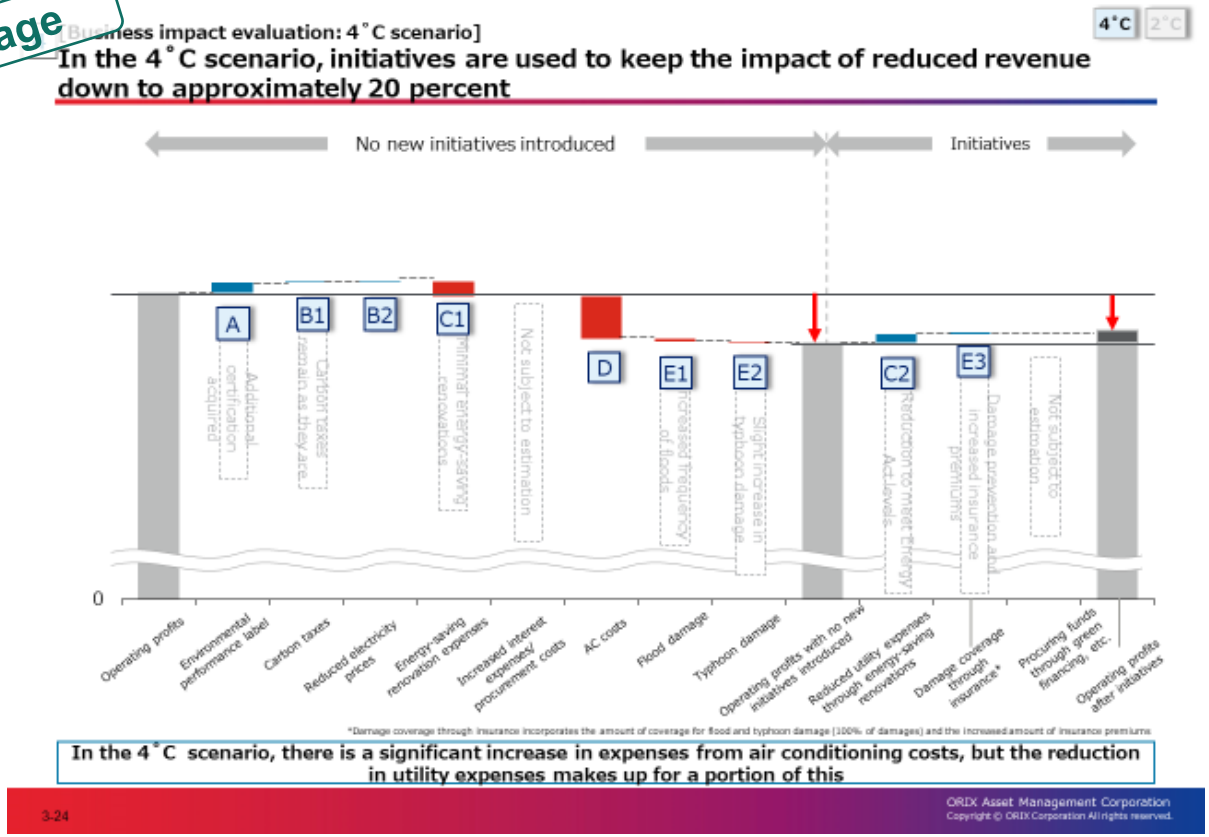
Continuous internal monitoring

- ✓ Continuously monitor to obtain up-to-date information on risks.

3 Understand the financial impact of climate change

Based on the estimated results, be aware of the scale of impact on the outlook

Image



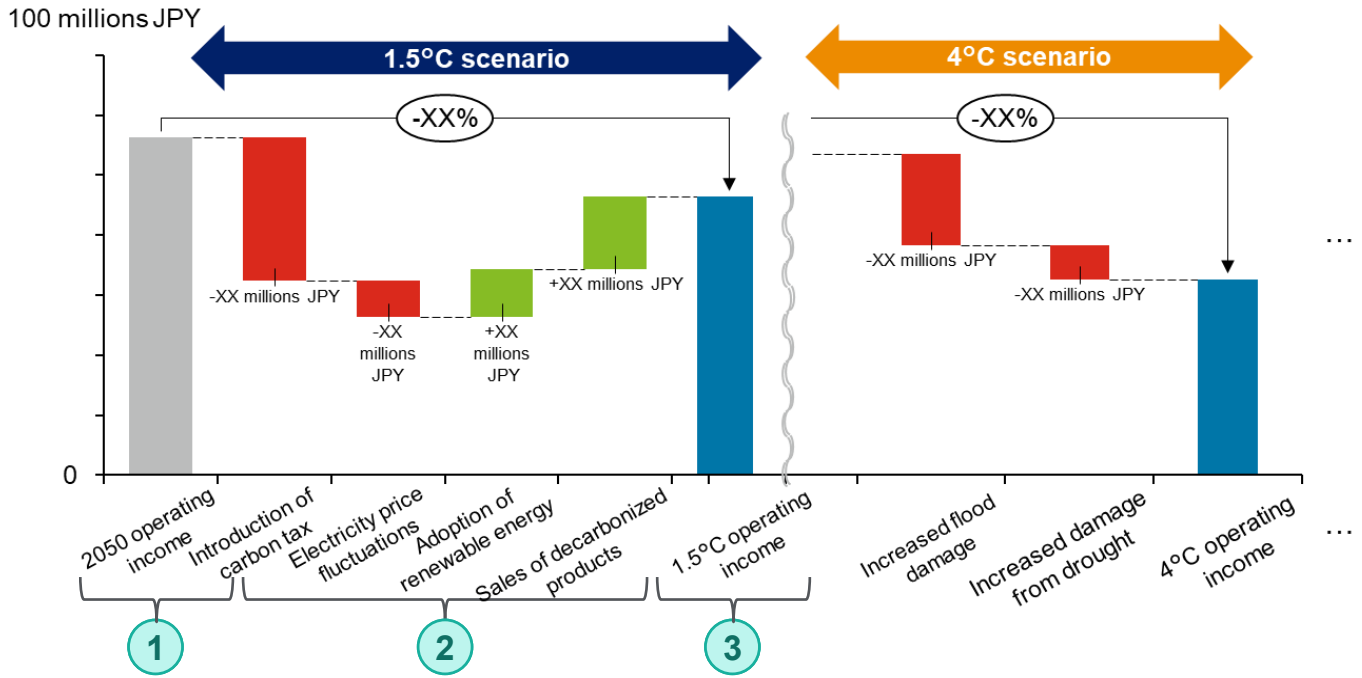
Understand the impact of climate change on business prospects (future management targets and plans)

- ✓ What risks and opportunities have a greater impact?
- ✓ It is possible to understand the extent to which climate change threatens the business prospects for future management and targets. In some sectors and industries, the impact may be smaller than anticipated.

Source : Projects supported by the Ministry of the Environment

3 Understand the financial impact of climate change > Point Understand the targets of business impact calculation

Compare "your company's situation in a business-as-usual scenario" with "your company's situation in a climate change-affected scenario (= in line with each climate scenario)" based on "the impact of each risk and opportunity as it occurs"



1 **Company`s situation in a climate neutral business-as-usual scenario:**
Examine the level of sales/operating income in the year of analysis (e.g., '30, '50, etc.) **if climate change is not considered**

2 **Impact of each risk and opportunity as it occurs:**
Calculate **the impact of each climate-related risk/opportunity on sales, costs, and operating income** under the scenarios set in STEP3.

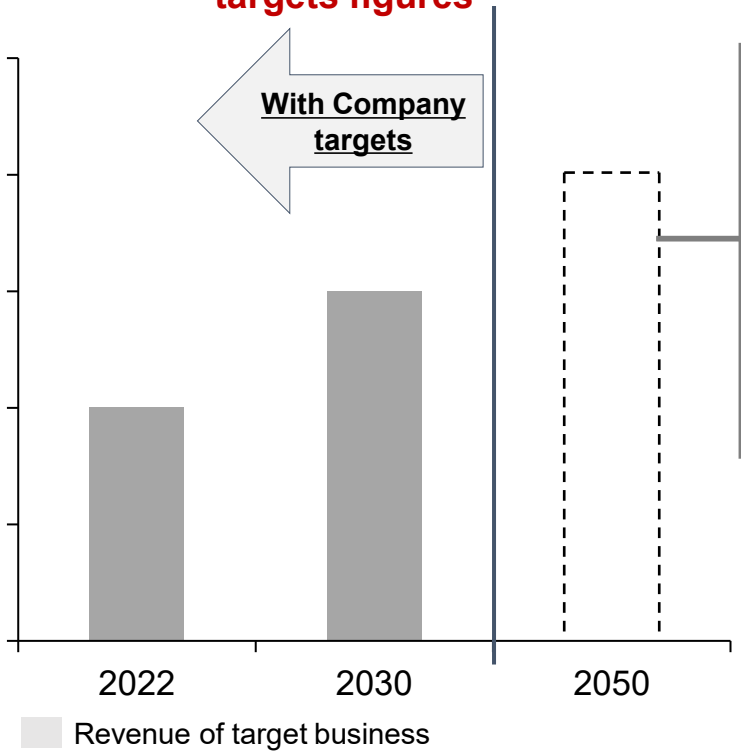
By calculating the total value of 1 - 2, it is possible to calculate 3 the situation of the company in the scenario affected by climate change. By comparing 1 and 3 ,the business impact of climate change (i.e., the gap between what is possible and what is not possible) can be determined.

3 Understand the financial impact of climate change > Point Scope of business impact calculation > Technique Setting a business-as-usual status: Financial status

If the company has a target set for the year analyzed, financial performance should be based on the targets. When analyzing a year without a set financial target, it can be assumed that the financial performance remains flat or external information can be used

Example of setting a business-as-usual situation : when targets are set till the year 2030

If targets are set for the analyzing year in the medium-term management plans, utilize the targets figures



Pattern① :

Assume that after the company`s target is met the financial performance will remain flat

- ✓ A conservative outlook pattern that **assumes that the company`s growth will be flat** after the target year

Pattern② :

Set using projected GDP growth rates

- ✓ A moderate outlook pattern that assume the company will **grow at the same rate as the Japanese/global economy**
- ✓ Using the company`s business areas/regions and the economic growth data that are referenced to determine whether to use Japanese/global/other figures

By reaching out to the department in charge of the developing the management plan or business plan when choosing the pattern, a more convincing analysis can be done

3 Understand the financial impact of climate change > Point Scope of business impact calculation > Technique Setting a business-as-usual status: Example of financial status

Whether to use Japan or the Global GDP growth rate data should be determined by the Company's business development outlook

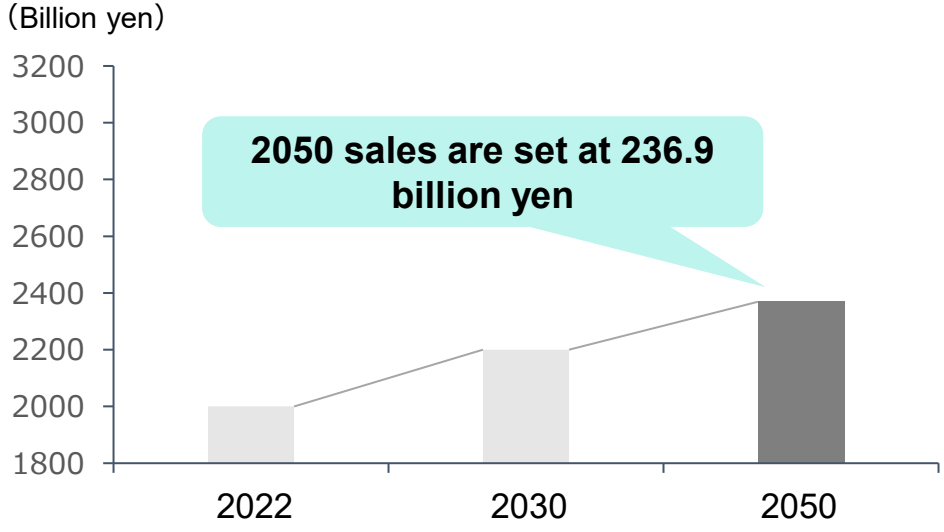
Assumption for estimation（tentative）

- Net sales and operating income related to the target business in 2022 were 200 billion yen and 20 billion yen, respectively.
- The Medium-Term Management Plan sets 2030 targets for the target businesses, with sales of 220 billion yen and operating income of 22 billion yen.

Pattern②-1：Set in line with Japan's GDP growth rate (with growth comparable to that of the Japanese economy)

OECD`s predicted values for the Japanese GDP are
2030：$5.631 million
2050：$6.060 million

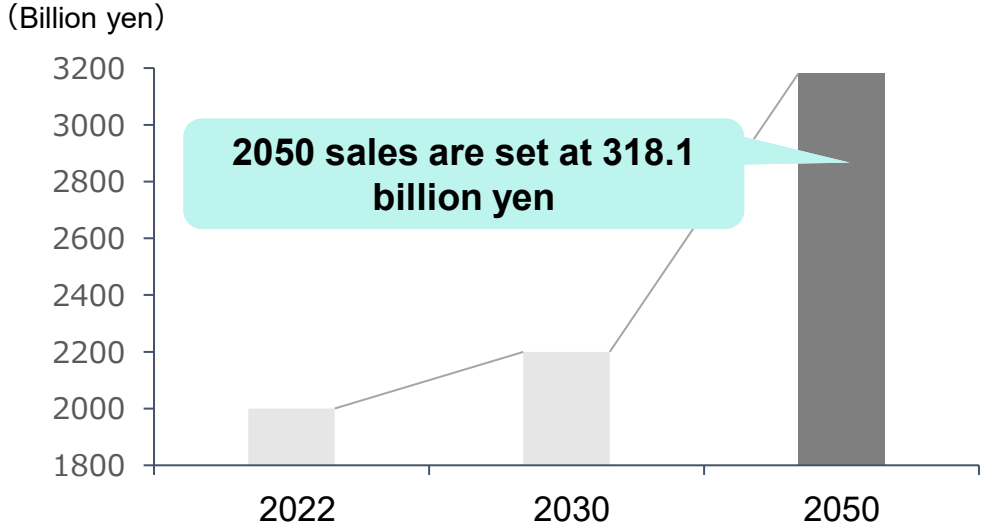
2030～2050, **Japan's CAGR is expected to be 0.37%**



Pattern②-2：Set in line with global GDP growth (with growth comparable to that of the global economy)

OECD`s predicted values for the global GDP are
2030：$141.996 million
2050：$205.429 million

2030～2050, **Global CAGR is expected to be 1.86%**



Source : Used the OECD Website（https://data.oecd.org/gdp/gdp-long-term-forecast.htm）to calculate

3 Understand the financial impact of climate change > Point Scope of business impact calculation > Technique Setting a business-as-usual status: CO2 emissions

CO2 emissions are set separately with whether the company`s target are achieved or not. By setting patterns for both the highest and lowest impact, detailed impact can be analyzed

Example of setting the business-as-usual CO2 emission

Achieved company targets	**Achieved** emission targets × **Change** in the emission factor	✓ A **pattern with the most decarbonized outlook**, in which the company's CO2 emission targets are met and the emission factor changes (improves) ✓ Calculate based on **"the company`s CO2 emission targets – the amount of reduction resulting from changes in the emission factor"**
	Achieved emission targets × **No change** in the emission factor	✓ A pattern in which the company's CO2 emissions target is met, but the emission factor does not change ✓ Calculated with the **"company's CO2 emissions target"**
Company targets **are not met**	Emission targets are **not met** × **Change** in the emission factor	✓ A pattern in which the company's CO2 emission target **varies linearly with the number of emissions in previous years**, and the emission factor also changes (improves) ✓ Calculated based on **"CO2 emissions by the company based on previous years' data - reductions due to changes in emission factors"**
	Emission targets are **not met** × **No change** in the emission factor	✓ A **pattern of the least decarbonized outlook**, with the company's **CO2 emissions targets changing linearly with previous years' emissions**, with no change in the emission factor ✓ Calculated based on **"the company's own CO2 emissions based on historical data"**

By setting both scenarios, it is possible to determine the maximum/ minimum impact

3 Understand the financial impact of climate change > Point Scope of business impact calculation > Technique Setting a business-as-usual status: Example of CO2 emissions

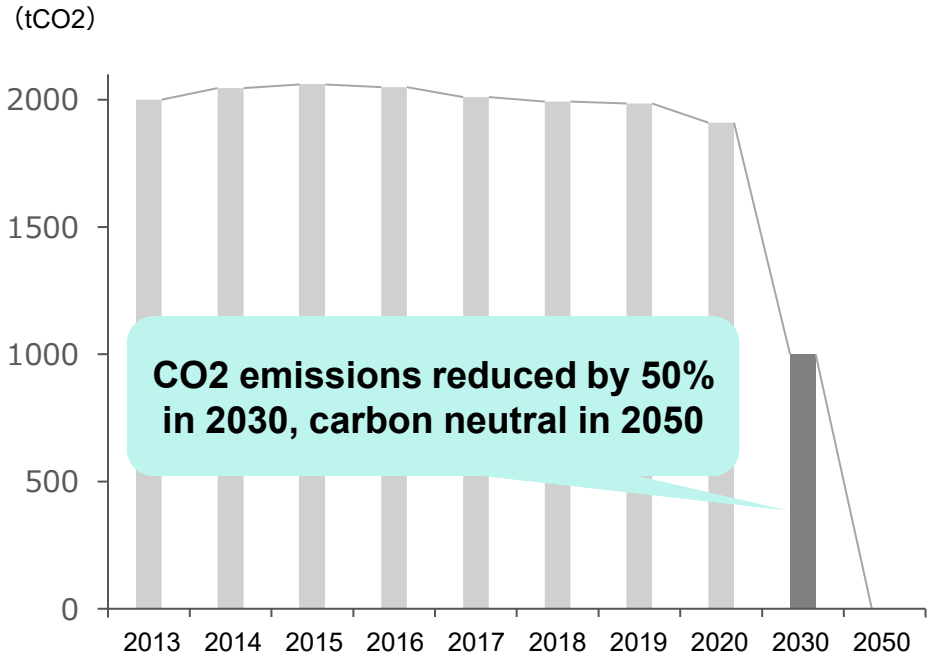
Set target achievement pattern with target values; and set the non-target achievement pattern using linear estimate of the past year emissions. Assess both the best and worst impacts to understand the specific impact on your company

Assumption for estimation（tentative）

- Aim to reduce emissions by 50% in 2030 (compared to fiscal 2013) and achieve carbon neutrality by 2050 as long-term reduction targets
- 1,000 tCO2 emissions in FY 2013, then a slight decrease until 2020

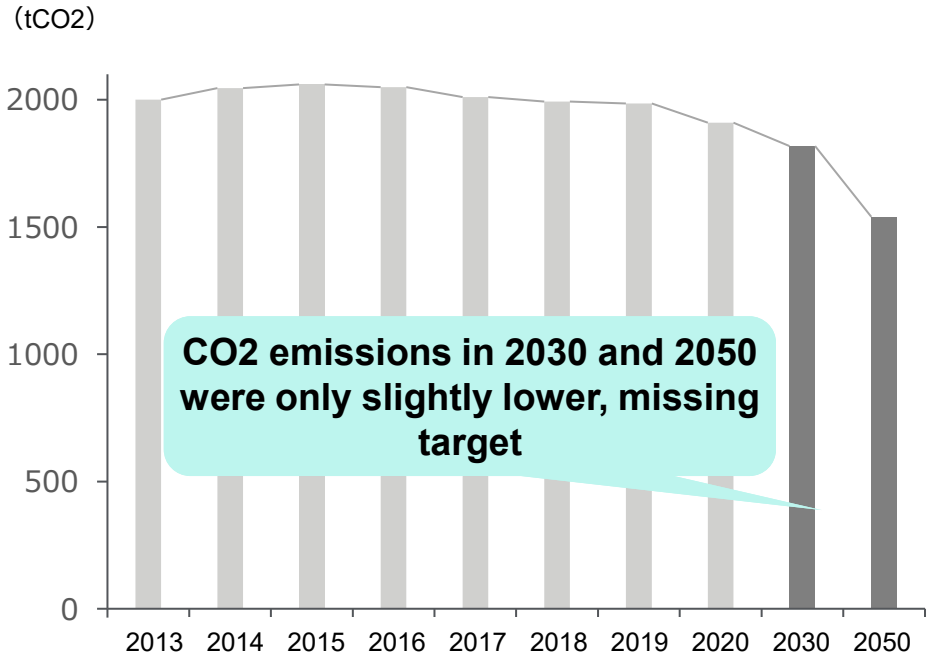
Pattern where the company‘s targets are achieved (without any change in the emission factor)

Set emissions projections **in line with company targets**



Pattern where the company’s targets are not met (without any change in the emission factor)

Set emissions projections **with past CO2 emissions using a linear fashion**



3 Investigate calculation formulas and gather parameters > Point Calculating business impact along with changing corporate behavior

In order to maintain consistency of own company's estimate results and properly confirm the impact of climate change, it is crucial to set a basic policy on each "behavior of own company (with measures and without measures)" before conducting estimates

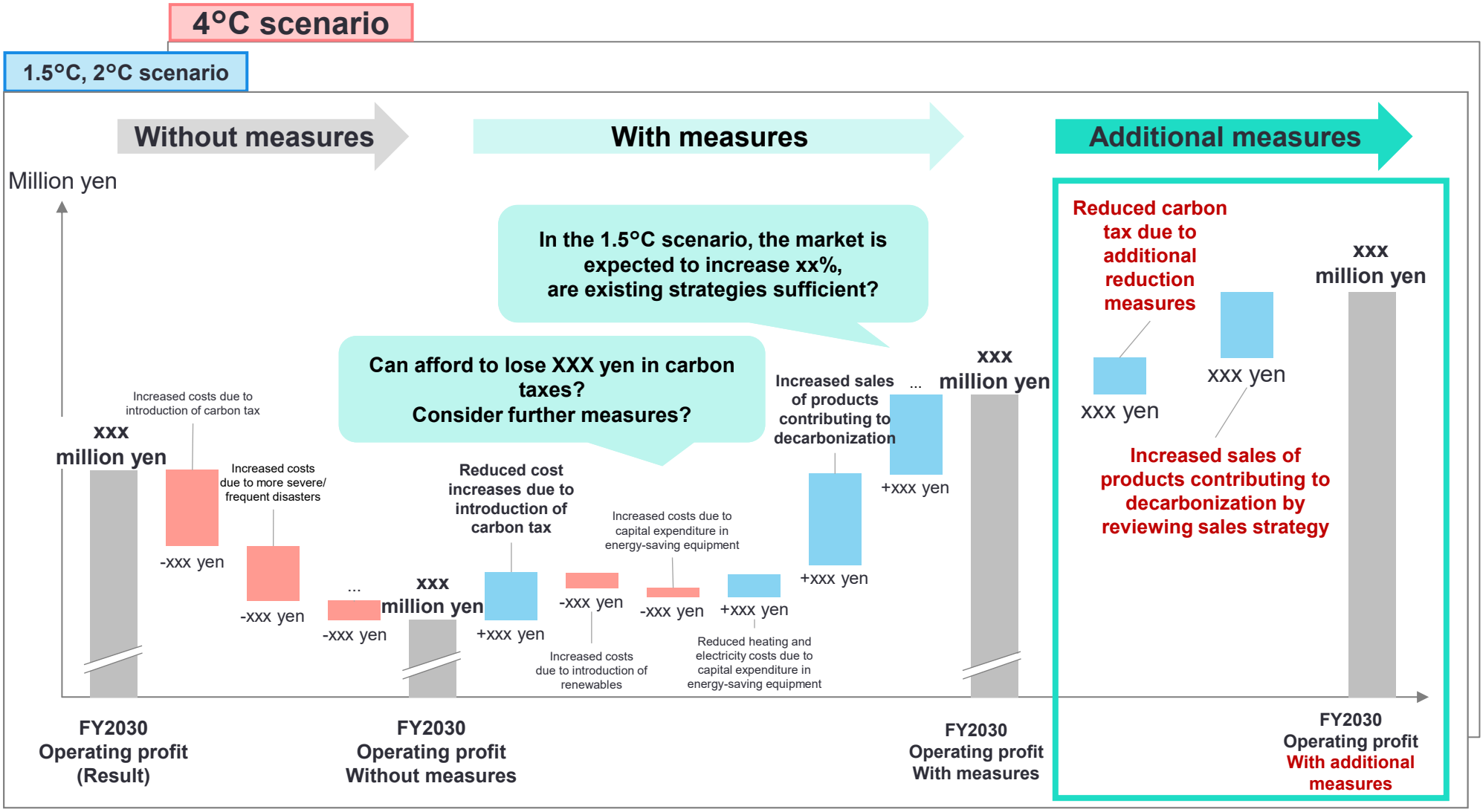
		Societal scenarios	
		1.5°C, 2°C scenario	**4°C scenario**
		• Increased decarbonization opportunities for governments (policies/regulations), consumers, financial institutions, and other stakeholders • However, will also need to respond to physical risks as temperatures increase to a certain point in 2030	• Severe heat, heavy rain, droughts, and other natural disasters occur more frequently and at a larger scale, increasing physical risks • Decarbonization efforts will stagnate, so there will be only limited transition risks and no need for further measures
Own company behavior	**Without measures**	▸ Assumes that no measures are taken for transition and physical risks/opportunities related to climate change*1	
	With measures	▸ Assumes that required measures have been taken for transition and physical risks/opportunities related to climate change, allowing the company to minimize risks and gain opportunities*2	▸ Assumes that required measures have been taken for physical risks/opportunities related to climate change, allowing the company to minimize risks and gain opportunities*2 ▸ Also assumes that measures for transition risks have not been taken, because decarbonization efforts are losing popularity throughout society and it would be difficult to imagine that measures would be taken by own company only*2

*1: Assumes that no further measures will be taken, if measures have already been taken

*2: Includes measures that are already being considered. However, there may be cases where additional policies thought to be required may also be incorporated.

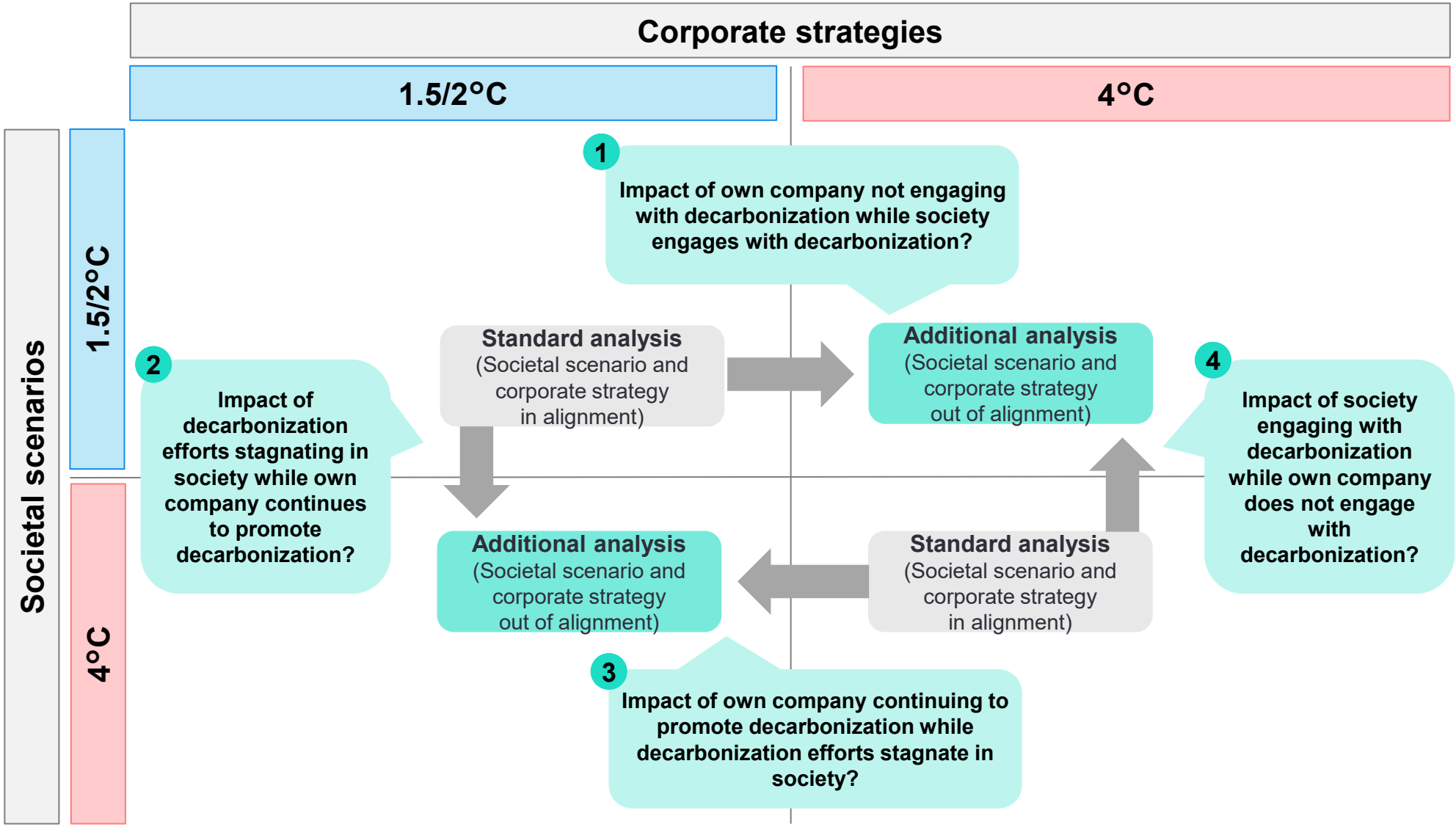
3 Investigate calculation formulas and gather parameters > Point Calculating business impact along with changing corporate behavior >
Technique How to express impact calculation

Run a simulation where countermeasures currently being considered are taken along with additional measures, in order to determine whether to incorporate with strategies/businesses and consider contribution to resilience



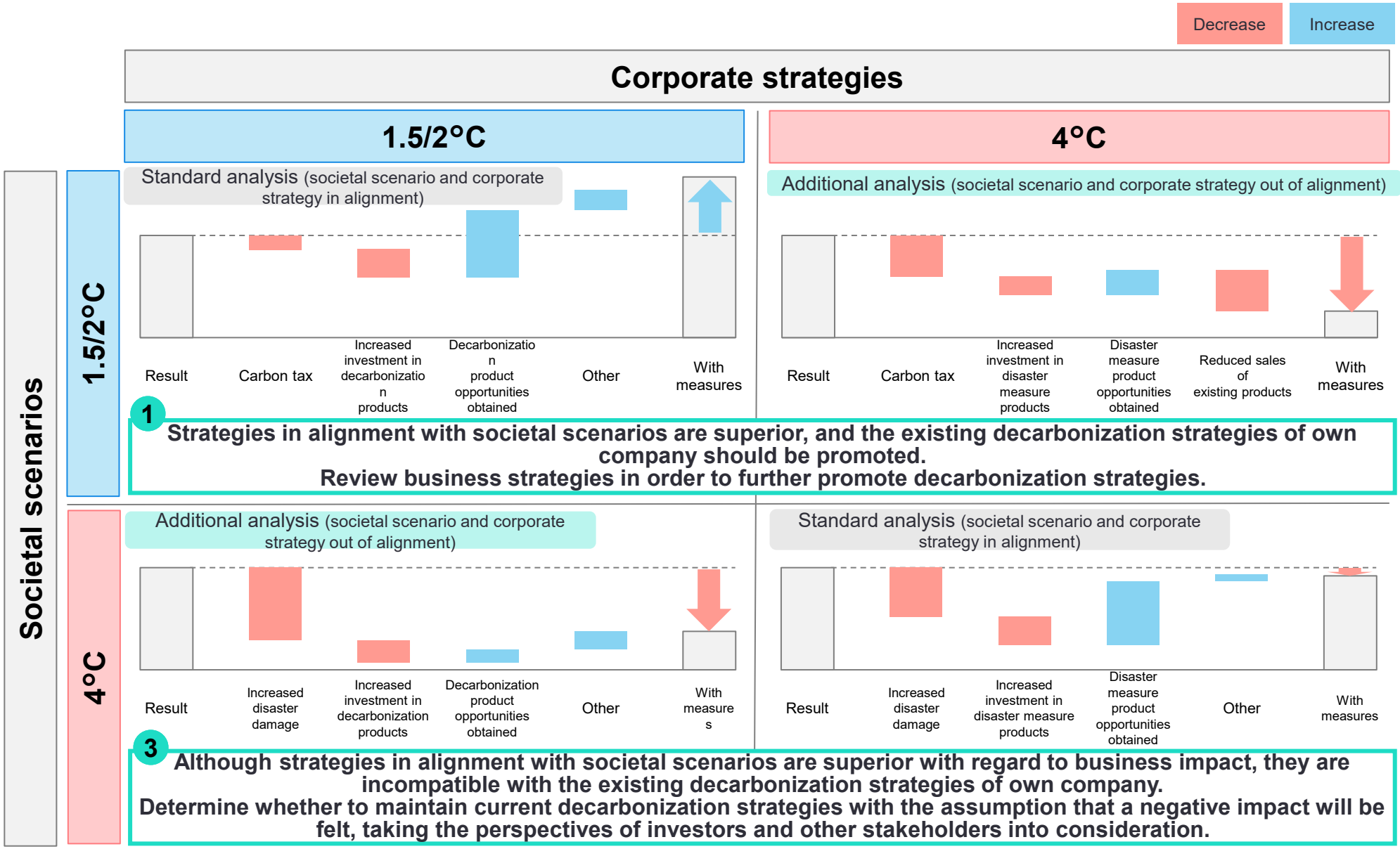
3 Investigate calculation formulas and gather parameters > Point Calculate business impact of cases in/out of alignment with societal scenarios and own company's strategies

Expand scope of analysis even to cases where "corporate strategy" is out of alignment with the "societal scenario," in order to further investigate own company's stance (strategies, business plan policies) on decarbonization



3 Investigate calculation formulas and gather parameters > Point Calculate business impact of cases in/out of alignment with societal scenarios and own company's strategies > Technique How to express

For example, one means of ensuring the validity of own company's stance is to estimate the business impact of adopting a "corporate strategy" that diverges from a "societal scenario"



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Identify potential responses

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities

1 Ensure governance is in place

Integrate scenario analysis into strategic planning and/or enterprise risk management processes.
Assign oversight to relevant board committees/subcommittees.
Identify which internal (and external) stakeholders to involve and how.

Get management and operation divisions involved!

2 Assess materiality of climate-related risks

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

What are the current and anticipated organizational exposures to climate-related risks and opportunities?
Do these have the potential tobe material in the future? Are stakeholders concerned?

Pick and choose from your industry and company viewpoint!

3 Identify and define range of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

What scenarios (and narratives) are appropriate, given the exposures?
Consider input parameters, assumptions, and analytical choices. What reference scenario(s) should be used?

Clearly imagine a future world under certain assumptions!

4 Evaluate business impacts

Impact on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

Evaluate the potential effects on the organization's strategies and financial position under each of the defined scenarios.
Identify key sensitivities.

Try not to seek too much accuracy!

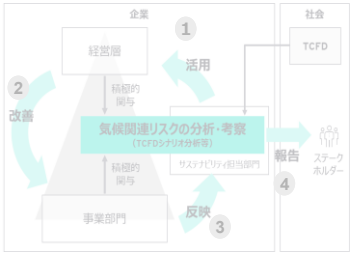
5 Identify potential responses

Responses might include
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities.
What adjustments to strategic/financial plans would be needed?

Do not narrow down! Take multiple scenarios into account!

Incorporate into strategy and execution



1. Utilization in management
2. On-site improvement
3. Reflection in analysis/discussion
4. External reporting

General: Foundation of climate change management

Build a company-wide change cycle!

6 Documentation and disclose

Document the process; communicate to relevant parties: Be prepared to disclose key inputs, assumptions, analytical methods, outputs, and potential management responses

Disclose information from readers' viewpoint!

(Notes in red: Points to consider in each step were added after the support program)

Sources : The Task Force on Climate-related Financial Disclosures, "Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate Related Risks and Opportunities", June 2017.

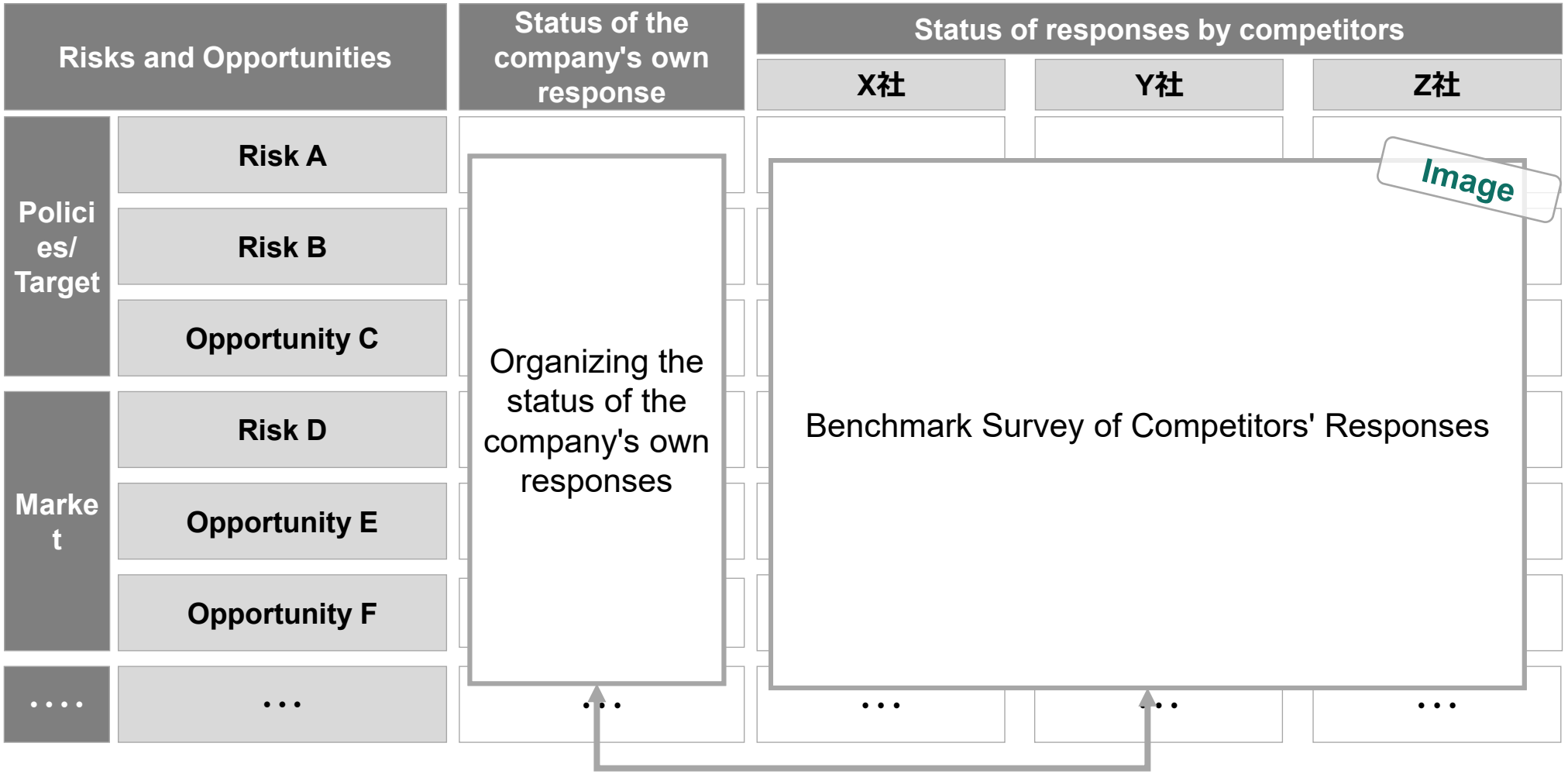
"Definition of countermeasures" steps

In defining countermeasures, it is crucial to inAvestigate specific countermeasures for certain risk/opportunity items, and include management and divisions in formulating a transition plan that is both feasible and consistent with the decarbonization goals of own company

	1 Determine response status of own company risks/opportunities	2 Investigate countermeasures to respond to risk and obtain opportunities	3 Formulate transition plan	4 Build internal organizations and begin taking specific actions
Overview	Determine response status of own company with regard to high-impact risks/opportunities	Investigate specific countermeasures with regard to risks/opportunities with high business impact	Formulate transition plan based on amount of emissions reduced for each countermeasure, etc.	Build internal organizations to promote countermeasures and begin taking specific actions
Point / Technique / Reference	**Point** **Investigate need for countermeasures while comparing with countermeasures of competitors**	**Reference** Approach for identifying countermeasures common to sector	**Point** **Formulate transition plan based on guidance recommendations** **Reference** Details on four areas **Technique** How to investigate superior policies	**Point** **Emissions for each policy and next term settings**
Roles: Management	-	-	Reflect company-wide plans (investment plan, GHG reduction plan) in transition plan	Establish/monitor internal organizations to implement countermeasures
Roles: Division	Organize countermeasures already under investigation	Plan countermeasures based on business lineup	Reflect division plans (investment plan, etc.) in transition plan	Participate in internal organizations to implement countermeasures
Roles: Department in charge of TCFD	Identify priority risk/opportunity items to define countermeasures	Identify additional countermeasures	Formulate transition plan based on TCFD guidance requirements	Investigate internal organizations and identify actions to implement countermeasures

1 Understand the status of your company's response to risks and opportunities

Regarding climate-related risks and opportunities with great financial impact, it is important to understand the company's current status for risk management.
If necessary, confirm the current status of rival companies



It is a suggestion to conduct comparative analysis on the company and competitors regarding risk management

1 Determine response status of own company risks/opportunities > **Point** Investigate need for countermeasures while comparing with countermeasures of competitors

Verify validity and investigate whether additional response is required, by confirming the response status of own company for risk/opportunity items and comparing this with countermeasures of competitors

Risk/opportunity items		Importance	Own company's response status	Competitor countermeasures		
				Company X	Company Y	...
Policies	Increased costs due to carbon tax	High	▸ Switch to renewables	▸ Upgrade to highly efficient equipment	▸ Introduce home generators using renewables ▸ Optimize energy by updating production processes	...
Market	Increase demand for related products through advances in electrification	High	▸ Enhance development of technologies related to reducing power consumption of electrification products	▸ Increase production capability by building new electric unit plants	▸ Enhance development of technologies related to developing lighter electrification products	...
Physical (Acute)	Supply chain disruption due to storm/flood damage	Medium	-(N/A)	▸ Require enhanced BCP from suppliers	▸ Make use of multiple suppliers ▸ Enhance procurement/logistics BCP	...
...	...	...	...	...	...	...

Compare with countermeasures of competitors to **verify validity of own company's countermeasures and investigate additional countermeasures**

Refer to countermeasures of competitors and **investigate own company's countermeasures**

Comparative analysis

2 Examine future countermeasures to address risks and capture opportunities

Consider practical countermeasures for risks and opportunities with great financial impact

Scenario	Future business impact	Countermeasures (Example)
1.5°C scenario	Operating income **-JPY X trillion**	• Change in business model ✓ Consideration of procuring alternative materials ✓ Investments in low carbon technology
4°C scenario	Operating income **-JPY Y trillion**	• Strengthen supply chain performance considering climate change ✓ Promote response to BCP ✓ Invest to improve quality of raw materials

It will become important to plan resilient countermeasures that can be used in any situation. Companies may also try deciding on a rough direction for countermeasures as a bare minimum before going on to consider specific countermeasures in the course of ongoing implementation

2 Investigate future countermeasures to respond to risk and obtain opportunities > **Technique** Approach for identifying countermeasures common to sector (risk case studies)

Investigate countermeasures for each risk/opportunity specified by own company, based on the countermeasures of industry peers mentioned in TCFD disclosures and CDP responses

Risk items for automotive part manufacturing

-Legend- Risk items common to sector

Category	Subcategory	Sub-subcategory	Specific impact	Benchmark company risk/opportunity awareness													Benchmark company countermeasures
				A		B		C		D		E		F	G	H	
				TCFD	CDP	TCFD	CDP	TCFD	CDP	TCFD	CDP	TCFD	CDP	CDP	CDP	CDP	
Transition risks	Policies / regulations	Introduction/strengthening of carbon pricing	Increased costs due to introduction of carbon tax	●	●	●	-	●	●	●	●	●	-	●	●	●	• Switch to renewable energy power • Optimize production processes
			Reduced sales caused by lower price competitiveness of products due to border carbon tax	●	●	-	-	-	-	-	-	●	-	-	-	-	• Switch to renewable energy power • Optimize production processes
		Stricter fuel consumption and exhaust gas regulations	Reduced sales of products not compliant with fuel consumption and exhaust gas regulations	●	●	-	●	-	-	●	-	-	-	-	●	●	• Develop technologies to enhance fuel consumption of internal combustion engines in HEVs, etc.
	Technology	Transition to low-carbon emissions	Increased costs related to introducing energy-saving and renewable energy technologies	-	-	-	-	-	-	-	-	●	-	-	-	-	-
	Market	Changes in customer behaviors following advances in the development of electric vehicles	Reduced demand for products for ICE due to advances in electrification, and lost opportunities due to delayed response to electrification	●	-	●	-	●	●	●	-	●	-	●	-	●	• Shift product mix for electric vehicles • Develop energy-saving technologies for electrification products • Enhance development of products for machine tools to handle processing and electrification of key parts as an alternative to internal combustion engines and transmissions, along with materials following reduction in weight of vehicles
		Changes in customer behaviors related to low-emission products	Reduced sales due to delayed response switching to low-CFP products	-	-	-	-	-	-	-	-	●	-	-	-	-	-
		Increased raw material costs	Increased raw material costs due to switch to eco-friendly materials	-	-	●	-	-	-	-	-	-	-	-	-	-	▸ Reduce weight and switch materials during product design to use fewer raw materials ▸ Recycle resources to purchase fewer raw materials ▸ Conduct decarbonization training and provide support for suppliers

2 Investigate future countermeasures to respond to risk and obtain opportunities > **Technique** Approach for identifying countermeasures common to sector (opportunity case studies)

Investigate countermeasures for each risk/opportunity specified by own company, based on the countermeasures of industry peers mentioned in TCFD disclosures and CDP responses

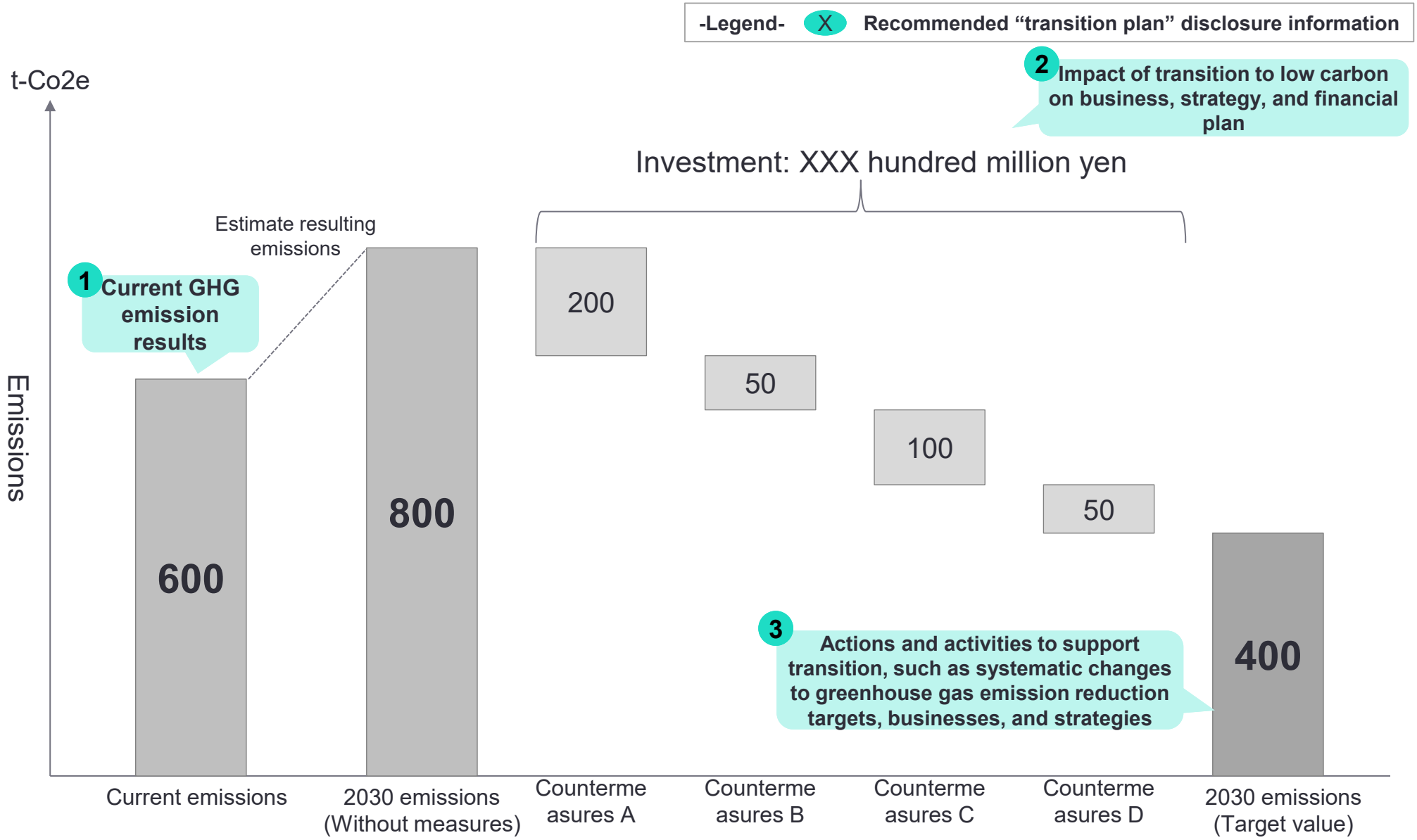
Opportunity items for automotive part manufacturing

-Legend- Opportunity items common to sector

Category	Subcategory	Sub-subcategory	Specific impact	Benchmark company risk/opportunity awareness													Benchmark company countermeasures
				A		B		C		D		E		F	G	H	
				TCFD	CDP	TCFD	CDP	TCFD	CDP	TCFD	CDP	TCFD	CDP	CDP	CDP	CDP	
Opportunities	Products / Services	Increased demand for products/services contributing toward decarbonization	Increased sales following higher demand for products compliant with vehicle electrification and emission regulations	●	●	●	●	●	●	●	●	●	-	-	-	●	• Accelerate development of electrification-related technologies (power-saving technologies, performance-saving technologies, compact high-output technologies, etc.) and heat management technologies • Increase production capability of products related to electric units • Enhance development, sales, production, and solutions for products compatible with the electrification of machine tools, etc. • Use digital twin technology to accelerate development
			Increased sales following higher demand for CO2 absorption technologies	-	-	●	-	-	-	-	-	-	-	-	-	-	• Realize carbon recycled concrete using owned technologies • Develop technologies for capturing/using CO2
			Expanded business related to renewables to support increased demand for renewables	-	-	●	-	-	-	●	-	-	-	-	-	-	• Develop perovskite solar batteries • Enhance development, sales, production, and solutions for products for wind power generation
			Increased sales following higher demand for low-CFP products	-	-	-	-	-	-	●	-	-	-	-	-	-	• Continue to create eco-friendly products • Reflect decarbonization in product value in business activities
			Increased sales of low-emission devices/services following higher demand among customers for reduced-energy plants	-	-	-	-	●	-	●	●	-	-	●	-	-	• Provide new solutions using tribology technologies • Provide solutions together with highly efficient equipment and IoT applications
		Increased demand for products/services contributing toward resilience	Increased sales of products/services contributing toward disaster prevention/mitigation	-	-	-	-	-	-	●	-	-	-	-	-	-	‣ Enhance development and production of products for construction machinery
⋮	⋮		⋮							⋮						⋮	

3 Formulate transition plan

Formulate transition plan based on amount of emissions reduced for each countermeasure, etc.



3 Formulate transition plan > Point Formulate transition plan based on guidance recommendations

It is important to disclose information while considering transition plan elements listed in TCFD "Guidance on Information Disclosure for Metrics, Targets, and Transition Plans"

Guidance on Metrics, Targets, and Transition Plans

Published in Oct. 2021

Publication history

As the world accelerates its transition to a low-carbon economy, investors and financial institutions now require their investments to include even more useful information in transition plans. With this in mind, TCFD published new guidance on climate-related metrics, targets, and transition plans.

- Contents -

A. Overview and background

B. Scope and approach

C. Climate-related metrics
1. Characteristics of effective climate-related metrics
2. Disclosing climate-related metrics
3. Driving toward comparability: Cross-industry climate-related metric categories
4. Portfolio alignment metrics for financial institutions

D. Climate-related targets
1. Characteristics of effective climate-related targets
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E. Transition plans
1. Characteristics of effective transition plans
2. Transition plan considerations
3. Disclosing transition plan information

F. Financial impacts
1. Inputs for estimating financial impacts
2. Disclosing financial impacts

Transition plan explanation

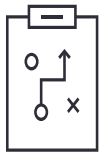
A transition plan contains a wide range of information, and the Task Force realizes that **it is not necessarily appropriate to include all of this information in financial reports and other annual reports**.

The Task Force recommends **disclosing the following major information from transition plans**, as one means of disclosing an organization's climate-related financial information.

GHG emission results

Impact of transition on business, strategy, and financial plan

Transition policies (Systematic changes to greenhouse gas emission reduction targets, businesses, strategies, etc.)



Source : Created by MOE based on "Guidance on Metrics, Targets, and Transition Plans" (TCFD)

In the guidance document, “Elements to consider” in transition plans are explained in four areas under TCFD recommendations

Governance

Approval
The board or appropriate committee of the board **approves the transition plan and climate-related targets**

Oversight
The board or appropriate committee of the board **oversees execution of the transition plan**

Reporting
The board or appropriate committee of the board and senior management receive **regular status reports**

Accountability
Senior management has **responsibility for execution of the transition plan**, and the responsible parties have adequate authority and access to resources to ensure effective execution

Incentives
Remuneration and other incentives are **aligned with the organization’s climate goals**, as described in the transition plan

Transparency
The organization **reports** on its transition planning goals and performance **to external stakeholders**, including financial aspects, performance against targets, and impacts on the organization’s business

Review
The organization periodically **reviews** and **updates** its plans, activities, metrics, and targets

Assurance
The organization’s reporting is subject to **independent review or third-party assurance**

Risk management

Description of risks
The transition plan describes **the risks that the organization faces** from a transition to a low-carbon economy

Plan challenges and uncertainties
The transition plan describes the **assumptions, uncertainties, and challenges** the organization faces in successfully executing its transition plan

Strategy

Alignment with strategy
The organization aligns its transition plan with its overall strategy; and the transition plan describes the following:

- Activities: **How the organization will achieve targets** in defined time horizons
- Temperature goal: **Alignment to** a global **temperature goal** (e.g., 1.5°C), relevant **regulatory** mandates, and/or sectoral **decarbonization strategies**

Action plans
The transition plan outlines short-term and medium-term **tactical and operational plans** and describes how related actions address material sources of GHG emissions The plan includes current and planned initiatives to reduce climate-related risks and **increase climate-related opportunities**

Prioritized opportunities
The transition plan describes how the organization intends to **maximize** its prioritized climate **opportunities** as the world transitions to a low-carbon economy

Financial plans
The transition plan describes the supporting **financial plans, budgets, and related financial targets** (e.g., amount of capital and other expenditures supporting decarbonization strategy)

Plan assumptions
The transition plan describes the organization’s **assumptions**, particularly around transition pathway uncertainties and implementation challenges. The assumptions should be **consistent with those used by the organization in its financial accounts, capital expenditures, and investment decisions**.

Scenario analysis
The organization **tests achievability of the transition plan and associated targets** using multiple climate-related scenarios

Metrics and targets

Metrics
The transition plan describes **metrics the organization will monitor to track progress** against plans and targets, including related operational and financial performance metrics, metrics aligned with the metricscross-industry, climate-related metric categories, and industry-specific or organization-specific

Targets
The transition plan includes quantitative and qualitative targets based on sound climate science. For GHG emissions targets, the plan indicates the **type and scope** of GHG emissions included **as well as the extent of GHG emissions across territories, timeframes, or activities.**

Dates
The transition plan specifies **the dates when** targets are intended to be reached and includes targets during the plan’s time horizon
*2030 and 2050 recommended

Methodology
Metrics and targets in a transition plan are based on widely recognized and **transparent methodologies**

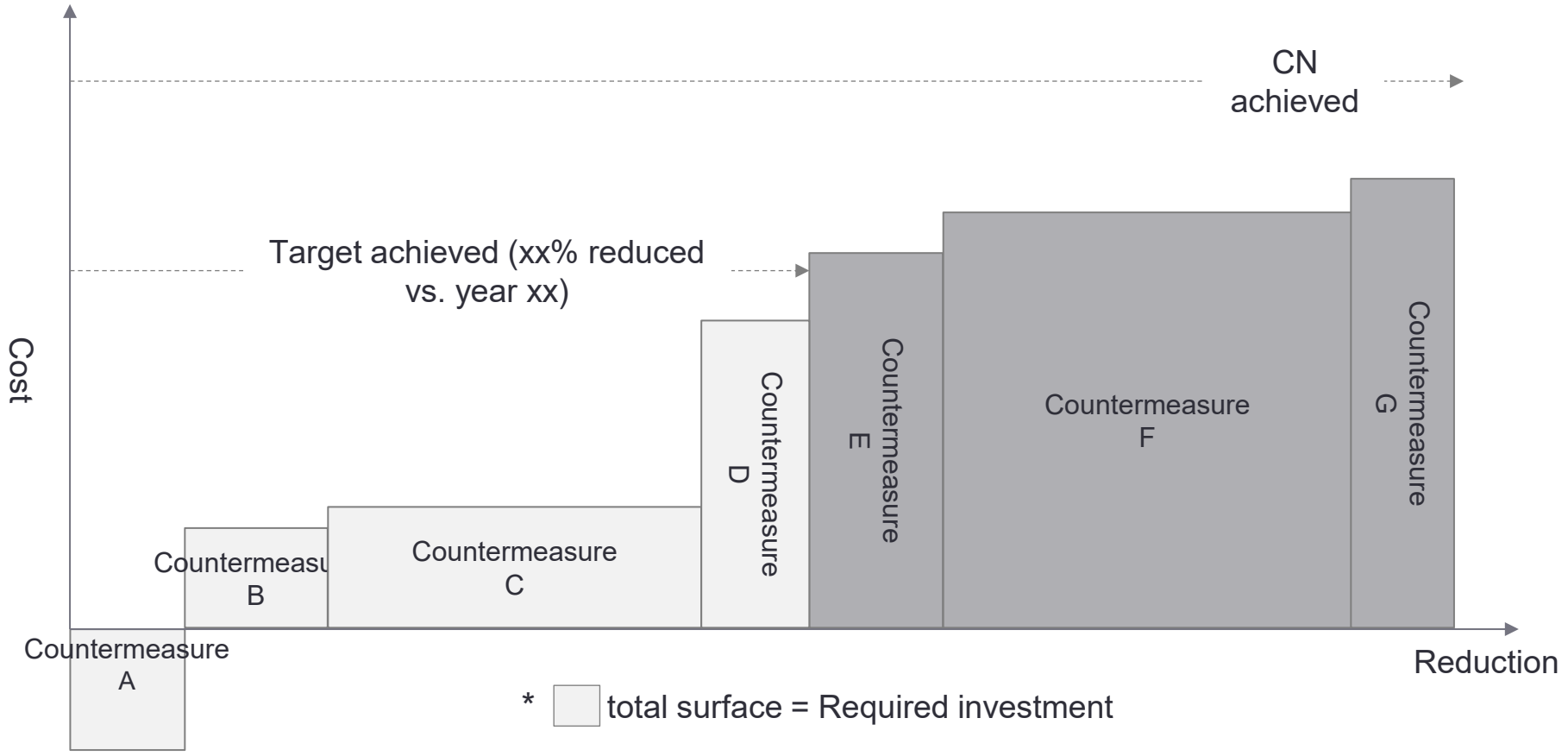
GHG emission reductions
The transition plan addresses the relative contribution of **reductions, removals, and offsets** for achieving GHG emissions targets

Source : Created by MOE based on “Guidance on Metrics, Targets, and Transition Plans” (TCFD)

3 Formulate transition plan > Point Key transition plan points > Technique How to investigate superior policies

Create a "marginal cost curve" for reduction measures, and then identify required policies and formulate a "roadmap," on the assumption that countermeasures will be implemented beginning with those with the lowest investment cost per unit of reduction

Example "marginal cost curve" for reduction measures



4 Establish an organizational and practical actions

Establish an organizational structure in order to implement countermeasures and take practical actions cooperating with relevant department

Image

Response implementation period (Example)	Future Actions (Example)		
	Establish an organizational structure	**Taking practical actions cooperating with relevant department**	**How to proceed with scenario analysis**
Currently or for a few months	✓ **Dissemination of the results of scenario analysis within the company** (including managements) ✓ **Gaining an agreement from managements on the needs for establishing an organizational structure** in order to promote countermeasures	-	✓ **Interviews with experts on important risks and opportunities** for which there is little information
– 1 year	✓ **Establishing an organizational structure in order to promote countermeasures through explaining to relevant department**	✓ Cooperating with relevant department **and take practical actions aligned with existing business plans that is relatively easy to implement** ✓ Beginning practical consideration with relevant department for new actions	✓ **Establishment of a monitoring system for scenario analysis** ✓ Monitoring
As needed (timings may differ for each company)	✓ **Incorporating climate change into medium term business plan** ✓ Encourage dialogue with stakeholders on climate change to create markets ✓ Introduction of internal carbon pricing as a mechanism to promote low-carbon investment		

Consider scenario analysis procedure, establishing an organizational structure , and getting relevant department involved in the course of scenario analysis, alongside with proceeding the incorporation of climate change into medium term business plan

4 Build internal organizations and begin taking specific actions > Point Emissions for each policy and next term settings

It is crucial to investigate specific steps for each response, and then draw a roadmap while considering factors such as the required timeline, reduction impact, and investment for each

Implementation policy	2023	2024	2025	2026	2027	2028	2029	2030	Reduction impact
Countermeasure A Countermeasure A-1 Countermeasure A-2									**200** t-co2
Countermeasure B Countermeasure B-1 Countermeasure B-2									**50** t-co2
Countermeasure C Countermeasure C-1 Countermeasure C-2									**100** t-co2
Countermeasure D Countermeasure D-1 Countermeasure D-2									**50** t-co2

Set specific decarbonization efforts split into steps during each term

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Documentation and information disclosure

What content is to be disclosed, to whom, and in what media?

1 Ensure governance is in place

Integrate scenario analysis into strategic planning and/or enterprise risk management processes.
Assign oversight to relevant board committees/subcommittees.
Identify which internal (and external) stakeholders to involve and how.

Get management and operation divisions involved!

2 Assess materiality of climate-related risks

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

What are the current and anticipated organizational exposures to climate-related risks and opportunities?
Do these have the potential tobe material in the future? Are stakeholders concerned?

Pick and choose from your industry and company viewpoint!

3 Identify and define range of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

What scenarios (and narratives) are appropriate, given the exposures?
Consider input parameters, assumptions, and analytical choices. What reference scenario(s) should be used?

Clearly imagine a future world under certain assumptions!

4 Evaluate business impacts

Impact on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

Evaluate the potential effects on the organization's strategies and financial position under each of the defined scenarios.
Identify key sensitivities.

Try not to seek too much accuracy!

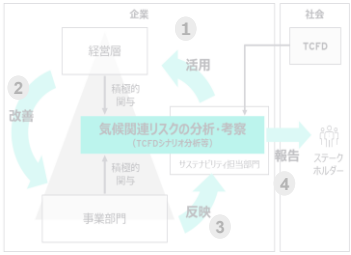
5 Identify potential responses

Responses might include
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities.
What adjustments to strategic/financial plans would be needed?

Do not narrow down! Take multiple scenarios into account!

Incorporate into strategy and execution



1. Utilization in management
2. On-site improvement
3. Reflection in analysis/discussion
4. External reporting

General: Foundation of climate change management

Build a company-wide change cycle!

6 Documentation and disclose

Document the process; communicate to relevant parties: Be prepared to disclose key inputs, assumptions, analytical methods, outputs, and potential management responses

Disclose information from readers' viewpoint!

(Notes in red: Points to consider in each step were added after the support program)

Sources : The Task Force on Climate-related Financial Disclosures, "Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate Related Risks and Opportunities", June 2017.

"Documentation and information disclosure" steps

For documentation and information disclosure, it is crucial to comply with disclosure standard requirements while investigating disclosure information and expression methods after clarifying targets and roles for each type of disclosure media, and accurately meet audience needs

	1 Describe relationship between TCFD recommended disclosures and scenario analysis	2 Create and announce disclosure documents
Overview	Use tools such as comparison tables to provide an overall image of TCFD recommended disclosures (11 items in four areas), and clarify the meaning of scenario analysis	List scenario analysis investigation findings for each step
Point / Technique / Reference	-	**Point** Organize roles for each type of disclosure media **Point** Determine key points evaluated by audience
Roles: Management	-	Engage in dialogue with stakeholders based on disclosure documents
Roles: Division	-	Review disclosure documents
Roles: Department in charge of TCFD	Organize relationship between TCFD recommended disclosures and scenario analysis	Create disclosure documents

1 Relationship between TCFD recommended disclosure items and scenario analysis

Utilizes comparison tables, etc. to provide an overall picture of the disclosure items (4 areas, 11 items) of the TCFD recommendations, and clarifies the position of scenario analysis

Image

Recommended disclosure items in the TCFD recommendations	Area disclosure
Governance: Disclose the organization's governance around climate-related risks and opportunities	
a) Describe the board's oversight of climate-related risks and opportunities	p.XX-XX
b) Describe management's role in assessing and managing risks and opportunities	p.XX-XX
Strategy: Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning (when important)	
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	p.XX-XX
b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	p.XX-XX
c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including the 2˚C or lower scenario	p.XX-XX
Risk management: Disclose the processes used by the organization to identify, assess, and manage climate-related risks	
a) Describe the organization's processes for identifying and assessing climate-related risks	p.XX-XX
b) Describe the organization's processes for managing climate-related risks	p.XX-XX
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management	p.XX-XX
Metrics and targets: Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities (when important)	
a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	p.XX-XX
b) Disclose Scope1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks	p.XX-XX
c) Describe the targets used by the organization to manage climate-related risks/opportunities and performance against targets	p.XX-XX

Showing scenario analysis's positioning in the TCFD's recommended disclosure items allows companies to show the overall picture of TCFD disclosure

Source : Prepared based on TCFD, "Recommendations of the Task Force on Climate-related Financial Disclosures" (Final version), 2017, page 19

2 List investigation findings for each step

Describe the results of scenario analysis conducted in each step

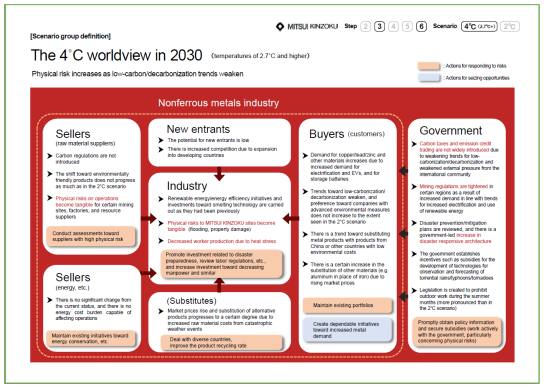
Visual examples of describing results for each step

Image

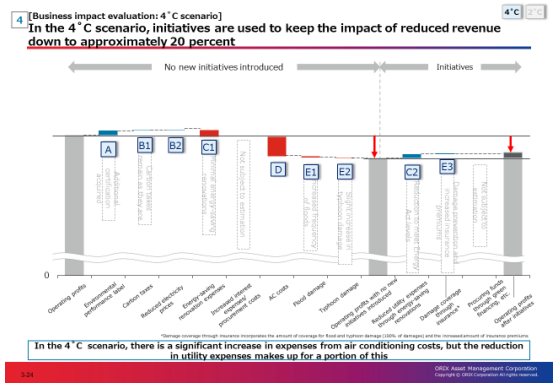
STEP2: Assess materiality of climate-related risks

Risks and Opportunities		Business impact			Assessment
Major classification	Small classification	Index	Discussion: Risks	Discussion: Opportunities	
Transition Risk	Carbon price	Revenue	➢ The introduction of carbon prices is expected to reduce the demand for fossil fuels (to reduce the demand for petroleum plants), which will have a medium-scale impact on PL.	➢ Developments in carbon tax markets could create new opportunities in low-carbon energy markets, such as hydrogen, CCU and bio-based chemical industries and decentralized utilities	Large
	Carbon emission targets/policies of each country (including subsidies)	Revenue	➢ Regulatory tightening affects orders for fossil-fuel-derived plants, affecting PL	➢ The market for green energy, hydrogen, etc. is expected to expand with the advancement of policy support, and the demand for plant and energy transportation, etc. is expected to increase, creating business opportunities.	
	In the energy mix Change	Revenue	➢ Large impact on PL due to changes in fossil fuel-derived power generation rate, which affects plant orders	➢ Alternatives to coal such as LNG and natural gas may increase demand for plant production, which can be an opportunity as well as a risk ➢ Increased demand for green energy creates new business opportunities	
	Energy Demand	Revenue	➢ Significant impact on PL due to decrease in demand for gasoline and decrease in orders for petroleum refineries ➢ Smaller plant size and diversification of customers and regions reduced business opportunities.	➢ Promoting LNG and natural gas as low-carbon fuels creates business opportunities in new markets (increased exports and imports in North America and Asia) ➢ New opportunities could emerge in low-carbon energy markets, such as hydrogen, CCU and bio-based chemical industries and decentralized utilities	
	Spread of low-carbon technologies	Revenue	➢ Influence on PL due to the spread of electric vehicles, reduced demand for gasoline, etc., affecting the volume of orders received for petroleum plants.	➢ Promoting LNG and natural gas as low-carbon fuels creates business opportunities in new markets (increased exports and imports in North America and Asia) ➢ New opportunities could emerge in low-carbon energy markets, such as hydrogen, CCU and bio-based chemical industries and decentralized utilities	
	Developing next-generation technologies	Revenue Spending	➢ Popularization of decarbonizing materials (bio-plastics, etc.) reduces the market size of petroleum products and has a large impact on orders for petroleum refineries	➢ New opportunities could emerge in low-carbon energy markets, such as hydrogen, CCU and bio-based chemical industries and decentralized utilities	
Other	Changes in customer reputation, changes in investor reputation, rising mean temperatures, rising sea levels, and extreme weather conditions	Revenue Spending	➢ Die investment accelerated for oil and LNG, and plant orders declined or were suspended. In addition, the postponement and cancellation of projects have an impact on PL. ➢ Construction delays caused by extreme weather conditions have an impact on PL due to increased construction costs, etc.	➢ Investors' evaluation improves due to orders received for projects aimed at realizing a low-carbon society such as renewable energy. ➢ Expected increase in demand for plant resilient to natural disasters, etc.	Small to medium

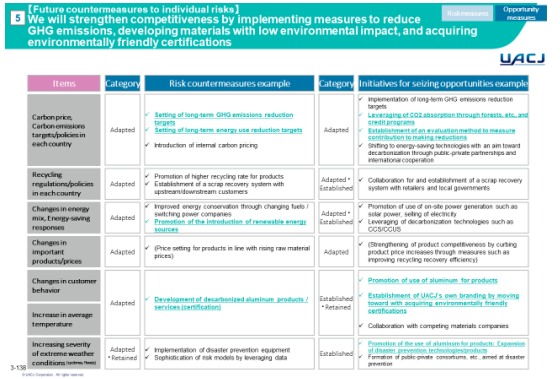
STEP3: Identify and define range of scenarios



STEP4: Evaluate business impacts



STEP5: Identify potential responses



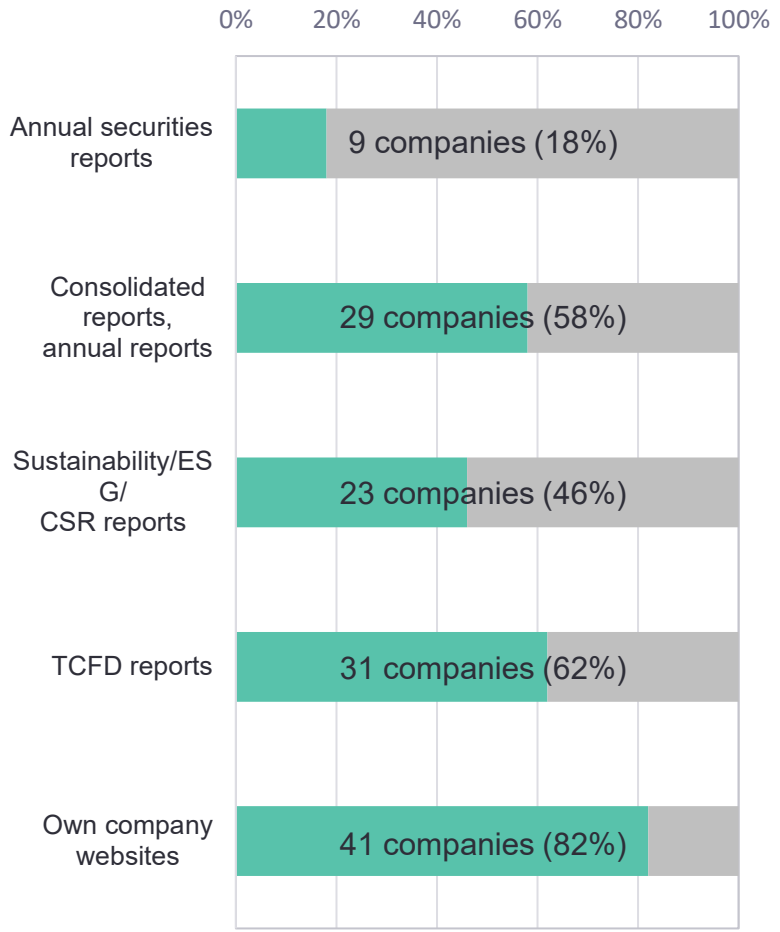
2 List investigation findings for each step > Point Organize roles for each type of disclosure media

Determine target audience for each type of disclosure media, and investigate what information and how much to disclose

Basic perspectives on disclosure content by media

Disclosure media	Climate-related information disclosure trends
Annual securities reports	Outline information based on four areas in TCFD recommendations These are legal disclosure documents and must disclose accurate figures, and so some companies disclose these split into detailed quantitative values in business impact evaluations (because many assumptions and hypotheses are included in calculations)
Consolidated reports, annual reports	Information based on 11 items in four areas of TCFD recommendations. However, if details are disclosed in sustainability reports or own company websites, companies might also include simple disclosure information or TCFD comparison tables, and then attach links to detailed information.
Sustainability/ESG/ CSR reports	Comprehensive information based on 11 items in four areas of TCFD recommendations. Includes detailed information, such as scenario analysis processes, conditions, and numerical data (GHG emission trends, etc.). May include numerical data in separate volume (data book, etc.), or post on own company website.
TCFD reports	Documents that contain only information based on 11 items in four areas of TCFD recommendations. Released only to audience that wants to refer to TCFD disclosure information.
Own company websites	Comprehensive information based on 11 items in four areas of TCFD recommendations. Includes detailed information, such as scenario analysis processes, conditions, and numerical data (GHG emission trends, etc.). May also post latest information on website, if details need to be updated before releasing a consolidated report or sustainability report.

Disclosure by media



*1: 50 companies inside and 50 companies outside Japan were surveyed, and the number of companies that had provided TCFD-related disclosure information by published media was counted

2 List investigation findings for each step > Point Understand the points that readers evaluate ①

It is important to describe climate change-related governance, as well as what was understood from the scenario analysis results and how the company plans to respond

Results of interviews with investors/experts

It is not the disclosure itself that will be evaluated; showing the results of risk/opportunity identification and the effect scenario analysis results have on management strategy is the important thing

- ✓ It is not the disclosure itself that will be evaluated; **what is important is using qualitative terms to communicate the company's current initiatives/future initiatives.** Disclosures should be made on the assumption that dialogue will take place and **describe the scenario analysis in an easy-to-understand manner as a starting point for discussion.**
- ✓ For scenario analysis disclosures, **investors want to know how the results of the scenario analysis will affect management strategy**. They are concerned that there will be companies that make scenario analysis an end.
- ✓ The results of scenario analysis show that **aiming for carbon neutrality by 2050 is not enough; what is important is that this is reflected in the transition. It is meaningful to present interim targets for 2030, etc., and if they are not along the carbon neutrality by 2050 path,** it is **important to show in an easy-to-understand manner how transitions will be made.** Many investors are concerned about how to evaluate companies that are deviating from the ideal reduction path toward 2030, and it is important for investors to **evaluate individual strategies and encourage companies to plan to reduce emissions more.**

Disclosing the following will make it easier to describe the resilience of the organization's climate change-related strategies

- ✓ **Status of climate change-related governance structure** STEP1
- ✓ **Information of data used as the basis for each scenario analysis** STEP3
- ✓ **Explanation of the company's appropriate transition toward decarbonization by 2050** STEP5,6
  - ✓ **Current/future initiatives toward risks/opportunities identified from the scenario analysis**
  - ✓ **Narrative for climate change-related value creation based on scenario analysis results**
  - ✓ **(If necessary) 2030 interim targets and transition plans**
- ✓ **How the company will proceed with scenario analysis and achieve the goals** STEP5

Source : Prepared based on interviews conducted by the Ministry of the Environment in FY2020-2021 toward investors and experts

2 List investigation findings for each step > Point Understand the points that readers evaluate ②

Investors are focused on the impact on operations, such as management‘s involvement and how scenario analysis results are leveraged in the company’s business and management

Results of interviews with investors/experts

For beginning scenario analysis	**What is important is whether the company has a structure that allows it to proceed with scenario analysis, as well as management's understanding** ✓ Scenario analysis is an area which is not yet covered by mainstream discussions in company management. Because of this, many companies have outsourced the first round of scenario analysis to external consultants in their corporate planning and so on, and it is questionable whether the company has established a structure that enables it to tackle scenario analysis on its own ✓ While involving external experts is a good tactic, investors are more concerned about how the company's senior management understands sustainability risks and discusses them at board meetings
Assess materiality of climate-related risks	**This area is the core of scenario analysis, and risks/opportunities affecting businesses should be explained in detail** ✓ This area is the core of scenario analysis, and should be explained in detail
Identify and define range of scenarios	**Along with the reasons for selecting a wide variety of scenarios, it is also recommended to implement scenarios in line with current trends (currently the 1.5°C scenario)** ✓ The reasons for scenarios being selected are important, as opinions on scenarios may vary according to the industry ✓ If the company has added its own variables to the parameters, specific explanation is needed, as side-by-side comparisons with other companies cannot be made in such cases ✓ A 1.5°C scenario aimed at 2050 may be necessary for companies with a goal of carbon neutrality by 2050, or for sectors with high emissions
Evaluate business impacts	**Disclosure of quantitative information is also being considered in light of increased implementation of systems and recent trends toward strengthening disclosure of climate-related information** ✓ There is no international consensus on the methodology for impact evaluation, and at present, investors may be satisfied with qualitative information. It is expected that demand for quantitative information will be determined by the future actions of financial supervisory authorities and the influence those actions have on financial institutions and general business companies afterward ✓ Rather than providing figures, it may be better to disclose the process for internal discussions and have direct dialogue concerning impacts that cannot be publicly disclosed ✓ Investors want to know how climate change will affect business, so the company should put a theoretical image of this into figures, even if it is only a rough one ✓ As exemplified by disclosures in securities reports, deepening of the relationship between climate-related information and financial information is being called for ✓ ESG investors are also paying attention to financial impact disclosure, and the TCFD’s metrics and targets guidance also includes the importance of disclosing financial impact
Identify potential responses	**Investors are focused on how the results of scenario analysis will be leveraged in the company's business and management** ✓ Investors are focused on how the results of scenario analysis will be leveraged in the company's business and management ✓ It is also important to express how climate change risks / sustainability issues will be addressed in strategies and which kinds of actions are insufficient ✓ At the same time, individual strategies need to be evaluated with respect to transition plans for high-emitting companies to reduce emissions, as greenwashing concerns and the Russia/Ukraine issue raise questions about the feasibility of post-2030 reduction plans.
Document and disclose information	**With the revision of the Corporate Governance Code, companies should focus on disclosure through various media such as reports and websites** ✓ With the revision of the Corporate Governance Code, investors will start to look at a wide range of disclosure media. In most cases, they will look at integrated reports and sustainability reports, but it is considered ideal if information related to the TCFD recommendations is summarized on the company’s website so that investors can check the latest versions for later review ✓ The basic premise is governance disclosure, and whether management has declared its commitment ✓ The basic understanding is that TCFD disclosures listed in integrated reports, etc., will also be included in the Corporate Governance Code

Source : Prepared based on interviews conducted by the Ministry of the Environment in FY2020-2021 toward investors and experts

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How do we incorporate the results of the scenario analysis into our strategies and link them to implementation?

1 Ensure governance is in place

Integrate scenario analysis into strategic planning and/or enterprise risk management process
Assign oversight to relevant board committees/subcommittees.
Identify which internal (and external) stakeholders to involve and how.

Get management and operation divisions Involved!

2 Assess materiality of climate-related risks

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

What are the current and anticipated organizational exposures to climate-related risks and opportunities?
Do these have the potential tobe material in the future? Are stakeholders concerned?

Pick and choose from your industry and company viewpoint!

3 Identify and define range of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

What scenarios (and narratives) are appropriate, given the exposures?
Consider input parameters, assumptions, and analytical choices. What reference scenario(s) should be used?

Clearly imagine a future world under certain assumptions!

4 Evaluate business impacts

Impact on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

Evaluate the potential effects on the organization's strategies and financial position under each of the defined scenarios.
Identify key sensitivities.

Try not to seek too much accuracy!

5 Identify potential responses

Responses might include
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

Use the results to identify applicable, realistic decisions to manage the identified risks and opportunities.
What adjustments to strategic/financial plans would be needed?

Do not narrow down! Take multiple scenarios into account!

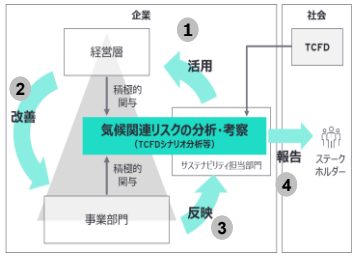
6 Documentation and disclose

Document the process; communicate to relevant parties: Be prepared to disclose key inputs, assumptions, analytical methods, outputs, and potential management responses

Disclose information from readers' viewpoint!

(Notes in red: Points to consider in each step were added after the support program)

Incorporate into strategy and execution



1. Utilization in management
2. On-site improvement
3. Reflection in analysis/discussion
4. External reporting

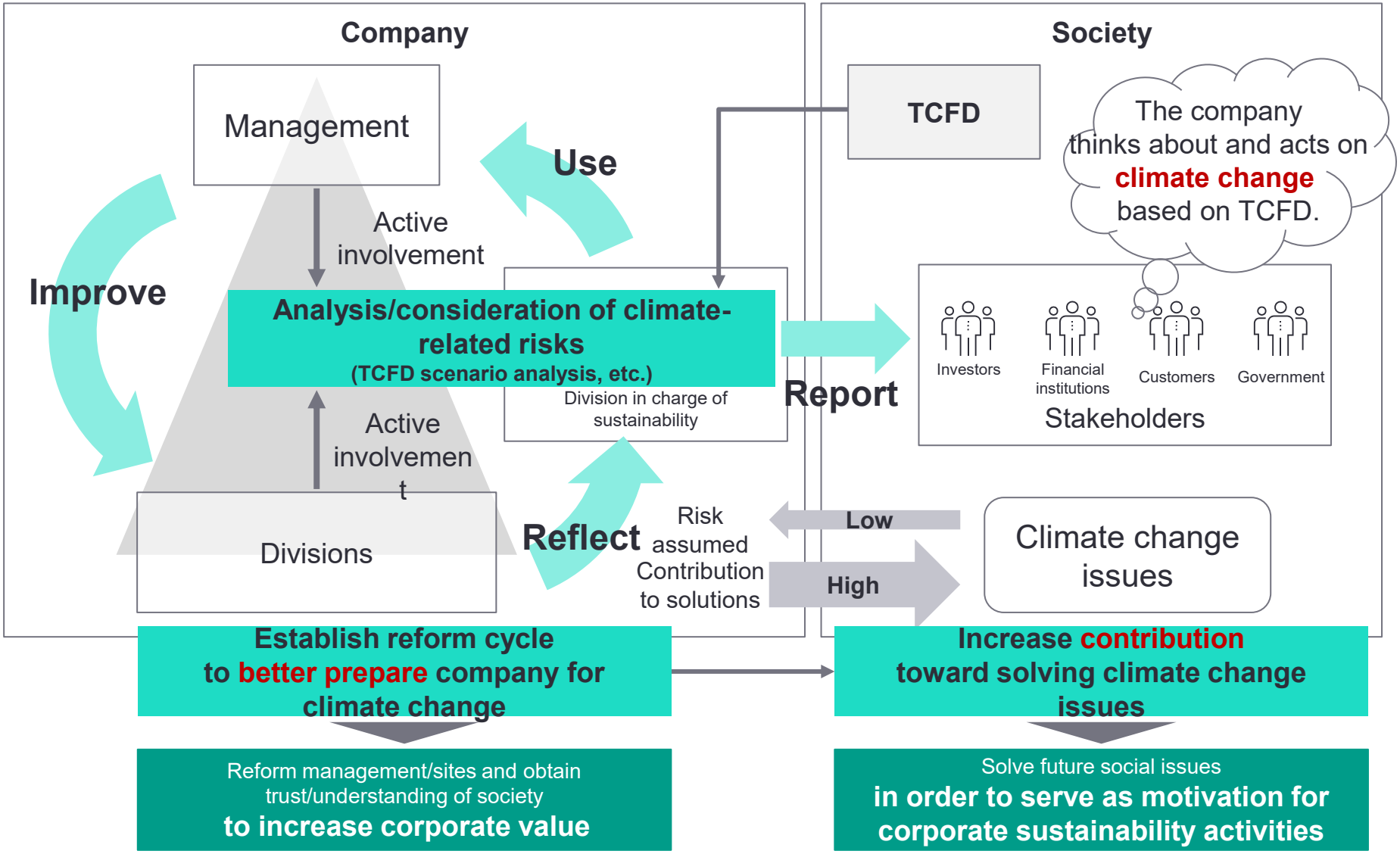
General: Foundation of climate change management

Build a company-wide change cycle!

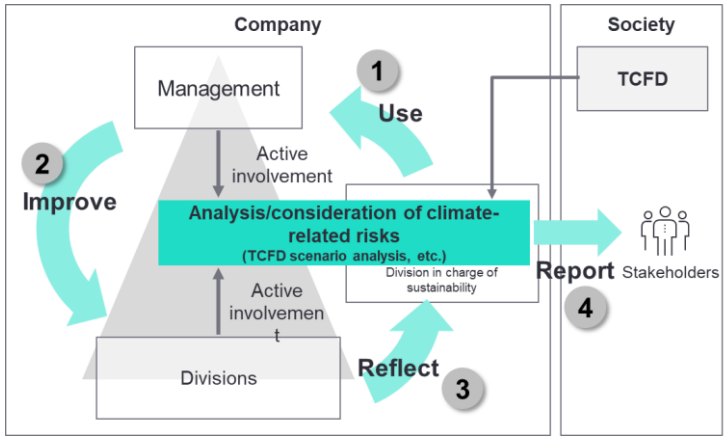
Sources : The Task Force on Climate-related Financial Disclosures, "Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate Related Risks and Opportunities", June 2017.

How a company should analyze climate-related risks

Elevate to company-wide activities in which management and divisions cooperate and establish a reform cycle to better prepare the company for climate change, in order to help increase corporate value and solve social issues



Establish a reform cycle in order to better prepare the company for climate change by integrating scenario analysis results into management



Specific initiatives

1 Use in management
- Reflect scenario analysis results in medium-term management plan
- Set medium- to long-term GHG reduction targets based on transition plan results

2 Improve sites
- Reduce GHG of existing businesses
- Engage with suppliers
- Establish new decarbonization-related businesses
- Introduce ICP to invest in decarbonization

3 Reflect in analysis/consideration
- Measure/disclose GHG emissions
- Integrate climate-related risks with company-wide risk management (ERM)

4 External reporting
- Disclose TCFD response status in annual securities reports, consolidated reports, etc.

General: Establish climate change management base
- Accumulate knowledge of climate change and foster awareness through study sessions, e-learning, etc.

Key initiative points

Governance	1	Establish a governance organization to ensure that management incorporates climate change in management
Strategy (Scenario analysis)	2	Reflect scenario analysis results in management strategies/plans to promote management resilient to climate change
Risk management	3	Integrate climate-related risks in ERM and manage them together with other company risks, to better prepare the company for climate change risks
Metrics and targets	4	Set KPIs and establish a PDCA cycle to achieve them, to promote better climate change management
Information dissemination	5	Disseminate information that is easy to understand, to obtain the understanding/trust of multistakeholders
Awareness fostering	6	Conduct training and provide information based on employee positions/roles, to spread climate change management internally and promote unified implementation

Promoting company-wide climate change management requires establishing a governance organization, and it is especially important to clarify the roles and responsibilities of directors and management

Governance:
Disclose organization governance related to climate-related risks and opportunities.

Standard sustainability promotion organization

Oversight function

- Board of directors

Execution function

- Management meetings
- Sustainability committee
  - Divisions
  - Corporate department
  - ....

Major roles described in TCFD recommendations, etc.*

Oversight by board of directors

- Consider risks/opportunities related to climate change in setting/reviewing **strategies**, **action plans**, **business plans**, and **targets**
- Consider risks/opportunities related to climate change in setting/reviewing **risk management policies**
- Consider climate change risks/opportunities in reviewing **annual budgets**, **capital expenditures** and **purchases**, and **asset sales**
- **Monitor performance** against **goals** and **targets** to deal with climate change risks/opportunities
- **Acquire specialized knowledge** on climate change risks/opportunities for members of the board of directors, or **make use of** internal/external **resources to compensate for lack of specialized knowledge**

Execution by management

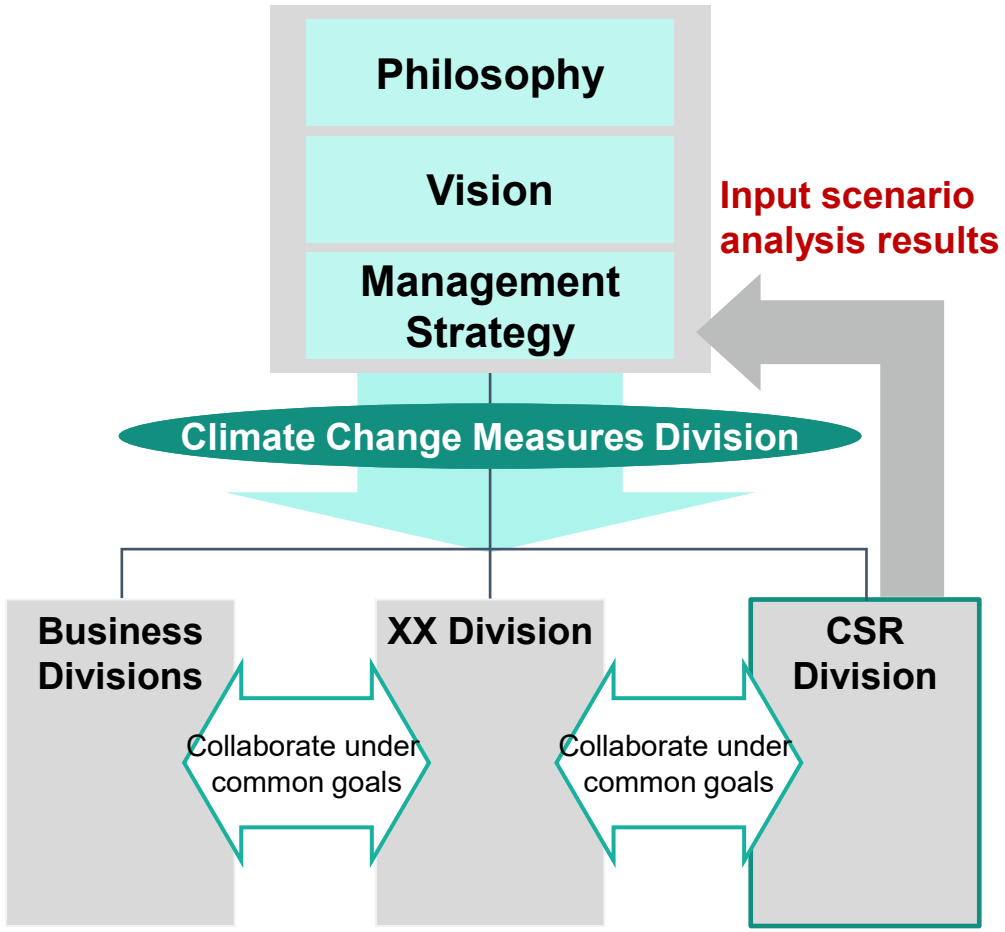
- **Responsibilities** related to climate change (**risk/opportunity evaluation**, **management**, etc.)
- **Report** information on evaluation and management of risks/opportunities related to climate change, to the **board of directors** or **related committees**
- **Receive reports from divisions, etc.** on information related to climate change

Promote handling of climate change by establishing an organization that allows the board of directors to provide oversight and management to execute

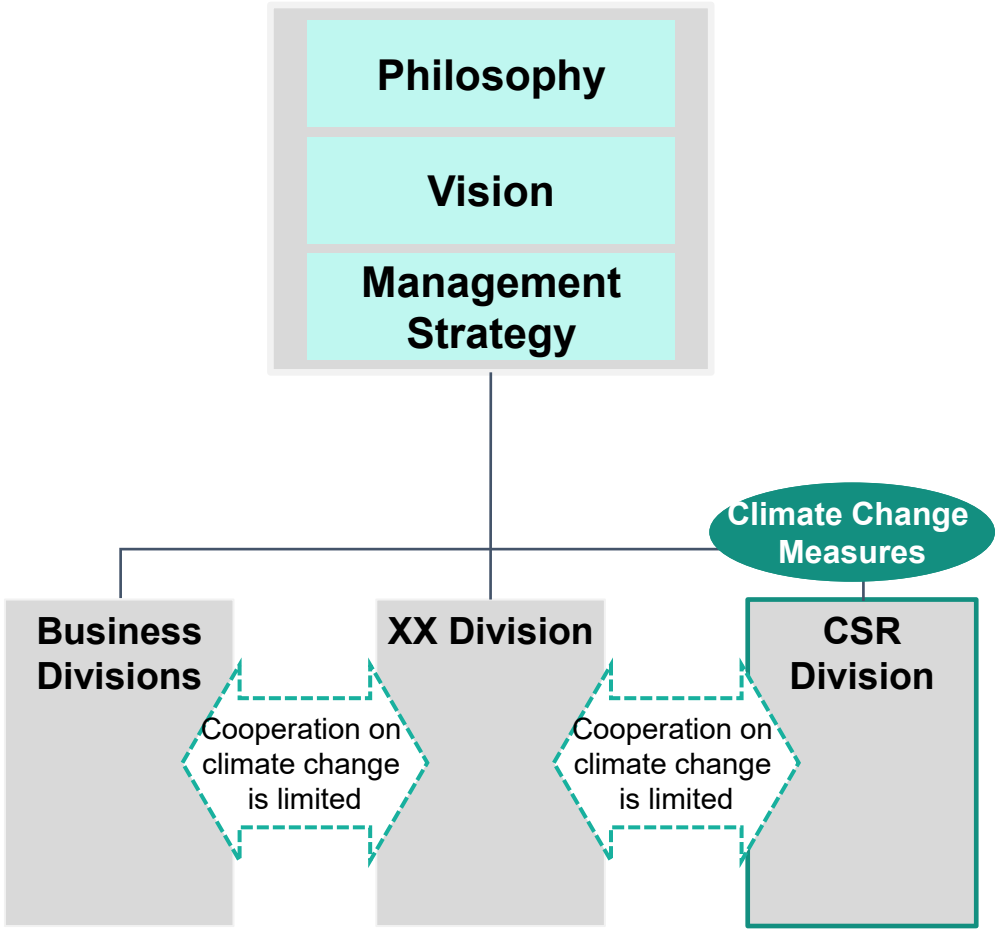
Source : Created by MOE based on “Final Report” and “Revised Appendices” (TCFD), “IFRS S2 Climate-Related Disclosures” (IFRS), and “Proposed Climate-Related Disclosure Rules” (SEC)

It may be suggested to create a cross-sectional organization directly under the corporate planning department that deals with climate change to give effectiveness to the result of scenario analysis

As a cross-sectional organization with climate change as a company-wide theme



Remain as limited initiatives by some divisions



TCFD guidance recommends linking non-financial KPIs with officer remuneration, as a policy to increase the commitment of management

TCFD (2021)
"Guidance on Metrics, Targets, and Transition Plans"

It is recommended to include climate change as a long-term incentive in officer remuneration, and to disclose weighting reflected in remuneration

"A remuneration policy is an important incentive for achieving the targets and goals of the target organization, and can provide hints on the organization's governance, oversight, and accountability in managing climate-related matters."

Example of cross-industry climate-related metric category and metrics

Metric category	Example measurement unit	Example metrics
Ratio of officer remuneration related to climate considerations	Percentage, weight, overview, or currency	• Ratio of annual employee discretionary bonus related to investment in climate-related products • Weight of climate goals related to long-term incentive scorecards for executive officers • Actual weight of business emission targets related to remuneration scorecards

System examples and case studies

System example

There are many examples of linking non-financial KPIs with evaluation metrics for performance-related remuneration for officer remuneration

Example

Basic remuneration	Performance-related remuneration	
	Annual bonus	Stock compensation

Financial KPIs: Consolidated ordinary profit, ROIC, standardized EPS, etc.
Non-financial KPIs: Climate change, waste, community, human right, DE&I, etc.

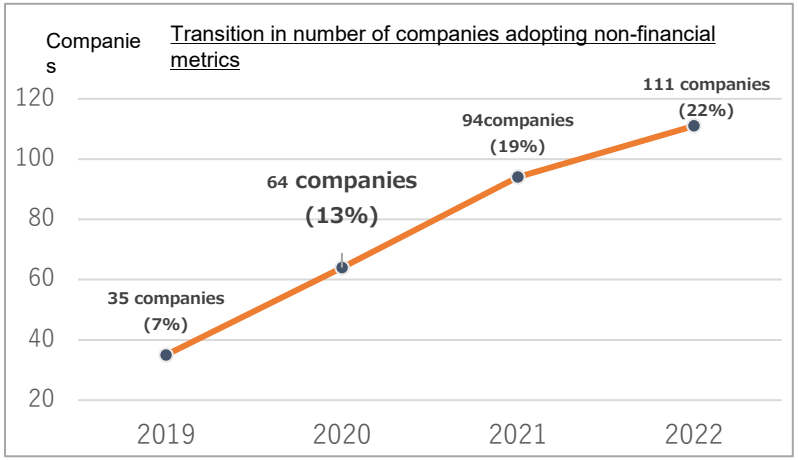
Company case studies

Company	System overview
Asahi Group HD	Midterm bonuses paid every three years to internal directors are **determined based on performance metrics, with social value metrics accounting for 40%**. Uses metrics related to important sustainability strategy topics (**climate change**, plastic, community, responsible drinking, DE&I, and external metrics).

Transition in number of companies

Adoption trends in companies

There is an increasing trend among companies in reflecting non-financial KPIs in officer remuneration; according to Nikko Research Center (2022), this is true for 111 (22%) of the 500 largest companies in terms of market capitalization in the TSE Prime Market



Source : Created by MOE based on "Guidance on Metrics, Targets, and Transition Plans" (TCFD), "Sustainability Report" (Asahi Group),

It is important to use management strategy and scenario analysis as mutual forms of input, and enhance climate change management

Strategy:
Disclose any important (material) information on climate-related risks and opportunities with an actual or potential impact on the organization's business, strategy, or financial planning.

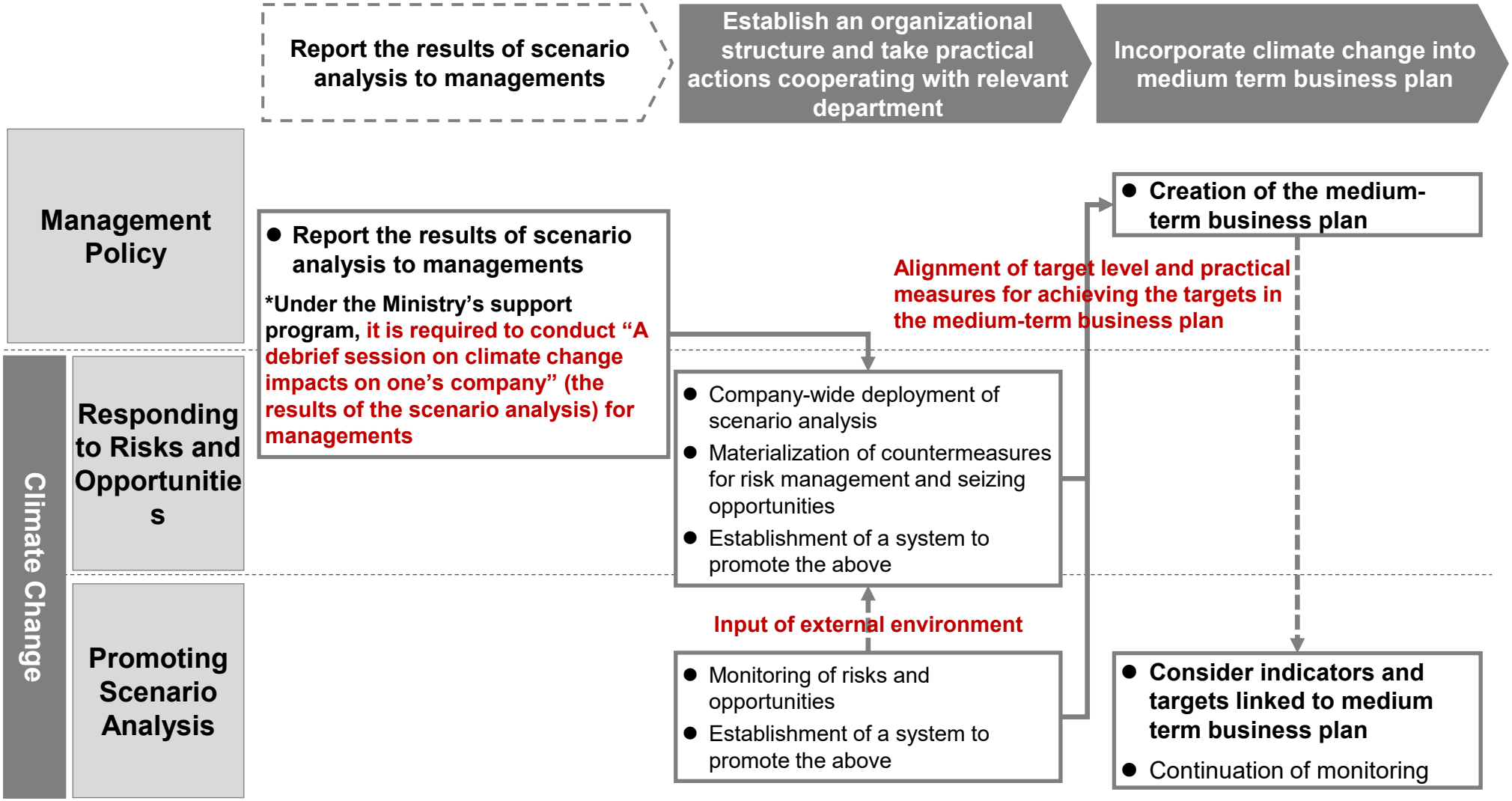
Management strategy ← **Formulate management strategy based on scenario analysis**

Management strategy elements		Specific examples	Examples of reflecting scenario analysis results	Scenario analysis: Risk importance	Scenario definition	Impact evaluation	Countermeasure definition
Strategy vision	Strategy policy	• Strategy vision/concept • Slogans	Reflect ideal state of own company depicting perspective of the world for each scenario, in strategy policy (vision and concept)	○	◎	-	-
	Numerical targets	• Financial targets (EBITA, ROIC, etc.) • Non-financial targets (GHG, waste, etc.)	Identify climate-related risks/opportunities unique to own company, and review/set financial and non-financial targets based on results of evaluating business impacts	○	-	◎	-
Company-wide strategy	Growth strategy	• Business portfolio strategies • New business strategies	Review business portfolio strategies based on evaluating the business impact of climate-related risks/opportunities and considering countermeasures for these	-	-	○	◎
	Priority policies	• Digital transformation • DE&I • Geopolitical response	Determine policies for company to prioritize, based on evaluating the business impact of climate-related risks/opportunities and considering countermeasures for these	-	-	○	◎
Business strategies	Business strategies/plans	• Business targets • Priority areas/products • Business differentiation strategies	Review business strategies/plans based on evaluating impact of climate-related risks/opportunities that could occur for each perspective of the world in each scenario, and considering countermeasures	○	◎	◎	◎

Implement scenario analysis based on management strategy

Periodically update scenario analysis based on management strategy to accurately determine climate-related risks with an impact on the strategies and plans of own company

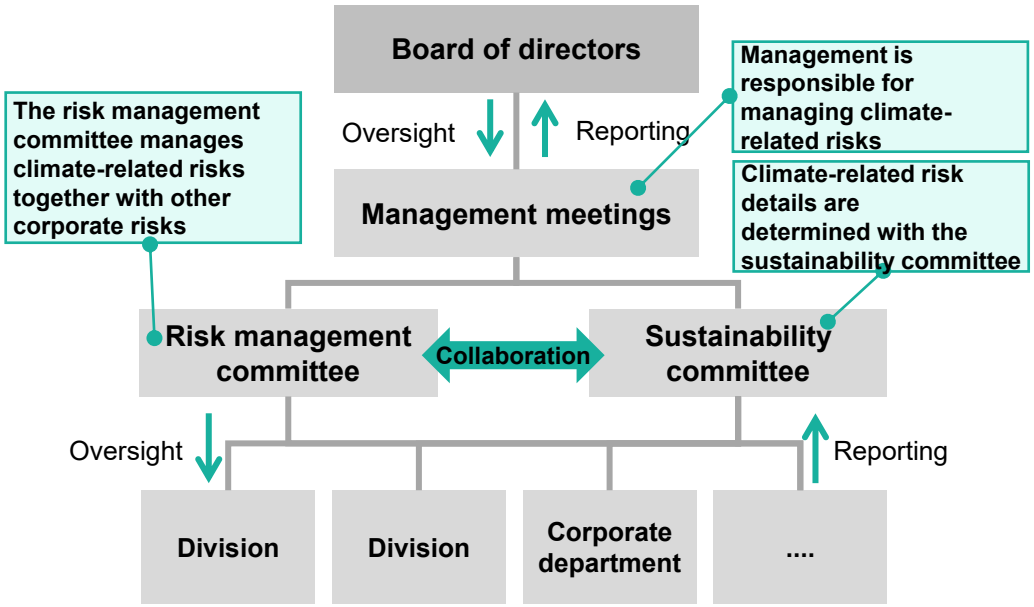
It is important that climate change be included in the process of business strategy planning. One tip is to include climate change into the nearest midterm management plan



It is recommended to manage climate-related risks integrated with other risks, with management taking responsibility for this. It is also important to determine the characteristics of climate-related risks integrated with ERM

Risk management:
Disclose how the organization identifies, evaluates, and manages the climate-related risks.

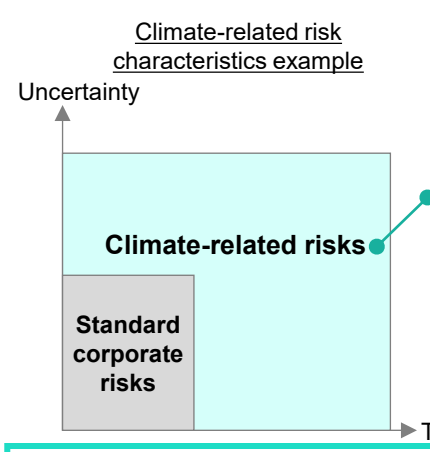
Risk management organization (example) and key points



Important to establish an organization to appropriately manage climate-related risks
(1) Set management as the organization responsible for managing climate-related risks
(2) The risk management committee manages climate-related risks together with other corporate risks
(3) Work with the sustainability committee, etc. to determine details of climate-related risks

Climate-related risk ERM considerations

- TCFD recommendations **suggest integrating** climate-related risk identification, evaluation, and management processes **with the enterprise risk management (ERM)** of the organization
- Guidance on Risk Management Integration and Disclosure released by TCFD notes the **importance of appropriately recognizing climate-related risk characteristics** during integration with ERM



Climate-related risk characteristics

Uncertainty: No precedent and difficult to estimate
Many climate-related risks have no precedent and contain many unknown elements, and it is therefore difficult to analyze statistics and trends based on past data

Timeline: Long-term impact over a long timeline
Climate-related risks impact business over a timeline exceeding conventional business plans and investment cycles

Important to consider differences between climate-related risks and standard corporate risks, and integrate with ERM
Pay close attention to climate-related risk “uncertainty” and “timeline” characteristics

Source : Created by MOE based on “Guidance on Risk Management Integration and Disclosure” (TCFD)

Set climate change KPIs and establish an effective PDCA cycle to promote solid strategies/plans

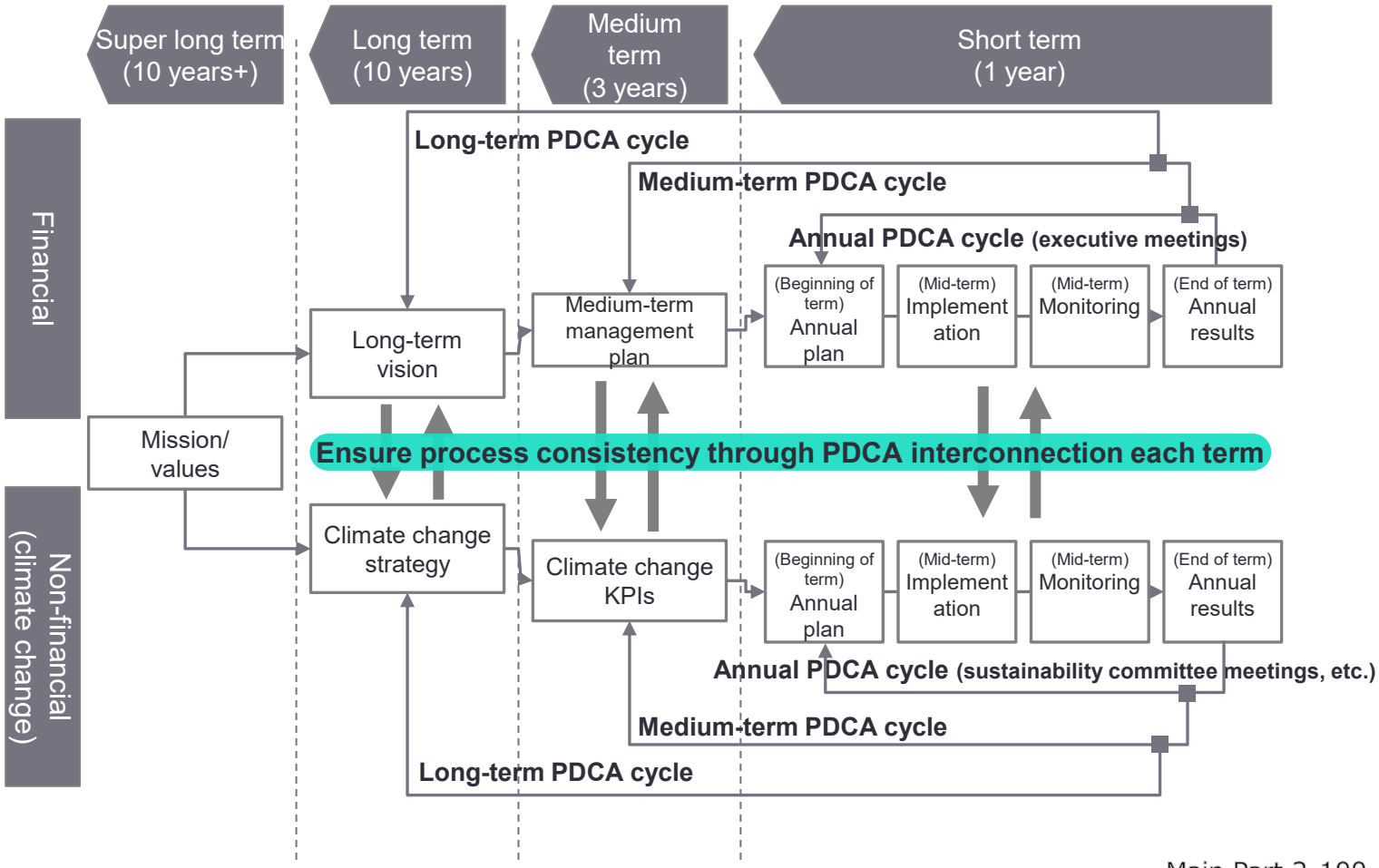
Metrics and targets:
When information is important (material), evaluate climate-related risks and opportunities, and disclose metrics and targets used for management

Climate change KPI examples

- Scope 1/2/3 emissions (t-CO2e)
- Renewables used in power consumption (%)
- Resources in flood risk regions (%)
- Earnings from low-carbon products/services (yen)
- Research investment in low-carbon products/services (yen)
- ESG bonds in fundraising (%)

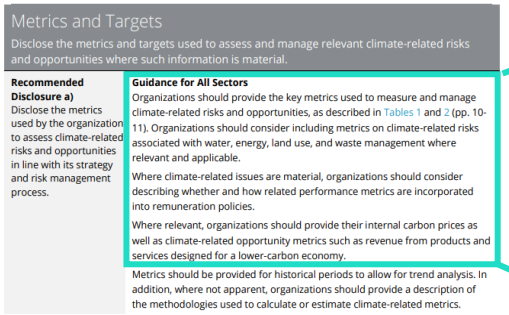
Set KPIs related to climate change and spread/disseminate them internally, to establish an effective PDCA cycle for achieving goals

Example of PDCA cycle interconnected with financial target management



The implementation of ICP is recommended in the “Indicators and Targets” section of the TCFD recommendations, and the "Guidance on Metrics, Targets, and Transition Plans" provides specific explanations on the use, setting, and disclosure of ICP

TCFD Recommendations (2017)



Metrics and Targets

Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.

Recommended Disclosure a)
Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.

Guidance for All Sectors
Organizations should provide the key metrics used to measure and manage climate-related risks and opportunities, as described in Tables 1 and 2 (pp. 10-11). Organizations should consider including metrics on climate-related risks associated with water, energy, land use, and waste management where relevant and applicable.

Where climate-related issues are material, organizations should consider describing whether and how related performance metrics are incorporated into remuneration policies.

Where relevant, organizations should provide their internal carbon prices as well as climate-related opportunity metrics such as revenue from products and services designed for a lower-carbon economy.

Metrics should be provided for historical periods to allow for trend analysis. In addition, where not apparent, organizations should provide a description of the methodologies used to calculate or estimate climate-related metrics.

- TCFD "Indicators and Targets" Section
  -> **Companies in all sectors** are required to provide **indicators to manage climate-related risks and opportunities**.
- **The ICP is mentioned as a concrete example of the indicator, and its implementation is recommended**.

TCFD “Guidance on Metrics , Targets, and Transition Plans” (2021)

Sections	Contents
General use of the ICP	• **Measuring Performance: Carbon-adjusted earnings per share, expected profitability, incentives for energy savings, identification of revenue opportunities and risks, procurement and supply chain management, etc.** • **Position management:** Valuation of assets, etc. • **Investment decisions: identification of low-carbon, high-return investment opportunities, fixed investment plans, and determination of the cost-effectiveness and net present value of projects,** etc. • **Strategy:** Assessment of future policy responses to climate change, including the potential for explicit and implicit carbon pricing, impacts on overall economic growth and sector demand, and technology and cost benefits • **Risk management:** Measurement, modeling, and management of GHG emissions

About ICP Settings	• In order to set an ICP, it is necessary to understand how to use the ICP, the appropriate form for the various uses of the ICP, and the approach to determine the price level
	• Effective carbon pricing also has the following characteristics
	  • Prices and pricing methods should be based on reliable and reputable scientific research in the light of social climate objectives. **At a minimum, the organization should consider a carbon price aligned with the thermometer path well below 2°C**
	  • The organization's ICP price must be consistent with the price implied by the organization's climate-related targets (e.g., the 2050 net zero, the Paris Agreement)
	  • **The ICP should rise over time to reflect the decline in the carbon budget**
	  • The organization should **recalculate as necessary** to take into account climate policies and regulations, or the lack thereof, that suggest rapid price increases
	  • The ICP **may need to reflect geographical and sectoral differences** when significant impacts or reliable sources of information are found

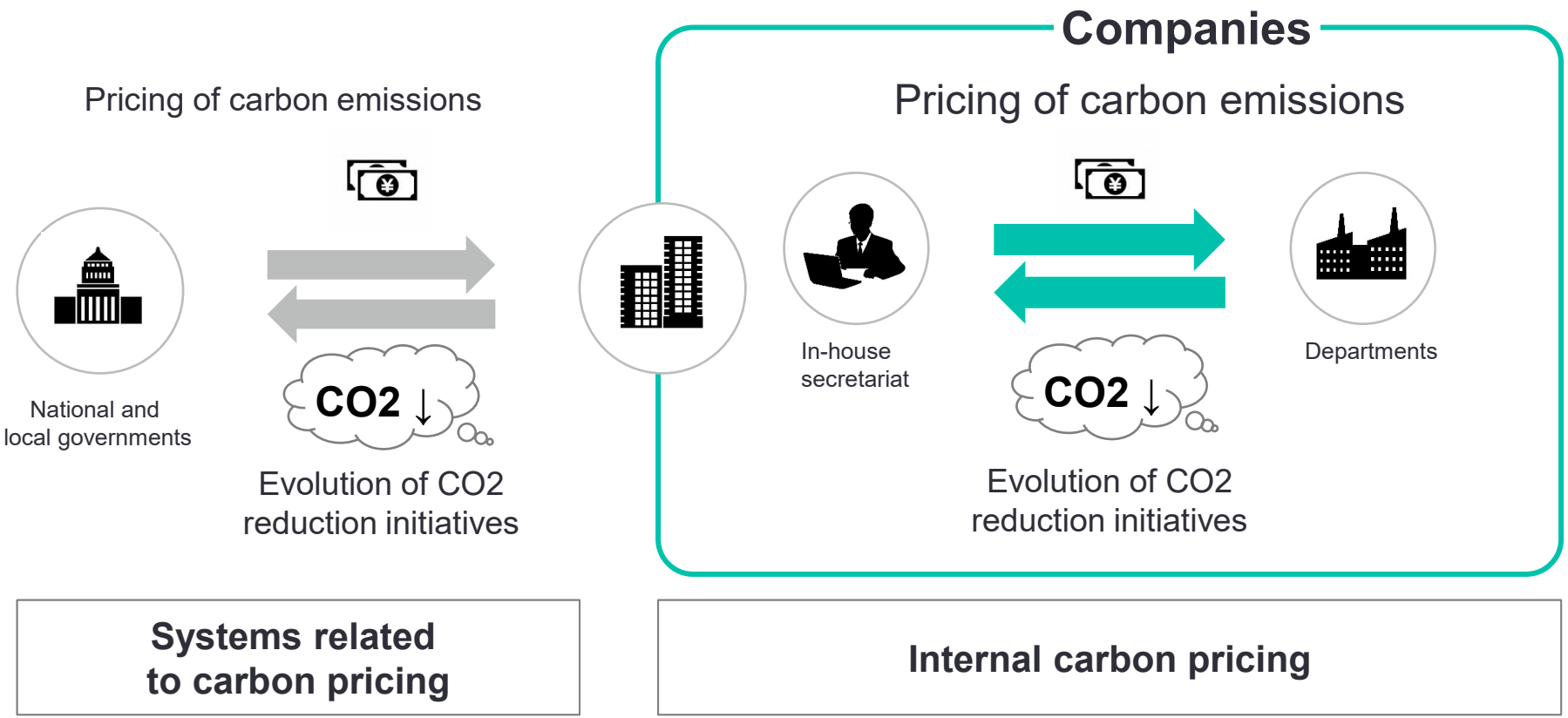
About Disclosure of the ICP	• Consideration should be given to providing the following detailed information regarding the ICP
	  • **Methodology** used to set the ICP
	  • How the ICP reflect the implicit costs of various climate policies (e.g., performance standards, renewable energy portfolio standards, explicit costs of GHG emissions (e.g., carbon taxes, cap and trade))
	  • Types and shares subject to carbon pricing (Scope 1, 2, 3)
	  • **Assumptions about how the ICP will change over time** in response to reductions in carbon budgets, policy changes and changes in emission projections
	  • Scope of ICP implementation (region/business) and whether it is applied as a margin-based cost
	  • **Whether the organization uses a common ICP or a differentiated ICP**

For details on ICP, see attached Chapter 2.

Source : TCFD, “Recommendations of the Task Force on Climate-related Financial Disclosures” (2017), Source: TCFD , “Guidance on Metrics, Targets, and Transition Plans”(October 2021)

Internal carbon pricing (ICP) refers to carbon prices that are set and used internally to promote decarbonized business

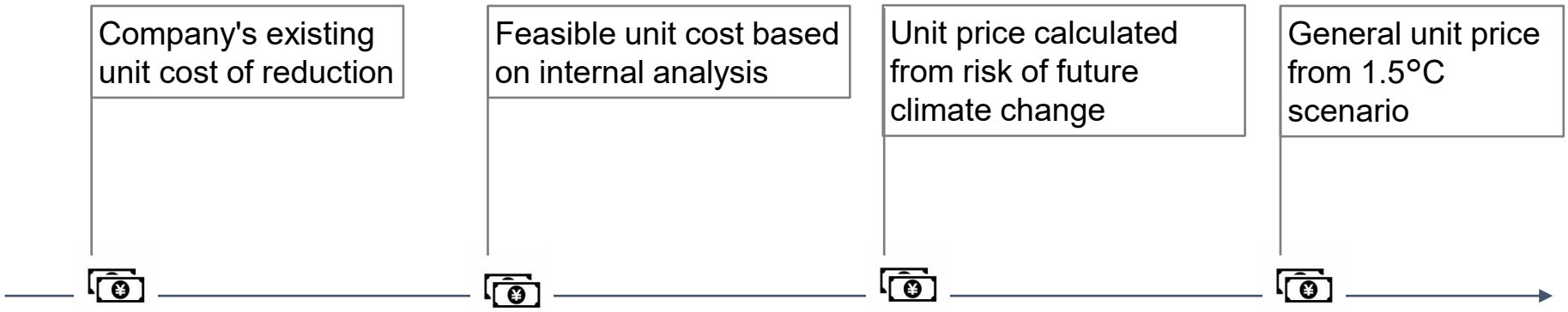
- Carbon pricing estimated internally by the company, used to promote investments in decarbonization efforts by companies
- A methodology used for corporate planning linked to climate change-related targets (carbon neutral/SBT/RE100)*, which can be used as an incentive to promote decarbonization, identify revenue opportunities and risks, or guide investment decisions



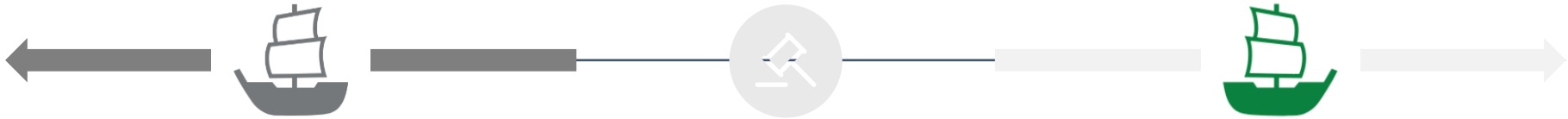
A major feature of the ICP is the ability to flexibly manipulate carbon prices in line with world trends and with the pace of internal decarbonization initiatives

- Companies can flexibly change their investment and business activities for decarbonization in light of social trends
- The flexibility to raise and lower prices also avoids corporate decision-making risks (i.e., once a decision to decarbonize is made, it must be followed through and can't be halted)

Pricing example



Price **change** example



If decarbonization is slowing ↓ :

Reduce the price ↓ and observe the status of decarbonization activities

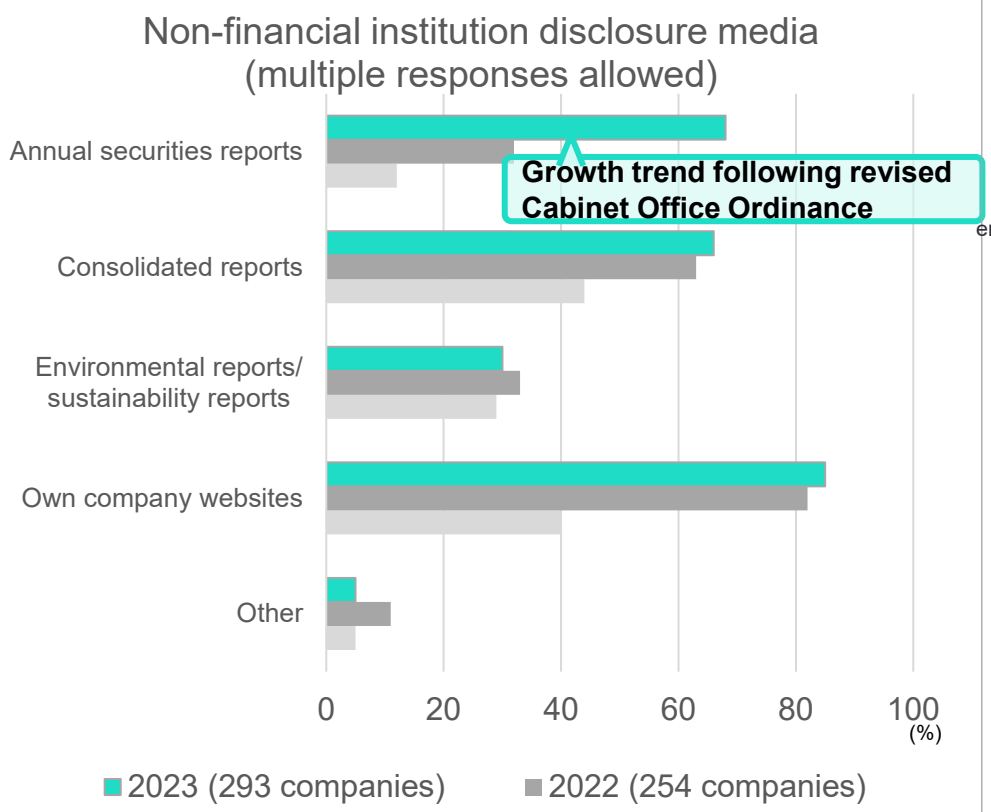
Decide upon ICP

If decarbonization is accelerating ↑ :

Increase the price ↑ and promote climate change management

Many companies in Japan disclose information on own company websites and consolidated reports, and an increasing number are also disclosing information in annual securities reports. It is important to share information with multistakeholders in an easily understood manner throughout all types of media

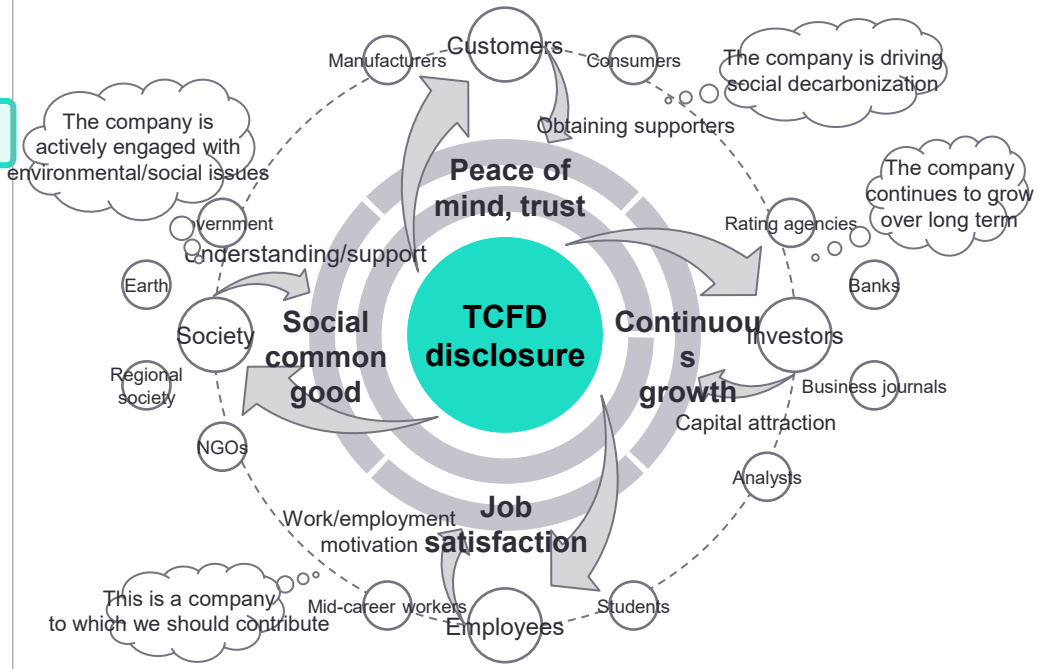
TCFD disclosure media selection



*TCFD Consortium conducts a survey of the TCFD response status of members each year. For 2023, 421 (100 financial, 321 non-financial) of 802 TCFD Consortium members responded.

Source: Created by MOE based on “FY 2023 TCFD Consortium Member Survey Result” (TCFD Consortium)

Dissemination of information to multistakeholders



It is important to disseminate information that is easy to understand throughout all types of media, in order to obtain understanding and trust from multistakeholders

In addition to involving management, it is important to change employee awareness. Policies on conducting training and providing information based on employee positions/roles are effective means of expanding climate change management internally

Plan policies based on expected role in climate change management, by position, year, department, job, etc.

	Management	Mid-ranking	New
Division A	Job A	Job A	Job A
	Job B	Job B	Job B
Division B	Job C	Job C	Job C
	…	…	…
Sustainability promotion department	…	…	…
Management planning department	…	…	…
Accounting department	…	…	…
IR department	…	…	…
…	…	…	…

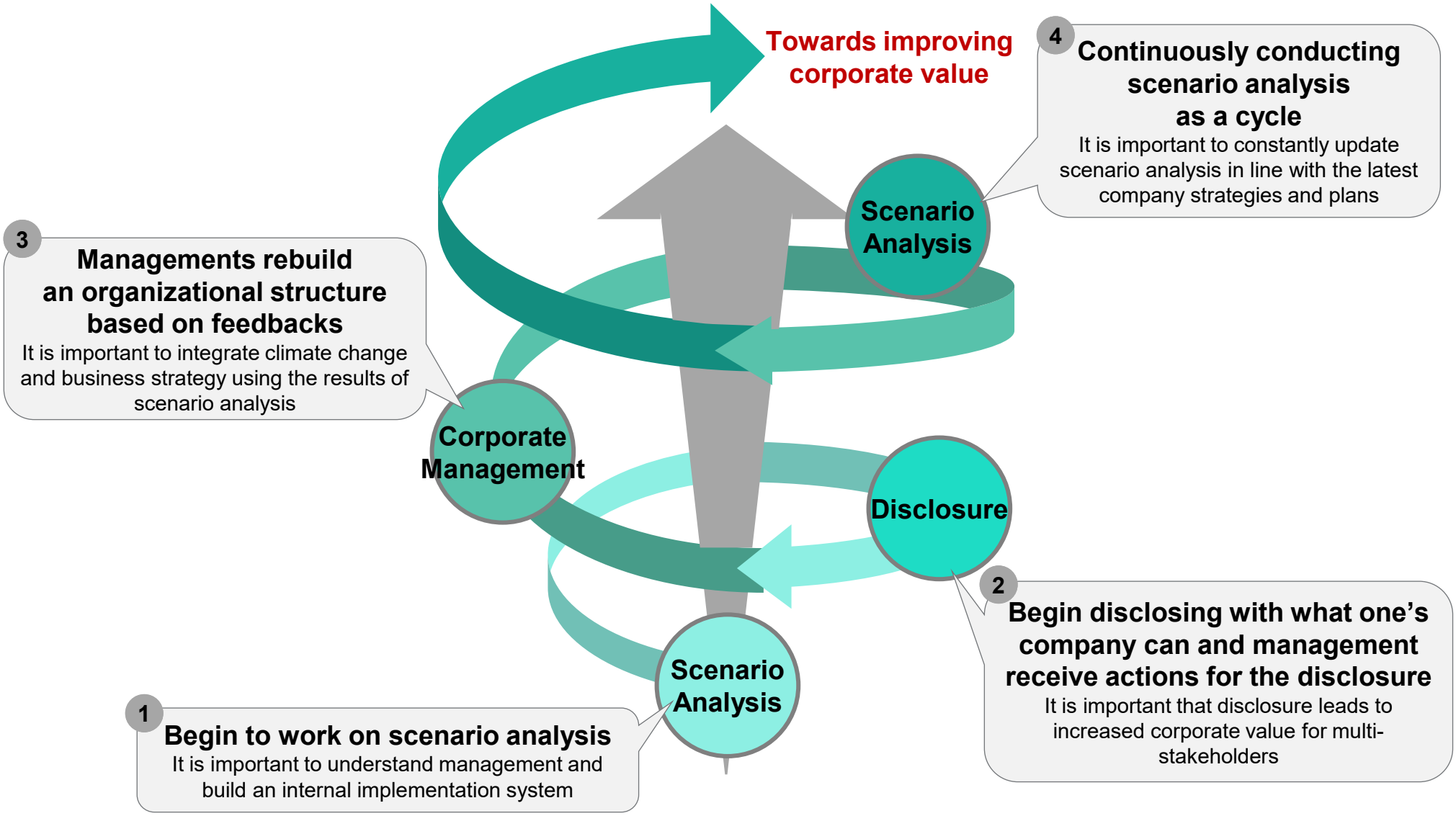
Goals	• Understand own role and significance of involving in climate change management • Propose autonomous practices and spontaneous improvements for own role

Steps for changing awareness and spreading climate change management

		Recognition Realize why climate change management is important	Understanding/desire Understand promoting climate change management	Knowledge Obtain knowledge required to promote climate change management	Taking action After obtaining knowledge, the employee then takes action	Taking root Recognize results, and promote reforms to ensure results continue over the long term
Employee status	Behavior	• Encounters the terms “climate change” and “decarbonization” at work	• Encounters the terms “climate change” and “decarbonization” in various media and is aware of trends	• Asks direct manager about contribution of own team	• Writes out what he/she can do	• Performs work toward achieving activity KPIs
	Thoughts/ feelings	• Has heard of it, but not in detail	• What policies does the company have on climate change management?	• How can department and employee himself/herself contribute? • What is competition doing?	• Difficult to find time, too busy with normal duties • Excluded from own duties?	• Achieving something? • On right track?
Challenges		• The significance and details of climate change management are not communicated	• Company climate change management policies are not understood	• Connections with work duties are not understood • Social demands and trends at other companies are not understood	• Climate-related KPIs have not been incorporated in the goal management and work processes of department and employee himself/herself	• No mechanism for reporting and evaluating activity progress • No mechanism for gathering individual suggestions
Example policies		• Describe climate change management using media that it easy to digest, such as comics and videos • Make use of company bulletins	• Communicated by management during company-wide events • Workshops • Distribute explanatory material on own company’s disclosure documents	• E-learning, seminars, departmental training • Connection with work duties explained by direct managers • Distribute materials summarizing trends among competitors	• Set activity KPIs • Reflect in goal management of department and employee himself/herself • Revise work procedures	• Review work evaluation system • Establish internal awards for climate change • Set opportunities for dialogue between management and employees

Conclusion

The purpose of scenario analysis is to integrate analysis results into management strategy and increase corporate value, and it is important to repeat the cycle of analysis → integration into management → disclosure → reflection of feedback in analysis



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In parallel with TCFD, organizations will also be required to work towards a TNFD nature-related disclosure framework which is conform to international targets

- TNFD recommendations, published in September 2023, conform to the Global Biodiversity Framework (GBF), while building on and integrating various existing scientific knowledge, frameworks and standards.
- TNFD is expected to make reference to international standards and national regulations while conforming to global targets. Organizations need to respond and prepare for the nature-related information disclosure along with TCFD.

TNFD Recommendations published in September 2023

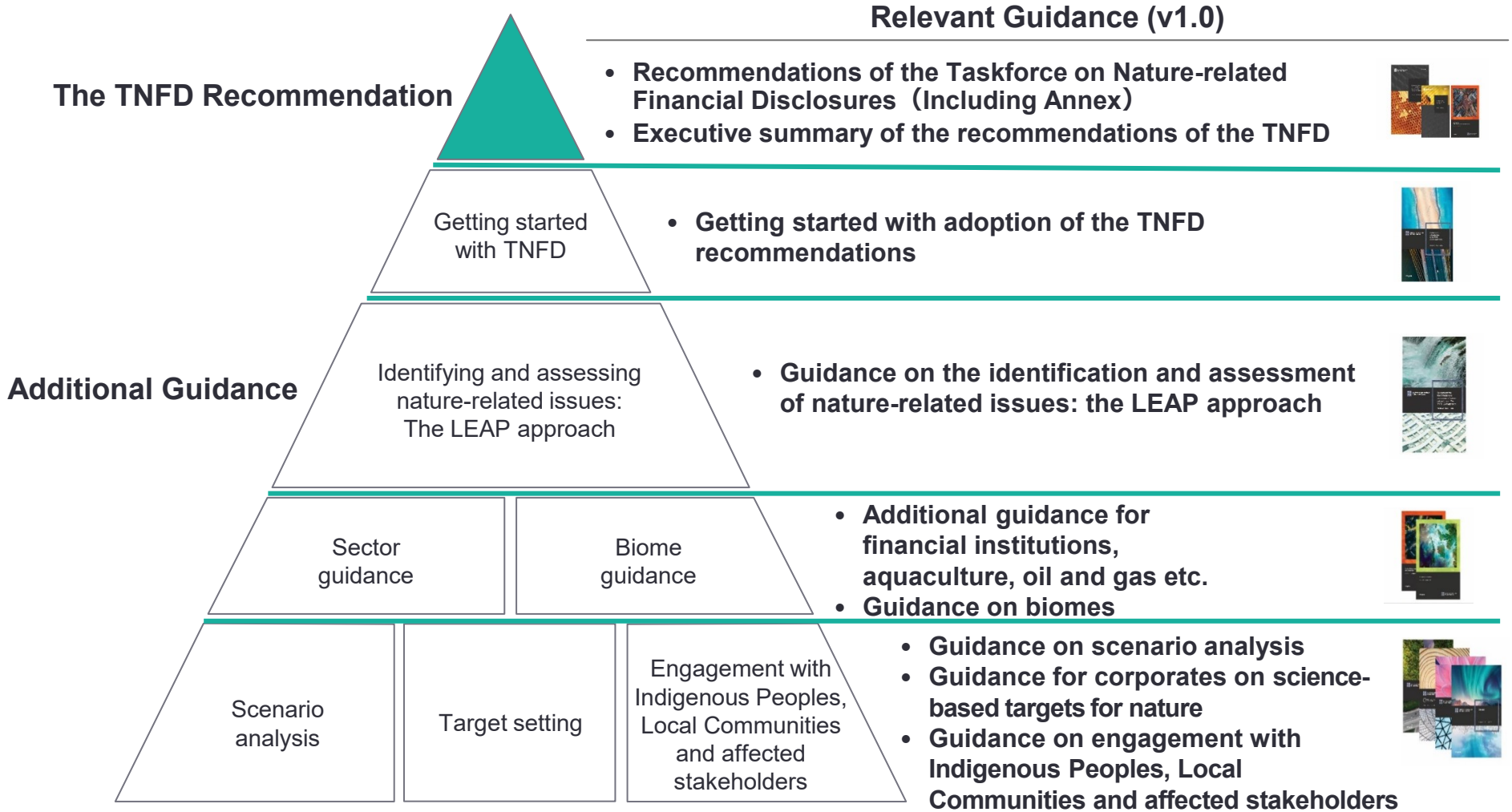
Scientific knowledge, framework and standards incorporated in TNFD recommendations

Source : TNFD「BOAD-LEVEL OVERVIEW TNFD In a Box version 1.0 December 2023」, 2023

Guidance Published by TNFD

The TNFD recommendations and additional guidance that have been published provide a framework for risk management and information disclosure to address evolving nature-related issues

■ The TNFD provides general guidance on disclosure recommendations (top of triangle in figure below), with additional detailed guidance. The additional guidance is intended to assist organizations in voluntarily responding to TNFD disclosure recommendations, but it is not mandatory for organizations.



Source : TNFD, Recommendations of the Taskforce on Nature-related Financial Disclosures September 2023

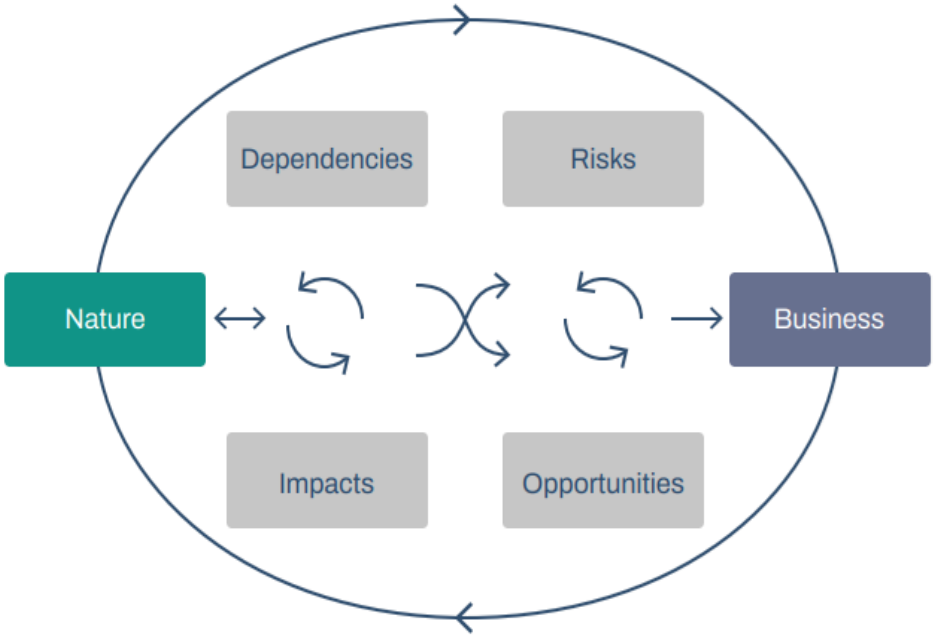
In TNFD, it is required to understand nature, and to evaluate, analyze and respond to the nature-related issues on dependencies, impacts, risks and opportunities

- Four concepts on dependencies, impacts, risks and opportunities are collectively referred as nature-related issues by TNFD. It is essential to evaluate dependencies and impacts on nature to assess the risks and opportunities to an organization.
- Disclosures should cover all four types of nature-related issues, as well as the organization's responses to them.

Nature-related Issues	Definition
Dependencies	Dependencies are **aspects of environmental assets and ecosystem services** that a person or an organisation relies on to function.
Impacts	Impacts on nature caused, or contributed to, by the organization. Impacts refer to a change in the state of nature (quality or quantity), which may result in changes to the capacity of nature to provide social and economic functions
Risks	Nature-related risks are **potential threats posed to an organisation** that arise from its and wider society's dependencies and impacts on nature
Opportunities	Nature-related opportunities are **activities that create positive outcomes for organisations and nature** through positive impacts or mitigation of negative impacts on nature.

Basic concept of nature-related issues (dependencies, impacts, risks and opportunities) according to TNFD

Organisations have dependencies and impacts on nature.
These give rise to nature-related risks and opportunities



Source : TNFD, Recommendations of the Taskforce on Nature-related Financial Disclosures September 2023

TNFD Disclosure Recommendation

The TNFD follows the language, structure and approach of the TCFD. The TNFD disclosure recommendations consist of four pillars (same as TCFD) and 14 recommended disclosures

■ Along the same four pillars of TCFD, TNFD provides 14 disclosure recommendations which incorporated with nature-related dependencies, impacts, risks and opportunities

Pillars	Governance	Strategy	Risk & impact management	Metrics & targets
Detail requirements	Disclose the organisation's governance of nature-related dependencies, impacts, risks and opportunities.	Disclose the effects of nature-related dependencies, impacts, risks and opportunities on the organisation's business model, strategy and financial planning where such information is material.	Describe the processes used by the organisation to identify, assess, prioritise and monitor nature-related dependencies, impacts, risks and opportunities.	Disclose the metrics and targets used to assess and manage material nature-related dependencies, impacts, risks and opportunities.
Recommended disclosures	A. Describe the board's oversight of nature-related dependencies, impacts, risks and opportunities.	A. Describe the nature-related dependencies, impacts, risks and opportunities the organisation has identified over the short, medium and long term.	A. (i) Describe the organisation's processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its direct operations.	A. Disclose the metrics used by the organisation to assess and manage material nature-related risks and opportunities in line with its strategy and risk management process.
	B. Describe management's role in assessing and managing nature-related dependencies, impacts, risks and opportunities.	B. Describe the effect nature-related dependencies, impacts, risks and opportunities have had on the organisation's business model, value chain, strategy and financial planning, as well as any transition plans or analysis in place.	A. (ii) Describe the organisation's processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its upstream and downstream value chain(s).	B. Disclose the metrics used by the organisation to assess and manage dependencies and impacts on nature.
	C. Describe the organisation's human rights policies and engagement activities, and oversight by the board and management, with respect to Indigenous Peoples, Local Communities, affected and other stakeholders, in the organisation's assessment of, and response to, nature-related dependencies, impacts, risks and opportunities.	C. Describe the resilience of the organisation's strategy to nature-related risks and opportunities, taking into consideration different Scenarios.	B. Describe the organisation's processes for managing nature-related dependencies, impacts, risks and opportunities.	C. Describe the targets and goals used by the organisation to manage nature-related dependencies, impacts, risks and opportunities and its performance against these.
		D. Disclose the locations of assets and/or activities in the organisation's direct operations and, where possible, upstream and downstream value chain(s) that meet the criteria for priority locations.	C. Describe how processes for identifying, assessing, prioritising and monitoring nature-related risks are integrated into and inform the organisation's overall risk management processes.	

Source : TNFD, Recommendations of the Taskforce on Nature-related Financial Disclosures September 2023

By utilizing the TCFD implementation experience and climate change-related countermeasures to date, it is possible to disclose and respond to natural capital and biodiversity related information through TNFD

- While the TNFD contains new elements compared to the TCFD, its starting point is the TCFD Framework, which ensures consistency in the approach to disclosure and is designed to enable organizations to address climate change and nature-related risks in parallel
- For TNFD, the TCFD implementation experience and climate change related countermeasures should be utilized and extended to assess natural capital and biodiversity related information

Commonalities between TCFD and TNFD	New elements in TNFD
• The disclosure recommendations are based on a **four pillars approach**. • The TNFD disclosure recommendations build on the **11 TCFD disclosure recommendations** as a starting point. • **Consistent with ISSB's global approach** of sustainability standards. • They **focus on opportunities** as well as risks. • **The entire value chain is covered.** (The "scope1, 2, 3" concept of climate change, or direct / upstream / downstream)	• It deals with comprehensive nature-related issues, including climate change. • **Analysis of location and investigation of relationship with biomes** are important. • Additional **"how-to" guidance** for nature-related risk assessment are published. **(LEAP approach)** • In addition to physical risks and transition risks, nature-related risks also include **systemic risks affected by whole society**. • Specific guidance for **priority sectors** have been developed. • **A conceptual structure and language system for helping to improve the understanding** on nature are presented to market participants.

Comparing TCFD and TNFD, the four pillars remain unchanged, while the content of the disclosure recommendations varies, and new responses are required

■ Although “Risk management" in the TCFD is referred to as “Risk & impact management" in the TNFD, the structure of the four pillars of both the TNFD and TCFD disclosure recommendation is the same. However, differences in the content of the disclosure recommendations should be noted.

Four Pillars	Differences (New Response Required)
Governance	■ In addition to risks and opportunities, board oversight and clarification of management's role on **nature-related dependencies and impacts** are required ■ Governance C) is added, which requires **explanations on the organization’s human rights policies and activities with respect to indigenous peoples, local communities and affected stakeholders**.−①
Strategy	■ Same as Governance, in addition to risks and opportunities, explanations of effects on strategy, transition planning and analysis on **nature-related dependencies and impacts** are required. ■ **Unlike the TCFD, no common numerical scenario is available in the scenario analysis. Thus, it is required to consider various scenarios individually by the organizations themselves**. ■ **Identification of natural dependencies and impact points in direct operations and value chains** are required.−②
Risk & impact management	■ **Identification and prioritization of nature-related dependencies, impacts, risks and opportunities in direct operations and value chains** are required.−③
Metrics & targets	■ **Disclosure of indicators to manage dependencies and impacts is required**, as well as risks and opportunities. ■ **Unlike the TCFD, no common numerical indicator is available. Thus, selection of the index to be used is necessary.**

TCFD Recommendations

Pillars	Governance	Strategy	Risk Management	Metrics and Targets
Detail requirements	Disclose the organization’s governance around climate-related risks and opportunities.	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization’s businesses, strategy, and financial planning where such information is material.	Disclose how the organization identifies, assesses, and manages climate-related risks.	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.
Recommended disclosures	a) Describe the board’s oversight of climate-related risks and opportunities.	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	a) Describe the organization’s processes for identifying and assessing climate-related risks.	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) Describe management’s role in assessing and managing climate-related risks and opportunities.	b) Describe the impact of climate related risks and opportunities on the organization’s businesses, strategy, and financial planning.	b) Describe the organization’s processes for managing climate-related risks.	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
		c) Describe the resilience of the organization’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower Scenario	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization’s overall risk management.	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

: Subject requiring additional response in TNFD disclosure rather than TCFD disclosure

TNFD Recommendations

Pillars	Governance	Strategy	Risk & impact management	Metrics & targets
Detail requirements	Disclose the organisation’s governance of nature-related s dependencies, impacts, risks and opportunities.	Disclose the effects of nature-related dependencies, impacts, risks and opportunities on the organisation’s business model, strategy and financial planning where such information is material.	Describe the processes used by the organisation to identify, assess, prioritise and monitor nature-related dependencies, impacts, risks and opportunities.	Disclose the metrics and targets used to assess and manage material nature-related dependencies, impacts, risks and opportunities.
Recommended disclosures	A. Describe the board’s oversight of nature-related dependencies, impacts, risks and opportunities.	A. Describe the nature-related dependencies, impacts, risks and opportunities the organisation has identified over the short, medium and long term. ③	A. (i) Describe the organisation’s processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its direct operations.	A. Disclose the metrics used by the organisation to assess and manage material nature-related risks and opportunities in line with its strategy and risk management process.
	B. Describe management’s role in assessing and managing nature-related dependencies, impacts, risks and opportunities. ①	B. Describe the effect nature-related dependencies, impacts, risks and opportunities have had on the organisation’s business model, value chain, strategy and financial planning, as well as any transition plans or analysis in place.	A. (ii) Describe the organisation’s processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its upstream and downstream value chain(s).	B. Disclose the metrics used by the organisation to assess and manage dependencies and impacts on nature.
	C. Describe the organisation’s human rights policies and engagement activities, and oversight by the board and management, with respect to Indigenous Peoples, Local Communities, affected and other stakeholders, in the organisation’s assessment of, and response to, nature-related dependencies, impacts, risks and opportunities.	C. Describe the resilience of the organisation’s strategy to nature-related risks and opportunities, taking into consideration different Scenarios.	B. Describe the organisation’s processes for managing nature-related dependencies, impacts, risks and opportunities.	C. Describe the targets and goals used by the organisation to manage nature-related dependencies, impacts, risks and opportunities and its performance against these.
		D. Disclose the locations of assets and/or activities in the organisation’s direct operations and, where possible, upstream and downstream value chain(s) that meet the criteria for priority locations. ②	C. Describe how processes for identifying, assessing, prioritising and monitoring nature-related risks are integrated into and inform the organisation’s overall risk management processes.	

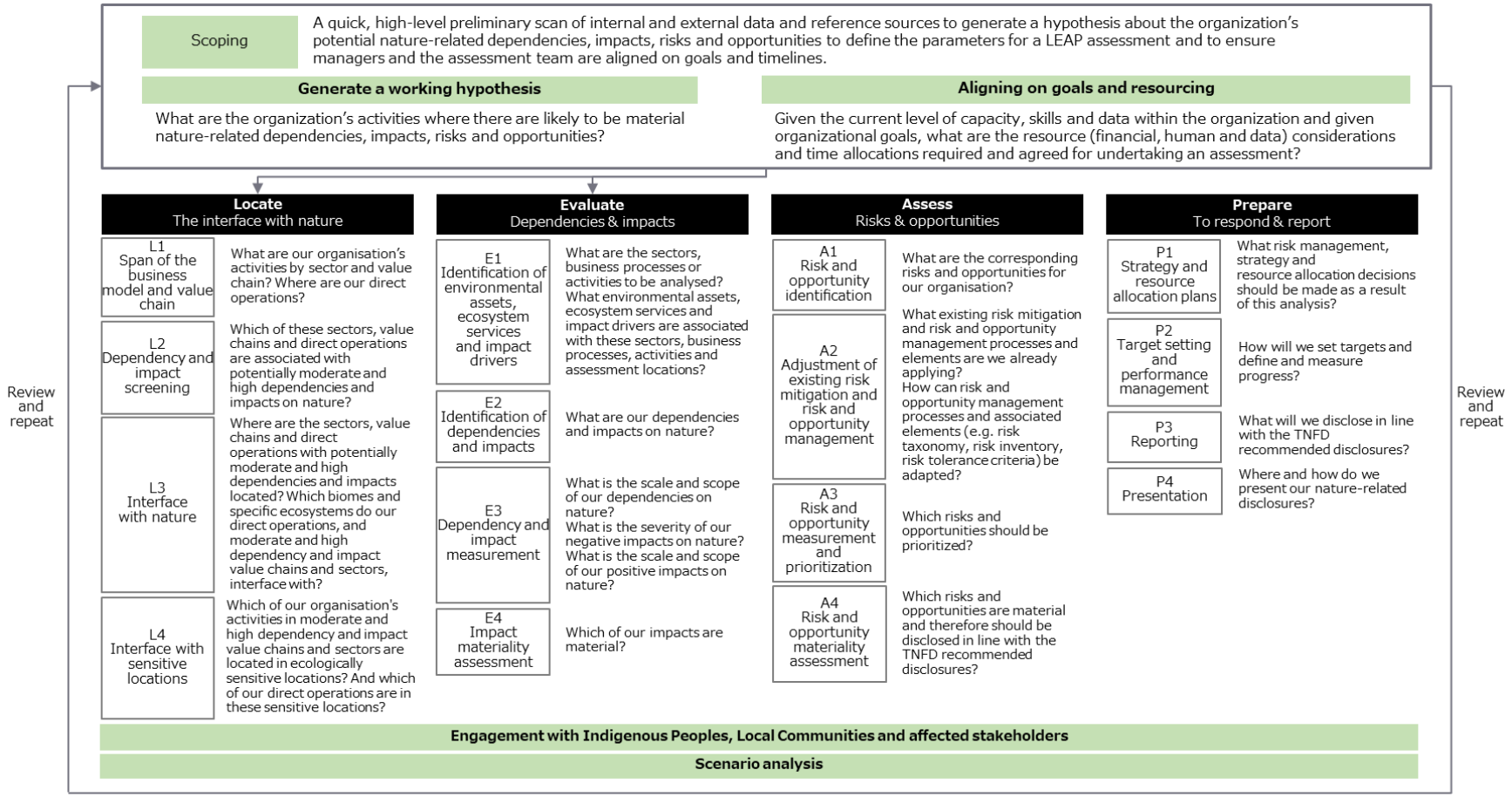
: Subject requiring additional response in TNFD disclosure rather than TCFD disclosure

: Subject require additional disclosures in the TNFD independently

* Underlined part: Additional disclosure required by TNFD

The LEAP approach has been proposed for the identification and assessment of nature-related issues in TNFD

- The LEAP approach, divided into **Scoping** and **Locate**, **Evaluate**, **Assess** and **Prepare** phases, is useful in identifying and evaluating nature-related dependencies, impacts, risks and opportunities. The LEAP approach can be used to prepare for disclosure corresponding to TNFD.
- However, the use of the LEAP approach is not mandatory and is only one of the approaches to facilitate disclosure, according to TNFD.



Source : TNFD, Recommendations of the Taskforce on Nature-related Financial Disclosures September 2023

The relationship between the TNFD recommendations and other related nature capital disclosure standards (CSRD ESRS)

The consistency is ensured in approaches and definitions between the development of the ESRS and TNFD recommendations and guidance.

Main similarities between TNFD and ESRS

- All 14 disclosure items recommended by the TNFD are addressed by the ESRS, emphasizing the need to disclose nature-related impacts, risks, opportunities, and dependencies that pose significant risks. Furthermore, the disclosure items of both frameworks correspond to the four pillars of the IFRS standards.
- Both frameworks enable a double materiality approach, and the materiality assessment of the ESRS can be covered using the LEAP approach. Additionally, consistency is ensured in the related indicators.

	Governance	Strategy	Risk & Impact Management	Metrics & Targets
TNFD Disclosure Recommendations (partial excerpt)	Disclose the organization's governance, as well as its human rights policies and engagement activities related to the assessment and management of nature-related dependencies, impacts, risks and opportunities.	Disclose the effects of nature-related dependencies, impacts, risks and opportunities on the organization's business model, strategy and financial planning where such information is material.	Describe the processes used by the organization to identify, assess, prioritize and monitor nature-related dependencies, impacts, risks and opportunities.	Disclose the indicators and targets used to assess and manage significant dependencies, impacts, risks, and opportunities related to nature. Align with the Kunming-Montreal Biodiversity Framework targets.
ESRS2 and ESRS E4 (partial excerpt)	Governance processes, management methods, and procedures established to monitor, manage, and oversee sustainability-related matters (ESRS2 Section 2 Governance). Developed or maintained through a continuous consultation process while obtaining balanced opinions from all relevant stakeholders, ensuring no group has undue authority or veto power (ESRS E4E4-2 para.AR.17 (b)).	How business strategy or sustainability-related matters and their impact on the value chain are considered in the business strategy and operations; how the assessment of significant impacts, risks, and opportunities connects to the strategy and business model (ESRS2 Section 3 Strategy). Consideration of the points of interaction with nature and related activity locations within the business and value chain (ESRS E2 para.AR 5(a)).	Processes and assessments to identify significant impacts, risks, and opportunities, including sustainability-related information (see ESRS2 Section 4.1). Managing significant sustainability-related matters (ESRS2 Section 4.2). Companies shall disclose the investigation process for identifying significant impacts, risks, and dependencies (E4 para.17 (a) (b)).	Disclosure of information on indicators and targets related to sustainability-related matters (ESRS2 Section 5 Metrics and Targets). Whether the targets are aligned with the Kunming-Montreal Biodiversity Framework, the 2030 EU Biodiversity Strategy, and other biodiversity and ecosystem-related national policies and laws (ESRS E4-4 para.32 (b)).

※**ESRS2** sets out disclosure requirements applicable to all sustainability topics, while **ESRS E4** focuses on how companies impact biodiversity and ecosystems

Source：TNFD/EFRAG,「TNFD-ESRS CORRESPONDENCE MAPPING」, 2024

The relationship between the TNFD recommendations and other related nature capital disclosure standards (GRI)

A high level of consistency in language, approaches, and definitions through close collaboration in the development of the TNFD recommendations and guidance, as well as the continuous updates of the GRI standards is being ensured.

Main similarities between TNFD and GRI

- A high level of alignment is ensured between the TNFD impacts on biodiversity and measuring changes in the state of nature. recommendations and the GRI standards in terms of nature-related concepts and definitions, materiality approaches, and sector-specific indicators. Specifically, both take in common the definitions of the direct drivers of biodiversity and nature loss provided by IPBES. The TNFD recommendations are also widely reflected in the GRI standards.
- The TNFD's LEAP approach is referenced in the GRI standards useful for identifying

※The GRI (Global Reporting Initiative) is an independent non-profit organization and standard setter that designs the GRI standards for evaluating and reporting economic, environmental, and social impacts.

High-level comparison of differences in TNFD and GRI reporting approaches

Topic	Issues covered and scope	Application of materiality	Value chain	Location of nature-related issues	Engagement with Indigenous Peoples, Local Communities and affected Stakeholders
TNFD	It is recommended to disclose the nature-related interdependencies, impacts, risks, and opportunities, including land, sea, freshwater, and atmosphere, emphasizing the conservation of biodiversity and the sustainability of human societies.	It is recommended to adopt a materiality approach based on the ISSB's definition of "financial materiality" to evaluate nature-related information, and to refer to the GRI's impact-focused approach as needed.	It requires explaining the scope of nature-related assessments and disclosures across direct operations and the entire value chain, identifying, assessing, and disclosing significant issues upstream and downstream, considering data and capability limitations.	TNFD recommends that organizations place the geographic relationship with nature at the center of their assessments and disclosures, identify and report dependencies and impacts, include the locations of impact drivers, disaggregate information to improve data accuracy, and identify "important locations" and "sensitive locations" within "priority areas."	TNFD encourages companies and financial institutions to actively engage with affected stakeholders, including indigenous peoples and local communities, in the assessment and management of nature-related dependencies, impacts, risks, and opportunities, and provides additional guidance on this matter.
GRI	It focuses on the impacts on the economy, environment, and people, with organizations reporting on the topics representing their most significant impacts in these areas. While nature-related dependencies, including biodiversity, are not directly targeted, impacts are partially covered by GRI 101.	The materiality approach focuses on impacts, enabling organizations to report on their most significant impacts on the economy, environment, and people (including human rights impacts). The GRI standards define the topics representing the organization's most significant impacts as material topics.	It covers the entire value chain of the organization, and GRI 101: Biodiversity 2024 expects disclosures on biodiversity to cover the organization and its entire value chain, including requirements and recommendations for reporting impacts from the organization's activities and business relationships.	It focuses on the sites of organizations with the most significant impacts on biodiversity, particularly those in ecologically sensitive areas. Understanding the local context is crucial, and GRI 101 requires information on the location and scale of sites, and for the supply chain, information at the country or regional level. A commonality with the TNFD is the need for disclosing information on sites with significant impacts on biodiversity.	GRI 101 uses the same criteria as the TNFD to identify ecologically sensitive areas and defines stakeholders potentially affected by the organization's activities as individuals or groups. GRI 2: General Disclosures 2021 and GRI 101 focus on engagement with stakeholders, including local communities and vulnerable groups, and include indigenous peoples. These definitions can be found in the glossary of the GRI standards.

Source: TNFD/GRI,「Interoperability mapping between GRI Standards and the TNFD Disclosure Recommendations and metrics」, 2024

The relationship between the TNFD recommendations and other related nature capital disclosure standards (SBTN)

While TNFD and SBTN objectives are “disclosure” and “science-based target setting” respectively, they are designed with high interoperability, such as having 8 outputs in common

Contents Related to Goal Setting in TNFD

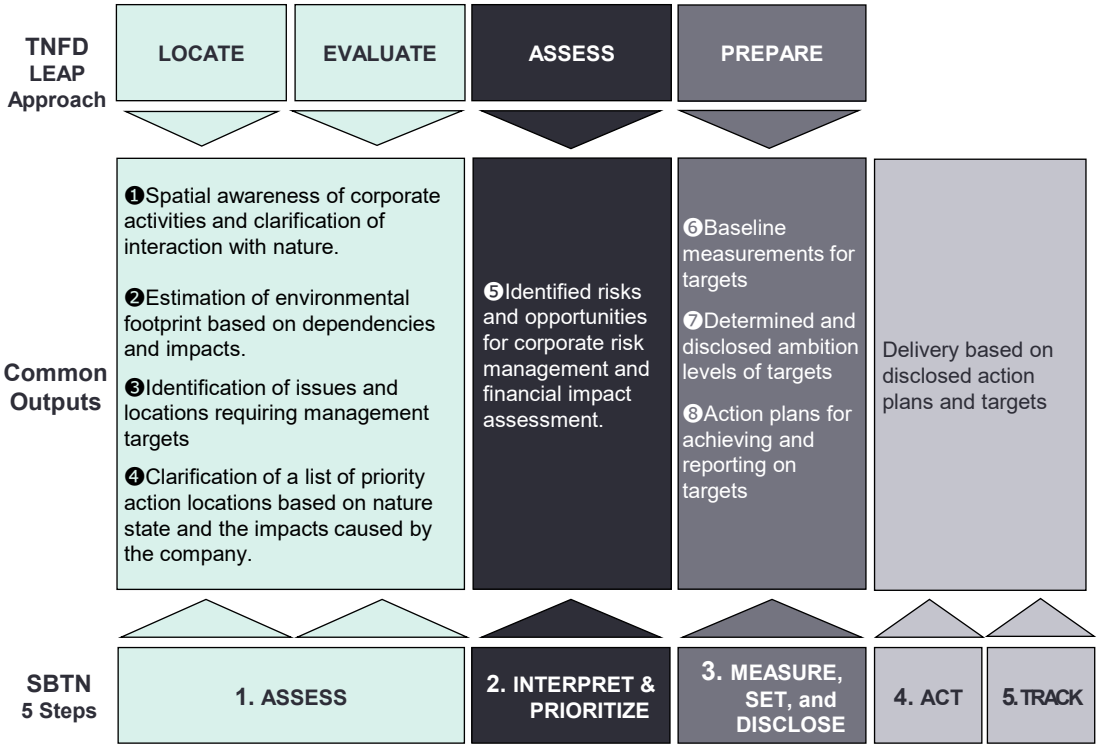
- TNFD provides a framework for evaluating and analyzing nature-related dependencies, impacts, risks, and opportunities, and for disclosing nature-related financial information. SBTs for Nature ※, on the other hand, is a framework for setting measurable, actionable, and time-bound targets based on scientific evidence.
- The SBTs for Nature approach is recommended as one of the goal-setting methods included in TNFD.

TNFD Recommendations	
Strategy B	Explain the impact of nature-related dependencies, impacts, risks, and opportunities on the organization's business model, value chain, strategy, financial plans, and **transition plans and analysis**.
Metrics & Targets C	Describe the **targets and goals** used by the organization to manage nature-related dependencies, impacts, risks, and opportunities, and its performance against these.
TNFD LEAP Approach	
Prepare P2: Target Setting and Performance Management	How to **set targets**, define progress, and measure it:

※The SBTN (Science Based Targets Network) provides a framework for setting science-based targets related to nature.

8 Common Outputs from TNFD LEAP Approach and SBTs for Nature Approach

- There are 8 common outputs between the TNFD LEAP approach and the 5 steps of SBTs for Nature, indicating a relationship where necessary data and analytical outputs can be mutually utilized.
- Both frameworks are coordinated to ensure consistency in core definitions, data requirements, analytical outputs, and stakeholder engagement related to impact management.



Source: TNFD,「Guidance for corporates on science-based targets for nature」, 2023

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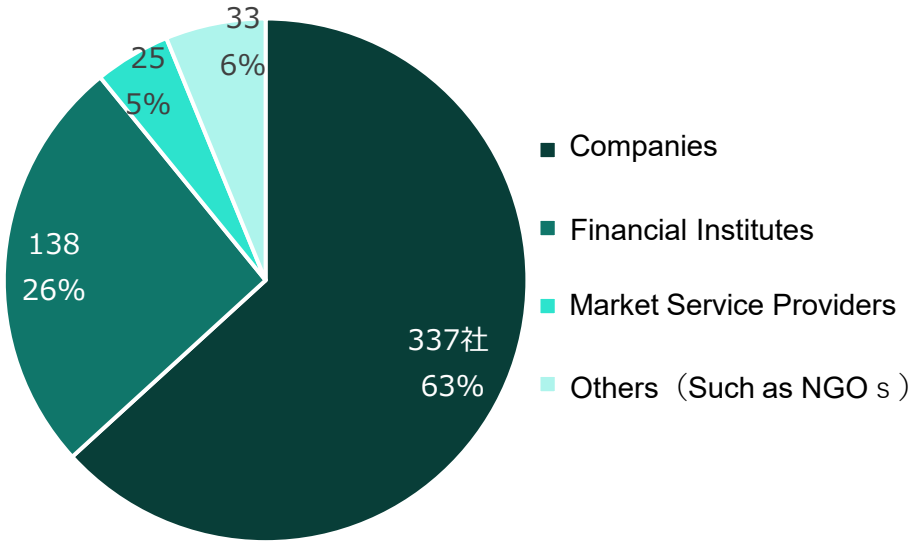
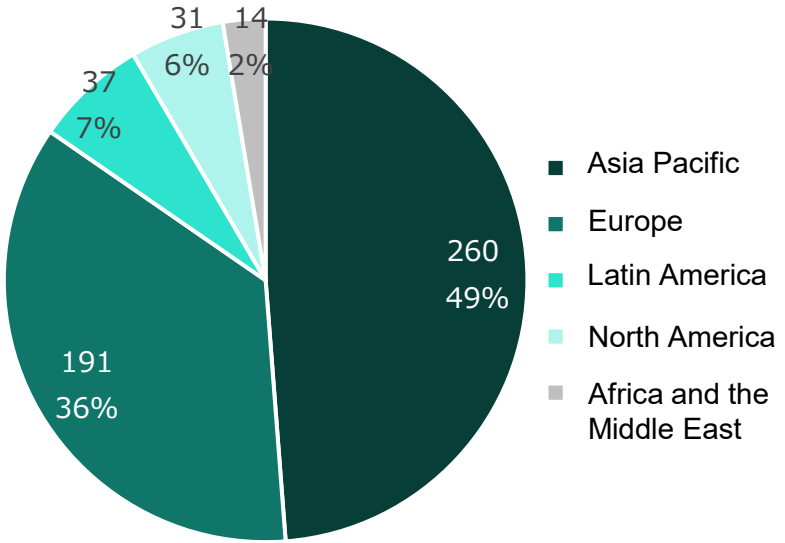
The number of TNFD Early Adopters in Japan is the highest in the world at 141 (as of 1 February 2024) and is expected to increase

- As of 1 February 2025, 533 companies had adopted the TNFD disclosure recommendations and announced their intention to publish TNFD-compliant disclosures, of which 141 companies, or more than one quarter, are Japanese companies.
- They include major listed companies, over 100 financial institutions, banks, insurance companies and major market intermediaries such as stock exchanges.

Breakdown of TNFD Adopters by business category



Breakdown of TNFD Adopters by regions



出所：TNFD “Press release320 companies and financial institutions to start TNFD nature-related corporate reporting”（2024）

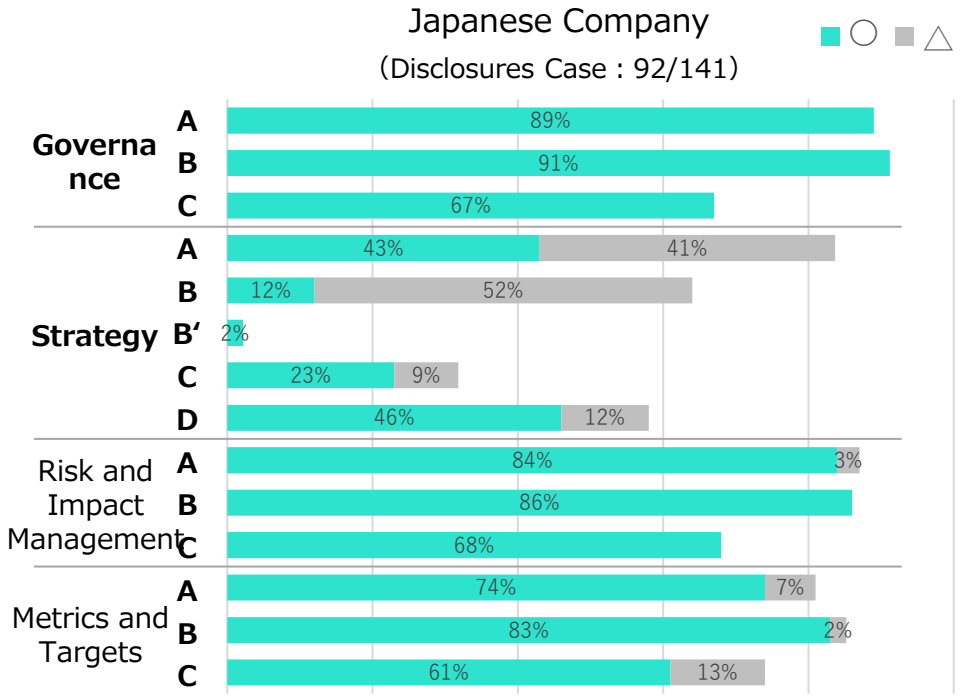
The maturity survey revealed that while progress has been made in governance and risk management disclosure, issues related to strategy (especially transition planning) are evident. Enhanced disclosure will be required in the future.

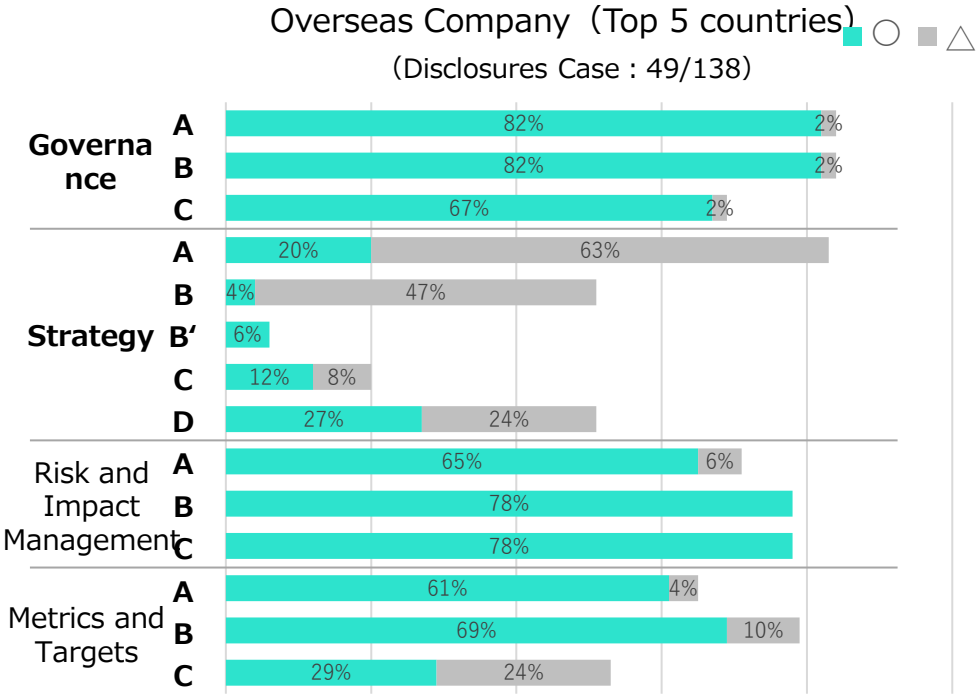
Items for which TNFD disclosure is progressing in Japanese companies

- Overall, Japanese companies tend to disclose more than their foreign counterparts
- The rate of disclosure of governance and risk management items is high, and a certain degree of progress has been made in establishing systems for nature-related initiatives.

TNFD Disclosure Issues for Japanese Companies

- Governance: Challenges exist in identifying and engaging stakeholders, including indigenous peoples and local communities
- (C)Strategy: Overall disclosure rate and maturity are low, with particular challenges in transition planning (B') and ensuring resilience based on multiple scenarios (C).
- Risk and Impact Management: High overall disclosure rate, but lagging behind foreign companies in integration into enterprise-wide risk management (C)
- Metrics and Targets: There are issues regarding the setting of targets for materiality items, the status of achievement, and monitoring and other mechanisms (C).





The survey was conducted on TNFD/sustainability reports and TNFD disclosures on their websites for Japanese and overseas adaptors in the top five TNFD adaptor regions (United Kingdom, Taiwan, France, United States, and Australia). The results of the survey are shown in avobe.

Section 3-2. presents examples of domestic and foreign TNFD disclosures and perspectives on disclosure. Companies are encouraged to keep a close eye on how investors judge the content of their disclosures and fulfil their own accountability

- The content of '3-2 Case Examples of TNFD disclosure,' is based on the survey of TNFD disclosure cases, and includes a comparison with TCFD, three new items, and examples of disclosure across the four pillars.
- Issues and examples of approaches and perspectives required for disclosure are identified from the interviews conducted with disclosing companies and investors/financial institutions.
- As this information provides examples of disclosures as at the date of publication of this guidance, companies are advised to monitor closely how investors assess the content of their disclosures and their own accountability.

TNFD Recommend Disclosures

11 items taken over from TCFD
3 new items added to TNFD

Governance	Strategy	Risk and Impact Management	Metrics and Targets
Disclose the organisation's governance of nature-related dependencies, impacts, risks and opportunities	Disclose the effects of nature-related dependencies, impacts, risks and opportunities on the organisation's business model, strategy and financial planning where such information is material.	Describe the processes used by the organisation to identify, assess, prioritise and monitor nature-related dependencies, impacts, risks and opportunities.	Disclose the metrics and targets used to assess and manage material nature-related dependencies, impacts, risks and opportunities.
A. Describe the board's oversight of nature-related dependencies, impacts, risks and opportunities.	A. Describe the nature-related dependencies, impacts, risks and opportunities the organisation has identified over the short, medium and long term	A(i) Describe the organisation's processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its direct operations.	A. Disclose the metrics used by the organisation to assess and manage material nature-related risks and opportunities in line with its strategy and risk management process
B. Describe management's role in assessing and managing nature-related dependencies, impacts, risks and opportunities	B. Describe the effect nature-related dependencies, impacts, risks and opportunities have had on the organisation's business model, value chain, strategy and financial planning, as well as any transition plans or analysis in place.	A(ii) Describe the organisation's processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its upstream and downstream value chain(s)	B. Disclose the metrics used by the organisation to assess and manage dependencies and impacts on nature
C. Describe the organisation's human rights policies and engagement activities, and oversight by the board and management, with respect to Indigenous Peoples, Local Communities, affected and other stakeholders, in the organisation's assessment of, and response to, nature-related dependencies, impacts, risks and opportunities.	C. Describe the resilience of the organisation's strategy to nature-related risks and opportunities, taking into consideration different scenarios .	B. Describe the organisation's processes for managing nature-related dependencies, impacts, risks and opportunities	C. Describe the targets and goals used by the organisation to manage nature-related dependencies, impacts, risks and opportunities and its performance against these
	D. Disclose the locations of assets and/or activities in the organisation's direct operations and, where possible, upstream and downstream value chain(s) that meet the criteria for priority locations.	C. Describe how processes for identifying, assessing, prioritising and monitoring nature-related risks are integrated into and inform the organisation's overall risk management processes.	

Source : Taskforce on Nature-related Financial Disclosures (TNFD) Recommendations

Kyuden Group set up two unique scenarios, analyzed “dependencies and impacts on nature” and “level of societal/policy interest” for each natural capital, and identified forest regeneration and due diligence as risk items.

1 Kyuden Group set up two unique scenarios for 2050, namely ”**Status Quo**” scenario and **Nature Positive Transition**” scenario.

2050 Scenarios	
Status Quo Scenario	**Nature Positive Transition Scenario**
• Globally, both natural capital and carbon neutrality continue under the current legally binding frameworks set by national governments, with no further regulatory strengthening, and private companies do not advance their measures and initiatives.	• Globally, both natural capital and carbon neutrality are achieved according to internationally set goals, with national governments strengthening regulations and private companies sufficiently advancing their measures and initiatives.

2 For each of the two scenarios set up, Kyuden Group analyzed the “**dependencies and impacts on nature**” and “**level of societal/policy interest**” for each natural capital (land, water, supply chain, nature conservation/restoration), and identified **forest regeneration and mandatory due diligence** as risks with **financial implications**.

		The current situation	2050 scenario: Status Quo Scenario	2050 scenario: Nature Positive Transition Scenario
Land	Status	• Regarding land use, new power stations are being developed based on environmental regulations and the consent of local communities. • Existing power stations continue to be used for thermal power, nuclear power, hydroelectric power, geothermal power, and biomass power. On the other hand, land use for solar power and wind power (both onshore and offshore) continues to increase with the development of renewable energy sources.	• The land use of existing power stations will be maintained. For thermal power generation, land use will not change as high-efficiency thermal power with CCUS or hydrogen/ammonia co-firing/dedicated firing will replace current thermal power stations at the same locations. Additionally, for biomass, the installation of co-firing facilities in existing equipment (including thermal power stations) will not lead to an increase in land use. • On the other hand, new developments in renewable energy (hydropower, geothermal, solar, onshore wind, offshore wind) will lead to an increase in land use. • Since the current regulations are maintained, there are no changes to the restrictions on land use for the development of new power stations. • Land use increases with new developments in solar and wind power. On the other hand, due to the limited suitable sites for new developments, land use for hydropower and geothermal remains only slightly increased.	• Regulations on land use will be strengthened to maintain and improve the natural state, and land use for development will be strictly limited. • Regarding renewable energy, for solar power, power stations that engage in inappropriate land use will be abolished, and all power stations will be based on appropriate land use. For offshore wind power, considerations for the impact on marine ecosystems in marine use will be strengthened, but at the same time, projects for the regeneration of large algae around power generation facilities and their commercialization (blue carbon projects) will also progress. On the other hand, for onshore wind power, similar forest regeneration (※) near the development site is a condition for forest development, but since suitable sites that meet these conditions are limited, new development is becoming difficult. Hydropower and geothermal power are facing strict development restrictions, making new
	Evaluation: interest in society/policies	Low • In Japan, the need for consideration of nature in land use is mainly limited to public nature reserves, and overall, there is not a high level of interest from society.	Middle • Although regulations on forest development are slightly strengthened, there are no significant changes in land use regulations, and the level of interest from society is moderate.	Very High • From the perspective of ecosystem conservation, forest development will be strictly limited, and the level of interest from society will be very high.
	Evaluation: dependencies and impacts on nature	High • Regarding terrestrial land conversion, the impact of solar power stations is significant.	High • Regarding terrestrial land conversion, there is no change in the significant impact of solar power stations.	Low • All power stations will be based on appropriate land use. Additionally, as regulations on land use become stricter, converting land from forests and other areas will become difficult, so new developments will only have a small impact on 'land conversion'

・ Risks in the status quo scenario : blue , Risks in the nature-positive transition scenario : green
・（※） Forest regeneration and due diligence are risk items identified through scenario analysis. Other items are evaluated as having a significant(“High)or very significant(“Very High”)impact or dependency on natural capital.

3 In addition to the items assessed as high risks on the heat map (High、Very High) regarding the dependencies and impacts related to natural capital, items identified through scenario analysis (**forest regeneration and mandatory due diligence**) were also assessed for their **financial impact** as risk items.

	Classification	Type	Risk Overview	Financial Impact	
Nuclear Power (Fuel Procurement)	Physical risk	Acute	Landslides and subsidence due to land conversion and fires from uranium mining	Deterioration of financial balance due to global uranium price increase. The proportion of uranium costs in nuclear power generation costs is small, so the financial risk is evaluated under regulatory risk as the impact is unlikely to be significant.	1~10 billion yen
		Chronic	Degradation and fragmentation of terrestrial ecosystems, invasion of alien species, and adverse effects on local vegetation and vegetation environments due to land conversion from mining operations. Depletion of aquifers due to excessive water use in mining. Operational disruptions due to increased severity and frequency of droughts. Emission of greenhouse gases, release of toxic substances into the atmosphere, adverse.		
	Transition risk	Regulatory	Increased fuel procurement costs due to the burden on miners, etc., for procuring greenhouse gas emission allowances for indirect greenhouse gas emissions, including those from uranium mining processes.		
			Mandatory due diligence on natural impacts up to the upstream end of the supply chain.(※)	Investigation and disclosure costs	Less than 1 billion yen
Hydro power	Physical risk	Acute	Mandatory due diligence on natural impacts up to the upstream end of the supply chain. Burden incurred due to changes in suppliers, etc., according to the results of such changes.	Restoration costs and costs for securing alternative power sources	1~10 billion yen
Geothermal	Transition risk	Regulatory	Obligation for forest regeneration in geothermal power generation involving forest development. (※)	Forest regeneration costs	Less than 1 billion yen

Source :「Kyuden Group TNFD Report 2024」（https://www.kyuden.co.jp/var/rev0/0582/0219/UTbhRXp6.pdf ）(accessed on February 3, 2025)

TNFD disclosure examples (scenario analysis)

Shimizu Corporation is conducting scenario analysis using Taskforce on Nature-related Financial Disclosures (TNFD) illustrative scenarios. The company is organizing the potential impacts of risks and opportunities, along with the timing and responses for each event, across its upstream, downstream, and direct operations.

1

Among the **TNFD's 4 default nature-risk scenarios**, "Shimizu used **Scenario 1: Ahead of the game"** (top left), which presents a worldview where there is strong momentum to protect and restore nature, and **"Scenario 3: Sand in the gears"** (bottom right), depicting a worldview where nature is deteriorating and societal interest is waning.

2

The company has identified and categorized events for each segment of its business scope—upstream, downstream, and direct operations—**into risks or opportunities, detailing the potential impact on its business for each scenario**. The company evaluates the **impact and timing of each identified risk and opportunity and documents its responses, including those that are already in place.**

(3) シナリオ分析に基づくリスクと機会の特定

当社事業に関連する自然（生態系サービス）への依存と影響を踏まえ、自然関連のリスクと機会を特定するシナリオ分析を実施しました。TNFD 提言が推奨する 4 象限シナリオのうち、自然を保護し回復する機運の高い世界観である「シナリオ 1：一歩先行する」と、自然が劣化し社会の関心も低下している世界観である「シナリオ 3：噛み合わない現状」を使用しました（図 3）。シナリオ分析では、TCFD ワーキンググループメンバーのほか、財務や当社事業の上流（調達）から下流（副産物管理）を含む部門からメンバーを選定し、複数回のワーキングにより整理しました。

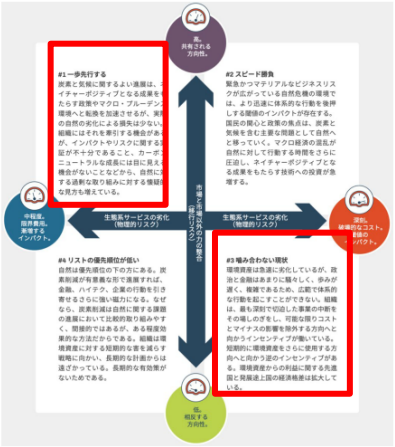


図 3　TNFD が推奨する 4 象限シナリオ [10]

(3-A) 上流のシナリオ分析

上流のシナリオ分析結果を以下に示します（表 9）。

シナリオ	事象
1	トレーサビリティや環境認証への要求
1	自然資本関連の責任追及や訴訟増加
3	建設資材の入手困難 不安定化 （災害、資源枯渇）

影響

(3-B) 直接操業のシナリオ分析

直接操業のシナリオ分析結果を表 10 に示します。

表 10　シナリオ分析結果（直接操業）

シナリオ	事象	リスクと機会(R:リスク、O:機会)		影響度	時期	当社の対応
1・3	土地改変への強い規制や土地利用の抜本的な見直し	R	新規建設需要の減少	↓↓↓	長	・新たな建設領域への投資（BLUE WIND※1 など） ・土地利用高度化に対応する技術力向上
1	建設現場での自然連規制や監視の強化					
3	発注者により環境意が異なる					
3	自然災害や生物災害の激甚化					

影響

(3-C) 下流のシナリオ分析

下流のシナリオ分析結果を表 11 に示します。

表 11　シナリオ分析結果（下流）

シナリオ	事象	リスクと機会（R:リスク、O:機会）		影響度	時期	当社の対応
1	「自然性能」※1 の評価やモニタリングの要求	R	長引く施工責任、後施工の増加、管理負担の増大	↓↓	短～中	・「自然性能」※1 を査定できる人財、組織の構築
		O	「自然性能」を顕現化し差別化する技術	↑↑	短～中	・「自然性能」※1 を高めることで不動産価値向上へ寄与
1・3	総量規制を含む再資源化への強い要請	R	設計段階からの強い制約	↓↓↓	長	・「新 Kan たす」※2 による副産物管理 ・設計・施工段階から建物解体撤去を見据えた 4R 活動の徹底
		O	解体技術が施工能力に直結	↑↑↑	長	・「新 Kan たす」※2 による副産物管理 ・リサイクルルートの開拓、積極採用
3	太陽光発電と生態系保護の対立の激化	R	地域や自然関連ステークホルダーとの軋轢が生じる	↓	短～中	・計画段階から環境アセスメント同等手法を取り入れ、影響低減策を実施 ・事例等を共有し水平展開

影響時期（短期：3 年以内、中期：3 年超～10 年以内、長期：10 年超）
影響度（下矢印↓はリスク、上矢印↑は機会を示し、矢印の数で 3 段階の影響度を示す）

3

The degree of impact is **being comparatively assessed** as an "impact on our own business."

Source: Prepared by EY based on Shimizu Corporation's Nature-related Financial Disclosures based on the Task force on Nature-related Financial Disclosures (TNFD) Recommendations (https://www.shimz.co.jp/company/csr/environment/tnfd/SHIMZ_TNFDreport2024.pdf) (accessed on February 3, 2025)

Suntory Group is participating in the pilot operation of the Science Based Targets Network (SBTN) to set freshwater targets, and is also utilizing some of the analysis results for TNFD disclosure.

1

In STEP 1 (Analysis & Assessment), assessments were conducted utilizing primary and secondary data on water quantity and quality in direct operations and upstream in the supply chain. **Based on those outcomes, STEP 2 (Understanding & Prioritization) was conducted, leading to the selection of high-priority locations from both direct operations and the upstream supply chain.**

2

In STEP 3 (Measurement, Setting, Disclosure), Suntory Group set targets for water volume and water quality using the following methods.

- Kumamoto location (**one of the group's key direct operations** locations): **Collaboration with local stakeholders** to construct a groundwater simulation model
- **Upstream** (2 locations)**: Utilization of global model**

SBTN pilot operation cases study

Actions taken

Suntory's materiality assessment (Step 1) covered 100% of its direct operations and 100% of its high-impact commodities upstream, equivalent to 68% of total procured raw ingredients.

Water use pressure in direct operations was mainly assessed using primary data. However, secondary data was used for water pollution, as primary data could not be monitored for office buildings and some plants that discharge directly into the sewage system. Water pollution pressure was instead estimated by applying the ratio of production volumes or the number of employees at sites for which primary data was available.

For upstream operations, secondary data was used to estimate each pressure by multiplying the basic pressure unit from the IDEA database by the amount of each commodity procured. Suntory worked with an external consultant, Yachiyo Engineering Co., Ltd., to progress on this journey. As a result of their prioritization analysis (Step 2), seven sites were selected as priority sites for direct operations, three sites for upstream operations, two sites for upstream operations, and ten sites for landscape engagement.

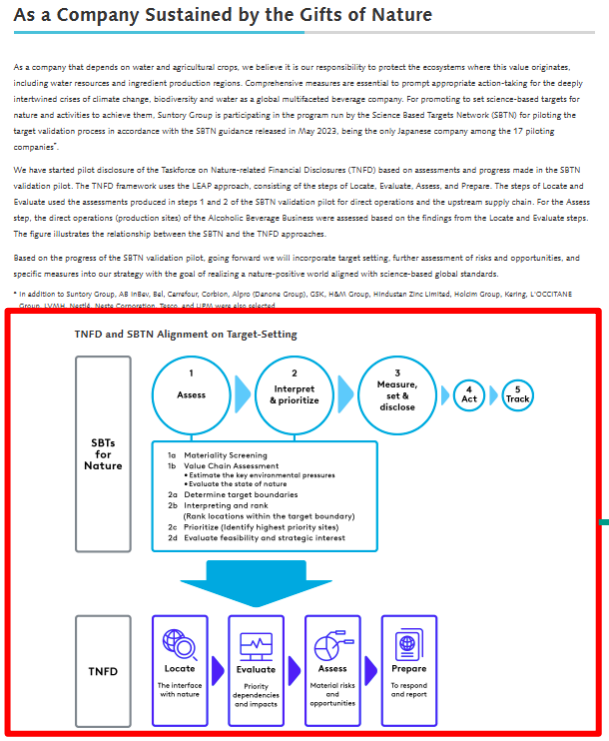
Findings

The Kumamoto region in Japan was identified as the target area for water quantity and quality as it is one of Suntory's major production sites, with high water use and growing demand for water from competing users in the basin.

Prior to the SBTN pilot, Suntory had already worked with local universities and government agencies in the Kumamoto region to build a local simulation model to visualize groundwater flow. As a result of further stakeholder engagement with these organizations, the company identified targets for water quantity and quality in Kumamoto.

Additionally, the company identified water quantity and water quality targets for two upstream sites using a global model: for green tea in Japan and coffee in Brazil. For land-based commodities, the company identified a target of phasing out the procurement of raw milk and coffee produced in areas where natural ecosystems have been altered after 2020. Land footprint reduction targets were set for several commodities, including tea and coffee, following the methodology of reducing the area occupied by farmland per kg of the target commodity by 1% per year from the base year to the target year.

Suntory Group disclosure of nature-related information based on the TNFD recommendations



As a Company Sustained by the Gifts of Nature

As a company that depends on water and agricultural crops, we believe it is our responsibility to protect the ecosystems where this value originates, including water resources and ingredient production regions. Comprehensive measures are essential to prompt appropriate action-taking for the deeply intertwined crises of climate change, biodiversity and water as a global multifaceted beverage company. For promoting to set science-based targets for nature and activities to achieve them, Suntory Group is participating in the program run by the Science Based Targets Network (SBTN) for piloting the target validation process in accordance with the SBTN guidance released in May 2023, being the only Japanese company among the 17 piloting companies*.

We have started pilot disclosure of the Taskforce on Nature-related Financial Disclosures (TNFD) based on assessments and progress made in the SBTN validation pilot. The TNFD framework uses the LEAP approach, consisting of the steps of Locate, Evaluate, Assess, and Prepare. The steps of Locate and Evaluate used the assessments produced in steps 1 and 2 of the SBTN validation pilot for direct operations and the upstream supply chain. For the Assess step, the direct operations (production sites) of the Alcoholic Beverage Business were assessed based on the findings from the Locate and Evaluate steps. The figure illustrates the relationship between the SBTN and the TNFD approaches.

Based on the progress of the SBTN validation pilot, going forward we will incorporate target setting, further assessment of risks and opportunities, and specific measures into our strategy with the goal of realizing a nature-positive world aligned with science-based global standards.

* In addition to Suntory Group, AB InBev, Bel, Carrefour, Corbion, Alpro (Danone Group), GSK, H&M Group, Hindustan Zinc Limited, Holcim Group, Kering, L'OCCITANE Group, LVMH, Nestlé, Nestle Corporation, Tesco, and UPM were also selected.

3

A trial disclosure of TNFD was implemented based on the analysis and progress observed during the SBTN pilot operation. **The Locate and Evaluate phases utilized the direct operations analysis results from STEP 1 and STEP 2, as well as the upstream supply chain analysis. Targets will be set** based on the progress of the SBTN pilot operation. In addition, **further analysis of risks and opportunities will be conducted, and specific countermeasures will then be incorporated into strategies.**

Source: Prepared by EY based on Suntory Group's disclosure of nature-related information based on the TNFD recommendations (Suntory Group's sustainability framework based on the TNFD recommendations, Suntory), and TSBTN "Case Studies SBTN Pilot:Suntory" (SBTN Pilot: Suntory – Science Based Targets Network) (accessed on January 31, 2025)

TNFD disclosure examples (transition plans)

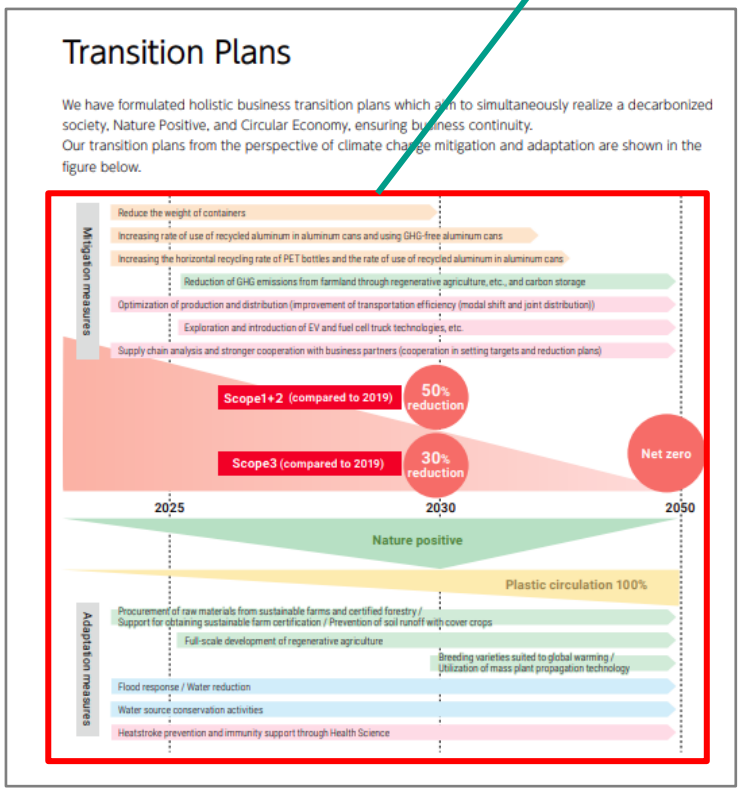
The Kirin Group has disclosed a transition plan that integrates initiatives for realizing a society with zero carbon emissions, resources recycling, and nature positivity, ahead of the release of the TNFD's draft guidance on nature transition plans.

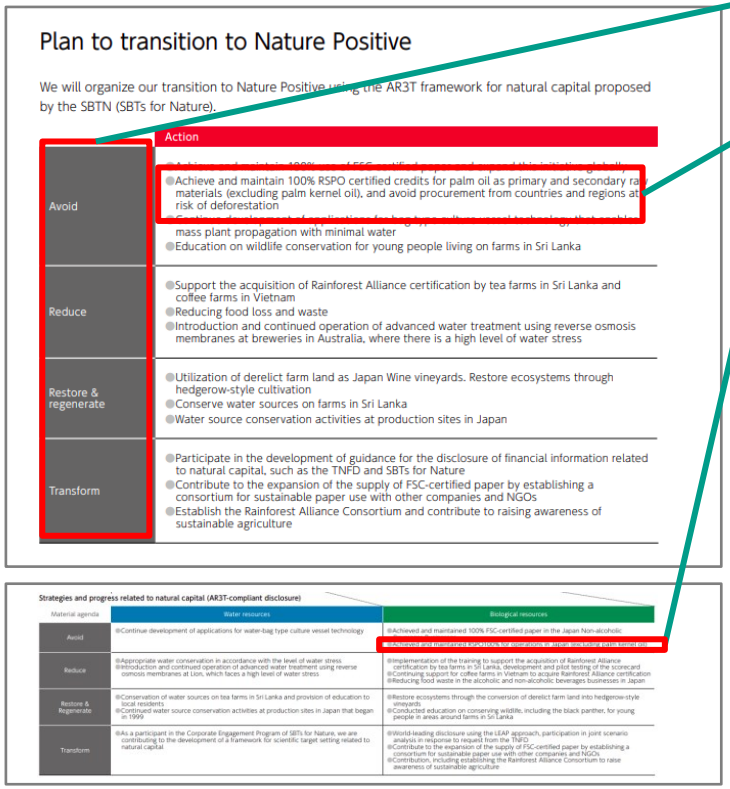
1

The transition plan is **designed as a cohesive plan that aims to concurrently realize a society with zero carbon emissions, nature positive businesses**, and a circular economy, while ensuring business continuity.

2

Kirin organized transition plan **actions** using the **AR3T framework** for natural capital as recommended by SBTN. These actions are consistent with the Ministry of the Environment's Transition Strategy, **"Contribution to the Conservation of Natural Capital and Value Creation."**





3

Kirin organizes strategies and monitors progress on the natural capital transition plan in line with the SBTN's AR3T framework."
For example, consider an action categorized as avoidance, such as **"achieving and maintaining 100% Roundtable on Sustainable Palm Oil (RSPO) certification credits for primary and** secondary palm oil materials, and avoiding procurement from countries or regions at risk of deforestation." The current progress for this action is disclosed as **"Japanese operations have achieved and maintained 100% RSPO certification"**

■ Transition plan takeaways

Disclosure of strategies and progress towards 2050 targets through the integration and achievement of decarbonization, nature positive, and circular economy initiatives

Source: Prepared by EY based on "Kirin Group's Environmental Report 2024" (issued in June 2024) (https://www.kirinholdings.com/jp/investors/files/pdf/environmental2024.pdf) (accessed on January 8, 2025)

Yamaha Corporation has disclosed its "Transition Plan to Achieve Nature Positive Outcomes by 2050," which includes quantitative targets, ahead of the issuance of the Natural Transition Plan Guidance.

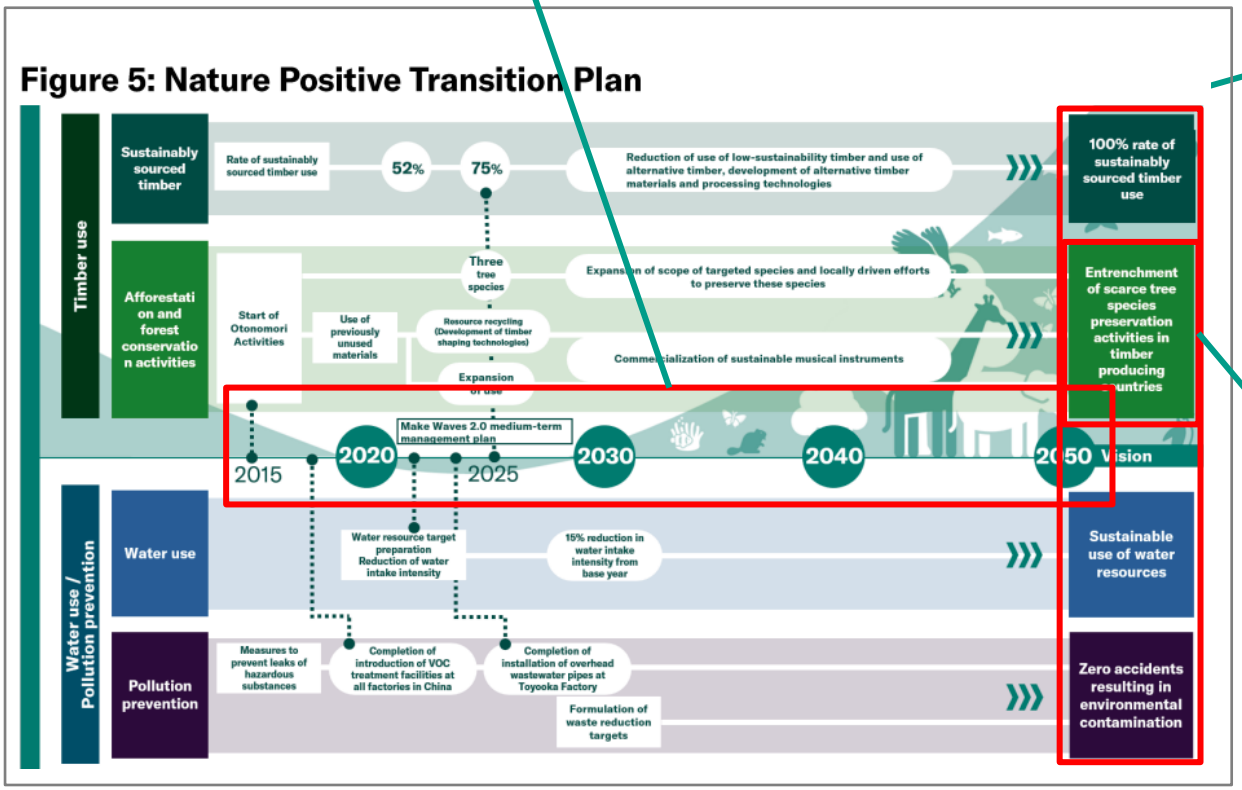
1

In integrated reporting for TCFD/TNFD, Yamaha Corporation has disclosed a transition plan towards achieving nature positive outcomes that **takes into account short-, medium- and long-term time horizons** ranging from 2015 to 2050.

2

Yamaha has disclosed the milestones and quantitative targets, **which have been backcasted from targets to meet by** 2050, along with the actions required to achieve them.

Figure 5: Nature Positive Transition Plan



3

The transition plan to realize a nature-positive outcomes includes **engagement and transformation** efforts not only within Yamaha but **also with the countries that produce raw materials.**

Efforts will be made to minimize the negative impacts of business activities and products on biodiversity by considering the impact on **them throughout the entire value chain**. The corporate policy is aligned with a focus on forest conservation, striving for the sustainable use of timber, and promoting the cultivation of suitable materials for musical instruments.

Excerpt from page 14 of “Yamaha Group’s TCFD, TNFD responses”

■ Transition plan takeaways

Yamaha has formulated a transition plan to achieve nature positive outcomes, which have been backcasted from targets to meet by 2050.

Source: Prepared by EY based on “Yamaha Group’s Responses to TCFD & TNFD”” (https://www.yamaha.com/ja/sustainability/environment/global-warming/pdf/2024_tcfd_tnfd_recommendations.pdf) (accessed on Janu 2025)

Column : Interviews with TNFD-disclosing companies①
Challenges and Case studies based on TNFD-disclosing companies

Themes/Challenges	Examples of solutions
Organizational Setup **How to organize the implementation structure and gather Know-Hows and resources**	• Besides the person in charge of sustainability, a person in charge of biodiversity has been assigned to the company. Actual activities are being promoted by involving the entire company, including each business unit, purchasing department, and factory. (General Consumer Goods Sector) • This company uses outsourced consultants for their objectivity and broad expertise. The method of use is selected according to the circumstances of each company, such as preparation of a basis for a disclosure framework, specialized analysis, and data collection. (Sectors*)
Management and internal awareness **Management awareness of biodiversity/natural capital**	• Regular input on biodiversity trends, including lectures on TNFD by external speakers. (Construction and Real Estate Sector) • Discussions on biodiversity are also held within the Sustainability Committee. (Consumer Goods Sector) • As an extension of the biodiversity initiatives that we have been working on for a long time, we approached our initial disclosure with the concept of communicating our efforts to the outside world through TNFD disclosure. (Construction and Real Estate Sector)
Reaction from investors, consumers and business partners **Reactions from investors and other external parties**	• After the disclosure, requests to speak at seminars have increased, and our company has learned a lot by participating. (General Consumer Products Sector) • Opportunities for dialogue with suppliers and other companies that are aware of natural capital issues have increased, as have opportunities to discuss collaboration on natural capital and biodiversity. (Information and Telecommunication Sector)

※ Sectors covered by the hearing: Consumer discretionary, construction and real estate, information and communications, trading companies

Column : Interviews with TNFD-disclosing companies②
Challenges and Case studies based on TNFD-disclosing companies

Themes/Challenges	Examples of solutions
Connection with TNFD **Making use of the TCFD Framework that are already being implemented**	• The four pillars of the TCFD and TNFD are the same, and governance has used the same content in the TCFD/TNFD. Some, such as board involvement in biodiversity, need to be considered. (Construction and Real Estate Sector) • Targets are disclosed from those already implemented, such as waste and water. (Construction and Real Estate Sector) • There is an awareness of the need to present interrelationships and trade-offs with climate change in a number of integrated forms to the outside world, and integrated disclosure of the TCFD/TNFD is being considered. (General Consumer Goods Sector)
LEAP Approach **How to start the LEAP Approach**	• We started by organizing what each site was already working on and applying it to LEAP. (General Consumer Goods Sector) • Initially, we focused on objectivity and used an analysis method that overlaid our own sites on global map data. We plan to gradually improve the accuracy of the analysis. (General Consumer Goods Sector) • It is important to conduct the analysis with an awareness of external disclosure from the beginning, rather than blindly doing it (Retail Company).
Tools **How to choose the most suitable TNFD Tools**	• To ensure objectivity, we chose a generic and reasonably priced TNFD referral tools. (General Consumer Goods Sector) • As for the tool, since it is inevitably a high-level survey, we consider it acceptable as long as we are comfortable with the results and do not miss any important aspects. (Construction and Real Estate Sector) • For areas where it is easy to obtain information, we evaluate the accuracy of the tools by comparing the TNFD tools with the information on the ground. (General Consumer Goods Sector)

※ Sectors covered by the hearing: Consumer discretionary, construction and real estate, information and communications, trading companies

Column : Investors While there are expectations of company-specific evaluation/disclosure in line with the TNFD framework, there is also a call for proactive evaluation first, even if qualitative, and to be followed by a gradual scale up of disclosure in the future

Japanese Asset Management

Progress in the TNFD framework means we now expect aligned assessments and disclosures. But it's not just about reacting to new frameworks and regulations. Companies need to proactively understand how biodiversity and natural capital affect their cash flows and profits, integrate this into their strategy , disclosing it as they assess their real impacts on their operations.

We understand that providing quantitative information in disclosures on Biodiversity and natural capitals is ideal, but it can be challenging in the initial stages. We encourage starting with qualitative disclosures, even if they are not perfect. It's important to begin by assessing the nature-related risks and opportunities for companies and their partners, and gradually enhance the level of disclosures.

Japanese Insurance Company

Japanese Financial Planner

The way nature ties into businesses varies a lot by industry and operation, making it tough for us as investors to get a clear picture from the top down. It's pretty individualized, and without companies disclosing, it's hard for us to analyze from the outside. Sector-level information alone does not lead to investment decisions. We're really looking forward to analysis and disclosures from those who know their own businesses best, taking into account their specific operations and local factors

※ Sectors covered by the hearing: Consumer discretionary, construction and real estate, information and communications, trading companies

Column: Investors emphasize the importance of corporate disclosure on natural capital, focusing on the commitment of management and the identification of risks and opportunities within the company and its supply chain.

Japanese Asset Owner

- It is not enough to just have a disclosure; we are looking at whether the risks and opportunities are properly identified and addressed.
- The most important thing is that the companies understand the risks and conduct due diligence within their own operations and supply chains.
- Although companies are beginning to recognize the importance of natural capital and biodiversity, they are not yet able to envision how these concepts apply to their supply chains. It is crucial for management to understand that if they do not translate these issues into concrete actions within their operations, they may not be able to do business in a few years.

Japanese Asset Management

- Governance information is prioritized, and the evaluation focuses on whether the information on supervisory and executive officers, third-party involvement, board structure and skills, and if the management involvement reflects the company's overall efforts.
- Regarding nature-related risks, it is required to report a balanced view of generally important information and the company's initiatives. Just presenting the quantitative data is meaningless if the information does not link the risks and opportunities identified in the strategy with the metrics used to manage them.

Foreign Financial Institutions

- When conducting engagement, unique goals are set for each company. These goals are based on the company's sector, maturity, and investor preferences, so they do not always have numerical standards. Sometimes, it involves checking whether the company is reporting based on TNFD and analyzing the content.
- Generally, SDG indicators are very high-level, and KPIs need to be set more specifically. However, it is challenging to specify concrete biodiversity related KPIs .

Column: Challenges in the valuation of natural capital as deemed by financial institutions

Financial institutions are engaging in practices such as examining the qualitative valuations of natural capital and integration in ESGs, focusing on companies' disclosure of management commitment and risk analysis.
Financial institutions are still considering quantitative evaluation criteria and methods. Additionally, they are facing challenges in establishing the relationship between corporate value and improving their environmental footprint.

1. Financial institutions' recognition of biodiversity and natural capital

- Financial institutions are acknowledging the significance of natural capital and are implementing strategies to carefully oversee investments and activities related to certain commodities, including palm oil.
- In particular, for ESG integration and engagement, natural capital is being incorporated and addressed as a topic for assessment and dialogue.

2. Obtaining information on corporate biodiversity and natural capital

- Information on corporate biodiversity and natural capital is obtained through dialogue with investment and financing partners.
- Financial institutions are using tools to partially verify risks based on the information about the business locations and operations of the companies in which they are providing financing or making investments.
- Information obtained from external vendors is used solely as a reference. There are cases where vendor information is utilized when there are no disclosures, which is acknowledged as a potential risk.

3. Using information on financial institution biodiversity and natural capital

- Within the process of integrating ESG components, qualitative information regarding natural capital is being incorporated into the assessment.
- Some financial institutions are currently concentrating on qualitative aspects but are examining the establishment of key performance indicators (KPIs) that they consider important for future dialogues with companies, with the aim of incorporating them into quantitative assessments.
- Currently, there is no unified standard for positive assessments; instead, criteria such as the Equator Principles are used for negative screening.

4. Key points and challenges that financial institutions focus on in corporate disclosures

- The most critical point of focus is whether management is cognizant of the risks associated with natural capital in relation to governance and actively participates in decision-making.
- We are aware of the general risks and opportunities related to key sectors, and it is particularly noteworthy how the analysis demonstrates the presence of risks at each stage of the supply chain.
- It is necessary not only to include KPIs and metrics but also to demonstrate how they contribute to the management of risks and opportunities related to natural capital.

5. Issues related to assessments of financial institution biodiversity and natural capital

- At present, it is difficult to establish KPIs for biodiversity and natural capital, including technological constraints.
- Due to a lack of understanding of the connection between initiatives related to biodiversity and natural capital and the enhancement of corporate value and returns, financial institutions need a mechanism that clearly demonstrates the relationship between corporate value, returns, and such initiatives to engage in proactive financing.
- When evaluating initiatives, it is necessary to organize approaches as there are no established criteria to determine whether the impact obtained from these initiatives are "high" or "low."

Column: Main assessment perspectives and methodologies used by financial institutions, and examples of required company responses (1/3)

- For each opportunity to assess natural capital, financial institutions have organized perspectives and methods to accurately evaluate the current situation.
- In addition, examples of responses required from companies to such assessments are described in detail.

	Assessment perspectives	Assessment methods	Examples of responses required from companies	Examples of metrics/criteria
Financial instruments	Monitoring biodiversity-related targets within financial products: ・Impact investing ・Positive impact financing ・Sustainability-linked loans	During financing procedures, financial institutions and companies establish common KPIs and evaluate them both quantitatively and qualitatively. These KPIs are monitored in accordance with Sustainable Development Goals (Sags) indicators or are set independently. However, although SDG indicators are high-level metrics that require further focus, referencing specific KPIs related to biodiversity and natural capital can be challenging.	Setting and managing business goals using SDG indicators and other relevant metrics, and outlining strategies for their realization.	・Reduction of water intake per unit compared to the previous fiscal year (quantitative target) ・Development of a biodiversity action plan aimed at obtaining OECM certification for group-owned forests (qualitative target)
	In certain financing transactions, assessments are conducted in accordance with international standards, such as: ・Green loans ・Green bonds	Ensure compliance with international standards and clarify how the use of funds will contributes to sustainability	Confirmation that projects conform to assessment criteria	Compliance with the Green Bond Principles (GBP)
	Assessment of biodiversity initiatives using unique rating criteria	Assessments are also based on the unique assessment criteria of financial institutions	Confirmation of the requirements of financial institutions	・The degree of contribution to activities for restoring nature and preserving traditional cultures ・The status of opportunities that have been created for employees and business partners to enhance their understanding.

Column: Main assessment perspectives and methodologies used by financial institutions, and examples of required company responses (2/3)

	Assessment perspectives	Assessment methods	Examples of responses required from companies	Examples of metrics/criteria
At the time of investment/financing	Qualitative assessment factors, including ESG integration, are incorporated into assessments, with some financial institutions also focusing on quantitative factors.	Assessment methods are included as part of the qualitative assessment of ESG issues. Investigate the challenges of direct investment and financing, as well as the risks associated with their occurrence. Currently, the impact on natural capital is minimal. However, there are no clear criteria for assessing positive impacts, which is left to the discretion of analysts and others.	Conduct thorough due diligence on risks, including those in the supply chain, and develop countermeasures. Companies should also highlight the positive impact of their initiatives.	N/A
	Financial institutions conduct independent assessments of biodiversity through their unique assessment criteria and methodologies.	(The criteria and methods for assessments may remain confidential, with the assessment process being opaque, since assessments are customized for individual projects and do not adhere to standardized universal benchmarks.)	Confirmation of and responses to the requirements of financial institutions	N/A
	Assess biodiversity initiatives by using measures, such as SDGs.	Assess the disclosure of indicators required by financial institutions, including SDGs indicators and SASB; Quantitatively assess the measures implemented for these disclosures as well as their effects.	Setting and managing business targets using financial indicators from financial institutions, including SDG indicators, and outlining strategies for their achievement.	N/A
	Conduct negative screening to avoid legal and reputational risks	Analysis and assessment of the business landscape and qualitative assessment of a company's countermeasure plans.	Understand the concerns of financial institutions and provide information on corresponding countermeasure policies	Percentage of net change in forest areas (quantitative targets)
	Projects expected to negatively impact biodiversity typically undergo impact assessments, have countermeasure plans in place, and are monitored for the status of initiative implementation	Analysis and assessment of the business landscape and qualitative assessment of a company's response plans; When adverse effects on nature are quantifiable, the efficacy of remedial actions can be monitored in quantitative terms	Demonstrate that the company's business does not negatively impact biodiversity Should there be a potential negative impact, outline management's methods for mitigating these impacts	Project that negatively impacted the Ramsar wetlands; Projects in violation of the Washington Convention
	Third-party assessments and status of obtaining international certification	Confirmation of assessment implementation and certification status	Obtain third-party assessments and certifications, and outline plans for achieving them until they are obtained	Implementation of environmental and social considerations, such as addressing water resource depletion and water quality and pollution, during the development of shale gas projects

Column: Main assessment perspectives and methodologies used by financial institutions, and examples of required company responses (3/3)

	Assessment perspectives	Assessment methods	Examples of responses required from companies	Sample metrics/criteria
Managerial engagement	Identification and recognition of risks and opportunities within the company and its supply chain	Ensure that risks and opportunities are clearly identified and that they are being addressed appropriately; and Verify whether there is awareness of supply chains challenges (disclosure alone does not necessarily meet requirements; it is important that appropriate management and strategies are demonstrated.)	Analyze the general risks and opportunities in the sector to which the company belongs, as well as the relationship with its own company, including its supply chain, to identify areas of risks to nature, and consider countermeasures	Forest sector: FSC Certification Palm oil: RSPO Certification
	Enhancement of managerial engagement in biodiversity, assessments on the status of strategy implementation, setting targets and KPIs, and planning future strategic directions.	Conduct qualitative assessments of initiatives aimed at enhancing management engagement, developing current and future corporate strategies, setting targets and KPIs, and monitoring established targets through engagement; and Confirm whether a system and capabilities for facilitating discussions at the board of directors level are in place	Establish specific measures involving management and a plan for implementing these measures	Progress of discussions on biodiversity among company executives
	Status of biodiversity information disclosure or future disclosure plans	Qualitative assessment of a company's disclosure status and future plans in alignment with initiatives aimed at TNFD and other biodiversity disclosure frameworks; and Monitoring established targets through engagement	Demonstrate progress on TNFD initiatives and future plans	Progress on TNFD initiatives
Exercise of voting rights	The impact of the engagement is verifiable, and a logical justification is offered in cases where there is no impact	Implement measures to achieve the targets established through engagement and assess the extent to which KPIs are being met	Demonstrate progress on measures and KPIs set through managerial engagement	KPIs set through engagement
	Disclosure of initiatives and commitments related biodiversity	Review internal regulations and declarations on biodiversity; Confirm participation in initiatives; and Verify specific actions	Demonstrate implementation of internal regulations, declarations, participation in initiatives, and specific actions related to biodiversity	Confirmation that the company maintains a biodiversity strategy

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The list of featured TNFD tools

Various existing data tools useful to the assessment and analysis for TNFD disclosure

■ There are various nature-related data tools useful for disclosing nature-related issues and implementing the LEAP approach. Since each data tool has different development objectives and scope of analysis, it is recommended to understand the characteristics of each tool before using it. This guide introduces the following data tools that are often used in TNFD disclosures by companies, from those introduced in the Tools Catalogue published by TNFD and published by the Science Based Targets Network (SBTN).

Data tools	LEAP	Overview
Integrated Biodiversity Assessment Tool (IBAT)	L2、L3	IBAT provides access to a geospatial database that includes the IUCN Red List, protected areas, and Key Biodiversity Areas. Further information, such as species potential risk assessments on specified sites, require fee.
Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE)	L2、L4、E2、E3、E4	ENCORE enables the visualization of business risks arising from ecosystem service dependencies, impacts and environmental changes. Can be used to assess sites such as operation sites and material sources in supply chains to identify nature-related risk and opportunities
Global Forest Watch	E2、E3、E4	Geospatial data for monitoring deforestation globally, including real-time data on land use, land use change and biodiversity around the world, focusing on forests.
Aqueduct - Water Risk Atlas	L3、E3、E4	This tool identify and evaluate water risks on geography in terms of physical (quantity and quality), regulatory and reputational risks.
WWF Water Risk Filter	L2、L3、L4、E1、E2、E3、E4、A1、A4、P1、P2、P3	Corporate and portfolio-level screening tool to help companies to prioritize action on what and where it matters the most at different stages of supply chains in different regions to address water risks for enhancing business resilience
WWF Biodiversity Risk Filter	L2、L3、L4、E1、E2、E3、E4、A1、A4、P1、P2、P3	Corporate and portfolio-level screening tool to help companies to prioritize action on what and where it matters the most at different stages of supply chains in different regions to address biodiversity risks for enhancing business resilience
SBTN Materiality Screening Tool	L2,E1,E2, E3	Potential material environmental impacts associated with direct operations and upstream supply chain operations in the company's action/sector can be screened (tool recommended in SBTN Step 1a Materiality Screening).

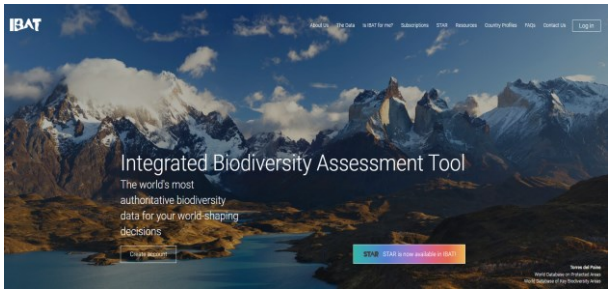
Source：TNFD「Tools Catalogue」、https://tnfd.global/guidance/tools-catalogue/ 、TNFD「Guidance on the identification and assessment of nature-related issues: the LEAP approach – TNFD 」（2025/02/05）

Featured TNFD tool #1-1

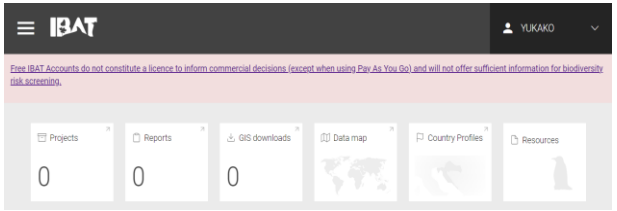
Integrated Biodiversity Assessment Tool (IBAT)

■ IBAT provides geographic information on global biodiversity for designated sites.

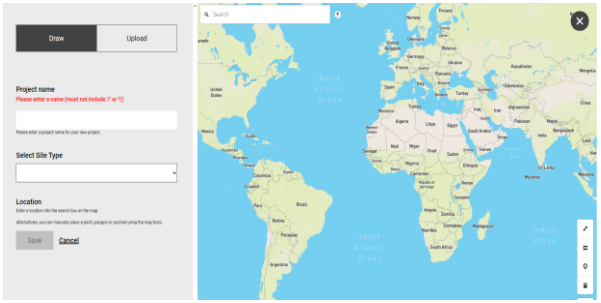
IBAT Website



Dashboard



Location data entry screen



Overview	• IBAT users can access the World Database on Protected Areas, IUCN Red List of Threatened Species, and the World Database of Key Biodiversity Areas.(Some services require fee) • Reports to assess the potential risk of species for designated sites （STAR), and Disclosure Preparation Reports (DPR) to assist in identifying and prioritizing areas for biodiversity consideration are available （fee apply ）
LEAP	L2、L3
What you can do with this	• Access to organized information on biodiversity in the areas around direct operations/suppliers' sites by entering the locations. • The free plan offers geographic information within a diameter of 50 km from the specified location. • The fee plans offer more detailed information as shown in the next page.
Notes	• The free plan requires the results to be checked for each site on the web for output when viewing multiple sites. • The free plan offers the information limited within a diameter of 50 km from the specified location.
Fee	Partly free, but for detailed information, access to reports, GIS data DLs, etc. a fee is required.
Link	URL：https://www.ibat-alliance.org/

Source : IBAT, https://www.ibat-alliance.org/（2024/02/01）

Featured TNFD tool #1-2

Integrated Biodiversity Assessment Tool (IBAT)

- In paid subscription versions of IBAT, it is possible to create reports that include more comprehensive environmental impact data.

Proximity Report	A report suitable for high-level early stage biodiversity risk screening at a single location The report contains information on protected areas within designated buffers, and key biodiversity areas & International Union for Conservation of Nature (IUCN) Red List of Threatened Species. Buffers can be selected from a range of 1km to 50km.
PS6 & ESS6 Report	A report suitable for high-level early stage biodiversity risk screening at a single location against IFC and World Bank performance standards The report contains information on overlapping protected areas within designated buffers of 1km, 10km, and 50km, and key biodiversity areas & IUCN Red List Species. There is also a likelihood of critical habitat being flagged.
Freshwater Report	A report suitable for high-level early stage biodiversity risk screening of projects with potential to impact on freshwater ecosystems. The report contains information on freshwater species upstream and downstream of a specified location (single location). Upstream and downstream buffers can be selected.
Multi-site Report	A report suitable for incorporating biodiversity into annual sustainability reporting (e.g. reporting against GRI or SASB standards). The report contains information on protected areas, key biodiversity areas & IUCN Red List Species at multiple locations. Buffers are user specified.
STAR Report	A report suitable for identifying opportunities for positive biodiversity actions and target setting. The report presents potential risks for species located within an area of interest based on Threat Abatement and Restoration scores.
Disclosure Preparation Report	In order to prepare for information disclosures related to biodiversity frameworks such as The Taskforce for Nature related Financial Disclosures (TNFD) and Global Reporting Initiative (GRI), the report is designed to support the identification and prioritization of sites with potential biodiversity impacts. The report can include up to 1,000 locations, automatically applies buffers according to the type of location or business, and provides information on protected areas, Key Biodiversity Areas (KBAs), and species listed on the IUCN Red List.

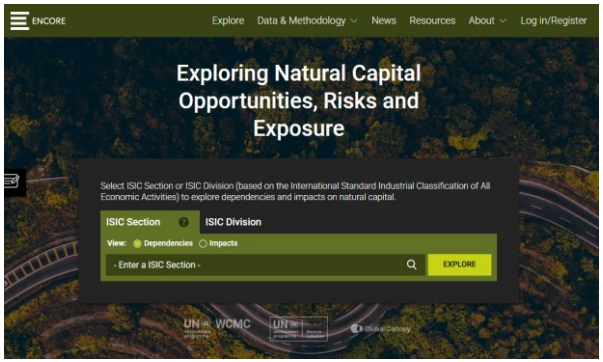
Source: IBAT, https://www.ibat-alliance.org/ (accessed on January 30, 2025)

Featured TNFD tool #2

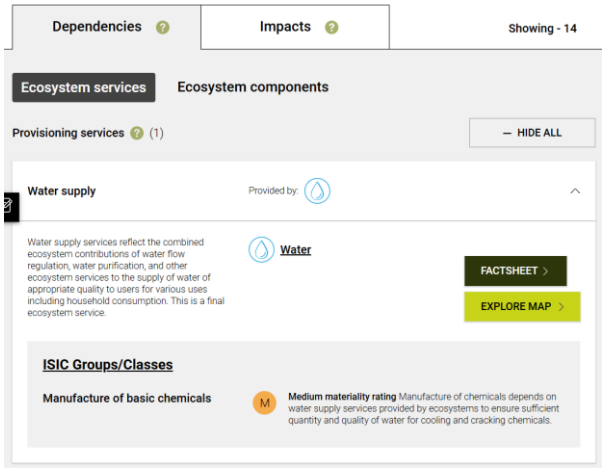
Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE)

■ The tool can be used to assess the materiality of the dependencies and impacts on ecosystem by selecting the relevant sectors based on the International Standard Industrial Classification (ISIC).

Data entry screen



Dependency and Impact Assessment results



Overview	• Assess and visualize how the economy depends on and may be affected by nature, and how changes in the environment generate risks for business • Designed initially for financial institutions to assess the nature-related opportunities and risks of investee companies but can also be used by companies to assess the sites of their own operations and those of their raw material suppliers.
LEAP	L2、L4、E2、E3、E4
What you can do with this	• Users can select the Section, Division, Group or Class based on ISIC to be investigated on the website. Maps on natural capital assets, drivers of environmental change and impact factors can be used to identify sector-specific risks. • Financial institutions can utilize ENCORE data to identify sector-specific nature-related risks caused by lending, underwriting and investment. • This could be useful for risk management (e.g. potentially important ecosystem services and natural capital), communication and stakeholder engagement, setting biodiversity targets and organizing portfolio alignment, etc.
Notes	• As the assessment is based on selected Group and Class categorized by the ISIC, company-specific information and information on the country or region in which the company or site is located must be considered separately. • The dependencies and impacts that the selected sectors generate through the supply chain (e.g. upstream dependencies and impacts such as resource extraction) are not included in the assessment, and the direct dependencies and impacts of production processes on ecosystem services and natural capital assets are accessible.
Fee	Free
Link	URL：https://www.encorenature.org/en

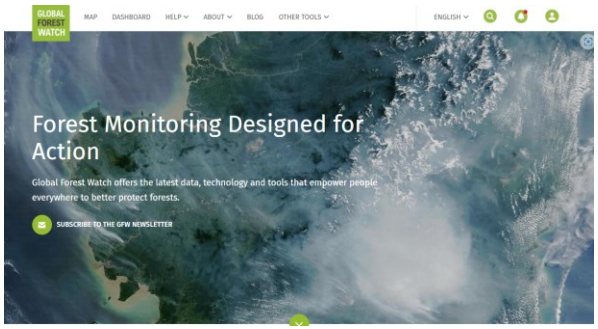
Source : ENCORE, https://www.encorenature.org/en（2024/02/01）

Featured TNFD tool #3

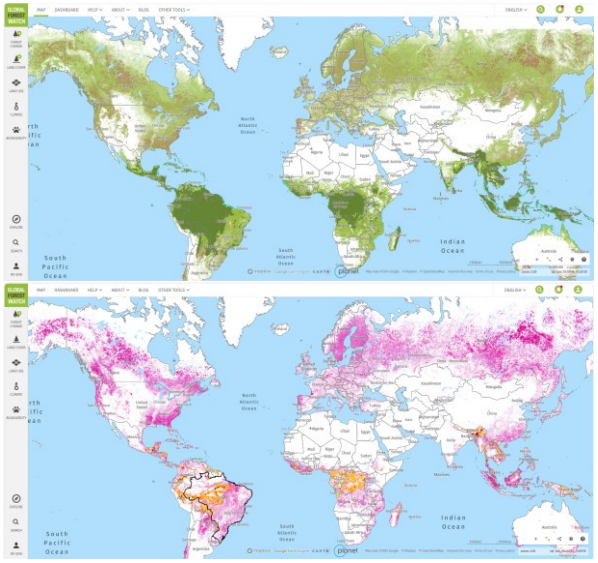
Global Forest Watch

■ Geospatial data for monitoring deforestation globally, including real-time data on land use, land use change and biodiversity around the world, focusing on forests.

Global Forest Watch Website



Example search results for Tree Coverage Locations and their changes



Overview	• Online map database for monitoring global deforestation.
LEAP	E2、E3、E4

What you can do with this	• Users can search for real-time information on forest-related conservation, land use, communities, changes in forest area, etc., and get an overall picture of the state of forests around the world.
	• The following information can be found on the map
	  • Forest change (e.g. deforestation alerts, fire alerts)
	  • Land cover (primary forest, plantations)
	  • Land use (mining concessions, palm oil mills, protected areas, dams, etc.)
	  • Climate (e.g. forest carbon removal, tree biomass density)
	  • Biodiversity (e.g. impact of forest change on biodiversity, biodiversity hotspots)
	  • *Data availability and granularity vary depending on the type of data.

Notes	• A wide variety of data is possible, but the availability of data by region and the date of data update varies depending on the items • Some data may only be displayed on a map and no numerical information is available, which may need to be supplemented by other tools or sources of information.
Fee	Free
Link	https://www.globalforestwatch.org/

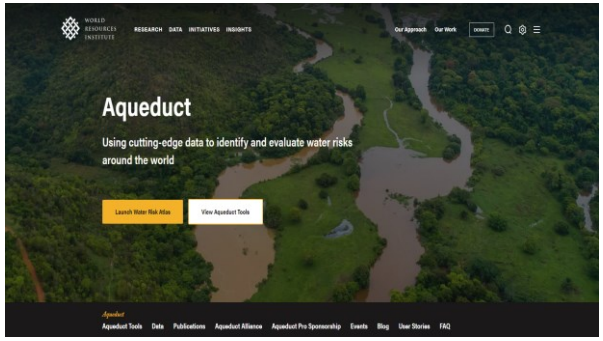
Source : Global Forest Watch, https://www.globalforestwatch.org/（2024/02/01）

Featured TNFD tool#4

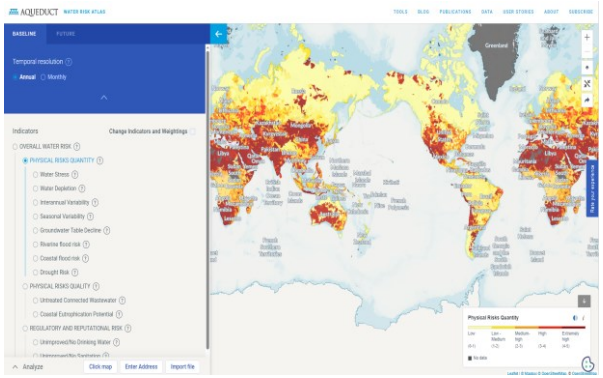
Aqueduct - Water Risk Atlas

■ Aqueduct provides information on water risks (e.g. flood, drought, stress) for each region on a map.

Aqueduct Website



Water Risk Mapping Screen for each region



Overview	• Water risk scores for each region of the world, assessed in terms of physical (quantity and quality), regulatory and reputational risks, are available on a map on the website.
LEAP	L3, E3, E4

What you can do with this	• Users can specify any region or indicator to search and check water risks by region.
	• Water risks are mapped based on each of the following risk parameters
	  • Physical risk (quantity): water stress, water depletion, inter-annual variability, seasonal variability, lowering of groundwater levels, river flood risk, coastal flood risk, drought risk.
	  • Physical risks (quality): untreated wastewater, potential for coastal eutrophication.
	  • Regulatory and reputational risks: drinking water, sanitation, national ESG risk index
	• The weights of each indicator can be customized depending on its importance and relevance to the business, allowing companies to visually identify water risks to meet their needs.
	• For each indicator (water stress, water depletion, etc.), the status of each region over time (2030, 2050, 2080) and by scenario (pessimistic, business as usual, optimistic) is also available.

Notes	・To locate the sites, it is necessary to provide their latitude and longitude information. ・This is a data-based risk assessment tool, so the likelihood of each risk requires individual judgement.
Fee	Free
Link	URL: https://www.wri.org/aqueduct

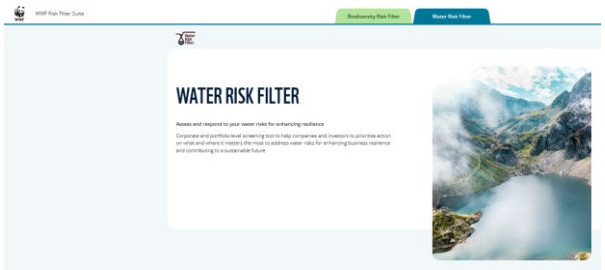
Source : Aqueduct, https://www.wri.org/aqueduct（2024/02/01）

Featured TNFD tool#5

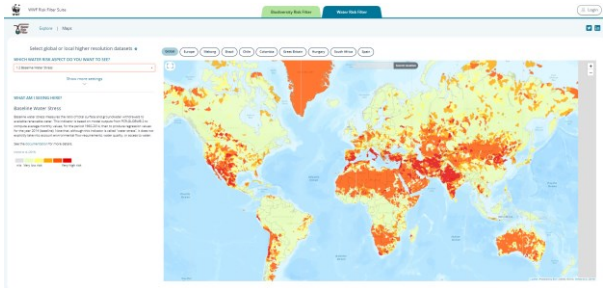
WWF Water Risk Filter

■ Corporate and portfolio-level screening tool to identify and prioritize physical, regulatory and reputational risks related to water in each region.

WWF Water Risk Filter Website



Water Risk Mapping Screen for each region



Example of Water Risk assessment Results（User registration required）

Overview	• Corporate and portfolio-level screening tool to help companies to prioritize action on what and where it matters the most at different stages of supply chains in different regions to address water risks for enhancing business resilience.
LEAP	L2, L3, L4, E1, E2, E3, E4, A1, A4, P1, P2, P3
What you can do with this	• Explore: Identify physical, regulatory and reputational risks related to water in the present and future timeframes. Map layers, country profiles, changes in water risks from 2030 to 2050 per scenario, and data (e.g. latest WWF publications) can be explored. • Assess: Able to assess physical, regulatory and reputational risks related to water across operations, supply chains and investments. • Respond: Identify company-level recommendations for addressing water risks. (To be published in due course).
Notes	• To assess operational risk, responses to company-specific questionnaires are required. • This is a data-based risk assessment tool, so case-by-case considerations of the relevance of the analysis results to other Locate and Evaluate phases is required. • As the assessable risk categories and assessment items are limited, additional risk items may need to be considered if necessary.
Fee	Free (Assess requires user registration)
Link	URL: https://riskfilter.org/water/home

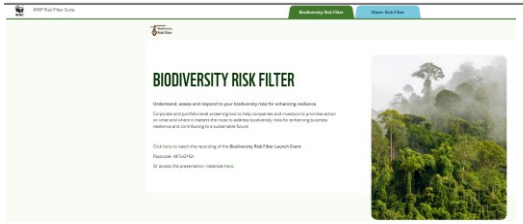
Source : WWF Water Risk Filter, https://riskfilter.org/water/home（2025/02/03）

Featured TNFD tool#6

WWF Biodiversity Risk Filter

■ Corporate and portfolio-level screening tool to identify and prioritize physical and reputational risks related to biodiversity in each region.

WWF Biodiversity Risk Filter Website



Biodiversity Risk Mapping Screen for each region

Example list of dependence and degree of impact by sector and location

Biodiversity Risk Filter Scape Risk Results

Site ID	Company Name	Site Name	Scape Physical Risk	1. Provisioning Services	1.1 Water Availability	1.2 Forest Productivity and Distance to Markets	1.3 Limited Wild Flora & Fauna Availability	1.4 Limited Marine Fish Availability	2. Regulating & Supporting Services - Enabling
			SPH	SRC1	S1_1	S1_2	S1_3	S1_4	SRC2
	Test company	test1	4.25	3.25	3.5	No dependenc	3	NA	4.25
	Test company	test2	2.75	1	1.9	No dependenc	No dependenc	NA	2.75
	Test company	test3	3.25	3.25	3	3.5	No dependenc	NA	2.25
	Test company	test4	3.65	3.65	3.8	3.5	No dependenc	NA	3.25
	Test company	test5	4.38	3.5	3	4	3	NA	4.5
	Test company	test6	3.88	2.65	3.3	2	No dependenc	NA	2.25
	Test company	test7	3	3.5	3.1	3.5	3.5	NA	2.25
	Test company	test8	2.75	1	1.8	No dependenc	No dependenc	NA	2.75
	Test company	test9	2.5	1.2	2.4	No dependenc	No dependenc	NA	2.5
	Test company	test10	2.38	1.05	2.1	No dependenc	No dependenc	NA	1.75
	Test company	test11	4.31	2.8	3.6	No dependenc	2	NA	3.62

Overview	• Corporate and portfolio-level screening tool to help companies to prioritize action on what and where it matters the most at different stages of supply chains in different regions to address biodiversity risks for enhancing business resilience.
LEAP	L2, L3, L4, E1, E2, E3, E4, A1, A4, P1, P2, P3
What you can do with this	• Inform: An overview of the direct impacts and dependencies on biodiversity of all industry sectors and the direct impacts and dependencies of specific industry sectors can be explored in detail. • Explore: Identify risks to biodiversity by region. Map layers, country profiles and data (e.g. latest WWF publications) can be explored. • Assess: Able to assess physical and reputational risks related to biodiversity across operations, supply chains and investments. • Respond: Information on reducing biodiversity risks and enhancing resilience is available. (To be published in due course).
Notes	• This is a data-based risk assessment tool, so case-by-case considerations of the relevance of the analysis results to other Locate and Evaluate phases is required. • As the assessable risk categories and assessment items are limited, additional risk items may need to be considered if necessary.
Fee	Free (Assess requires user registration)
Link	URL: https://riskfilter.org/water/home

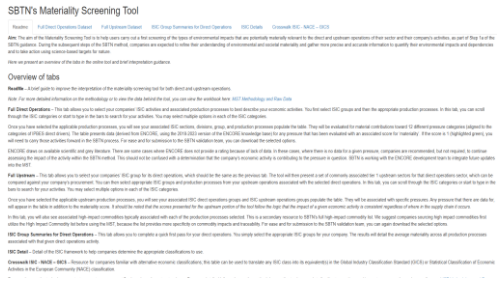
Source : WWF Biodiversity Risk Filter, https://riskfilter.org/biodiversity/home（2024/02/01）

Featured TNFD tool#7

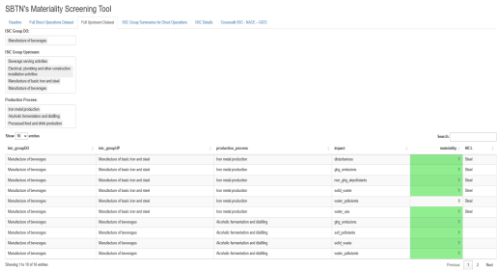
SBTN Materiality Screening Tool (MST)

■ The tool can be used to confirm sector-related material pressure categories.

Top page of Materiality Screening Tool (MST)



Sample of assessment results for upstream supply chains



Overview	• SBTN Materiality Screening Tool (MST) is an online tool recommended to assist in Step 1a (Materiality screening) of the SBTN Methodologies. • Economic activities are classified according to International Standard Industrial Classification of All Economic Activities (ISIC) categories and can be used for preliminary screening of environmental impacts related to direct and upstream operations of a sector.
LEAP	L2, E1, E2, and E3 (not included in the TNFD Tools Catalogue, but listed as recommended tools under the guidance of the LEAP approach)
What you can do with this	• Full Direct Operations Dataset: When selecting the ISIC categories and production processes within a company's direct operations, the associated 12 pressure categories are assessed along with their materiality scores of 0 or 1. • Full Upstream Dataset: When selecting the ISIC categories and production processes within a company's direct operations and supply chain, the associated 12 pressure categories are assessed along with their materiality scores of 0 or 1. The tool also displays high-impact commodities typically associated with each of the production processes selected.
Notes	• The 12 pressure categories are aligned to the categories of The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) direct drivers. • The source data for the online tool, which is in Excel file format, can be downloaded for reviewing specific data like pressure scores that are used to calculate materiality scores. • The source data used is the same as that for ENCORE, with modifications applied specifically for SBTN analysis.
Fee	The visualization tool is free
Link	URL: https://sbtn.shinyapps.io/MaterialityScreeningTool/

Source: SBTN's Materiality Screening Tool、https://sbtn.shinyapps.io/MaterialityScreeningTool/ (accessed on February 5, 2025)

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Describe the analytical process of scenario analysis and goal setting supported in the Nature Disclosure Practices Project conducted to advance nature-related information disclosure

Overview

- This section contains materials used in the “Model Project for Supporting Nature-related Financial Information Disclosure Utilizing Climate-related Financial Information Disclosure in FY2024 (commonly referred to as the Nature Disclosure Practice Project)” conducted by the Ministry of the Environment, Japan.
- The scope of the project in FY2024 was TNFD scenario analysis and target setting, and we will explain the analysis process, methodology, tools, and how to use the tools, etc., based on the materials used in the support interviews with each company.
- Please note that this papers are “case studies” based on the methods used in the model project, and are not “recommendations” by the Ministry of the Environment or other related organizations
- While the TNFD scenario analysis and target setting analysis methods are explained to a certain extent in the guidance issued by the TNFD and SBTN, it is not possible to determine the optimal solution for the analysis method and outputs due to a wide range of interpretation in the explanation of the analysis method and insufficient accumulation of case studies, etc. Therefore, this case study is also a case study. Therefore, this case study is positioned as a case study only.

Outline of Nature Disclosure Practice Project

Background

- The issuance of the TNFD Disclosure Proposal in September 2023 triggered various stakeholders, including financial institutions, to demand corporate disclosure of nature-related financial information.
- As a result, a certain degree of progress has been made in disclosing information in line with the TNFD recommendations, particularly among companies listed on the prime market. In particular, the number of companies analyzing information using the LEAP approach is on the rise, while companies' responses to nature-related target setting and scenario analysis have been limited.

Objective

- To provide support for “scenario analysis” and “goal setting” in corporate disclosure of nature-related information, with the aim of improving the quality and expanding the quantity of disclosures made by the Task Force on Nature-related Financial Disclosure (TNFD) and others in Japan by making the results widely available to the public.

Period of support

- September 2024 - March 2025

Supported Companies

- Scenario analysis: Takenaka Corporation / KDDI Corporation
- Target setting: TOPPAN Holdings Corporation

See Attachment 3 for the results of the model project.

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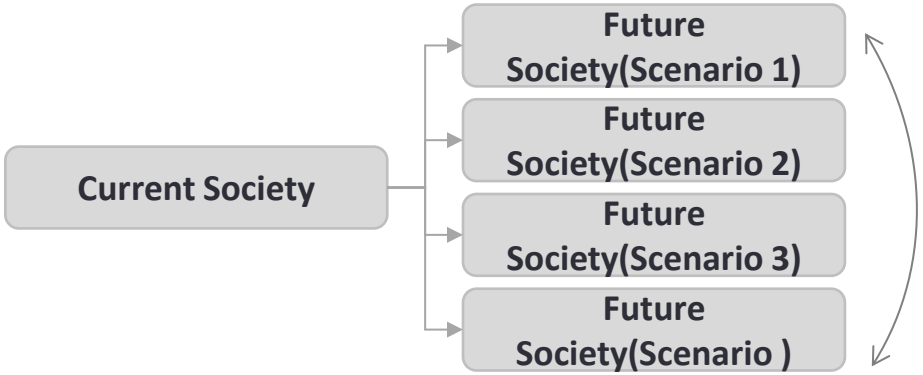
Scenario analysis allows us to envision multiple worlds and build a resilient structure that will allow us to conduct business wherever the future world may take us

Overview	 • The Guidance on scenario analysis issued by the TNFD describes a four-step participatory workshop-driven approach • Scenario analysis is positioned as a risk assessment tool under Strategy C of the TNFD Disclosure Recommendations and the Assess phase of the LEAP approach, but can inform all LEAP items. • Unlike climate scenarios, natural scenarios are considered exploratory scenarios that account for various uncertainties and set plausible futures (as opposed to backcast scenarios such as climate), as there is no single globally agreed-upon indicator such as the 1.5°C target. Translated with DeepL.com (free version
Objectives	Validate corporate resilience by assessing natural-related dependencies, impacts, risks, and opportunities while accounting for complex uncertainties
Conceptual Diagram of Scenario Analysis	 ✓ **Describing multiple scenarios and analyzing the nature and business relationships therein** ✓ **Preparing for multiple scenarios will ensure that your company's operations will be rock solid no matter where the world goes in the future.**
Outcome	By setting up multiple scenarios and analyzing the natural capital and corporate impacts therein,, ・ Evaluate and prioritize nature-related risks and opportunities for each scenario and identify mitigation and management measures ・ Identify in greater detail where sectors, business units, and value chains have natural dependencies and impacts ・ Disclose resilience with respect to nature by testing and disclosing the resilience of the organization's strategic choices and plausible future response options

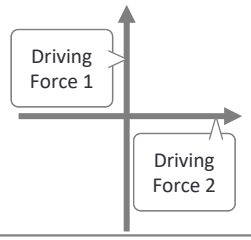
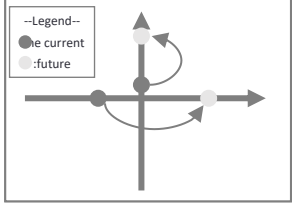
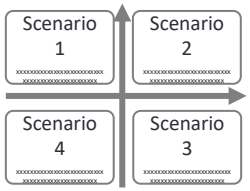
TNFD recommendations and the positioning of the support content of this model project

The model project basically followed the recommended steps in the TNFD scenario analysis guidance, but also combined common steps in scenario analysis that are widely adopted by companies.

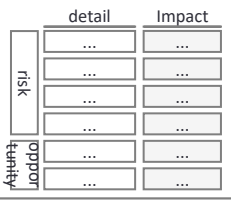
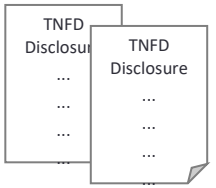
-Legend- Steps defined in the model project / TNFD scenario analysis guidance steps

Advance preparation (determining the scope)

Scenario group definition

	STEP1	STEP2	STEP3
Steps	Identifying	Aligning businesses and facilities (Using Toolkit)	Scenario story description (Using Toolkit)
References to	▸ two driving forces that will drive important changes to be considered as scenarios - Examples of driving forces - ▸ Number of ecosystems affected ▸ Rate of ecosystem change ▸ Degree of consumer interest, etc.	▸ Plot where your business sits on the driving forces of uncertainty ▸ Based on group discussion, preferably using tools	▸ Depicts a scenario story for each of the four quadrants (four scenarios) based on two driving forces ▸ For each scenario, consider what changes from the current situation and what new risks and opportunities may arise.
Additional measures taken	▸ Considering consistency with climate change scenarios	▸ None (implemented as described in the	▸ Considering consistency with climate change scenarios
Image of	Identifying 	Placement of business / facility on driving forces 	Scenario story description (narrative / illustration) 

Workshop implementation

	Business impact evaluation	Defining countermeasures	Documentation and Disclosure
	No detailed explanation in scenario analysis guidance	STEP4 Identifying high-level decisions	
References to	▸ There is some explanation in the ✓ Conduct qualitative scenario workshops (especially where quantification and the availability of quantitative models are limited) ✓ Avoid rushing to quantify before you understand qualitatively	▸ Based on the scenario depicted, consider / decide on the following: ✓ Identifying important uncertainties and addressing them ✓ net zero / nature positive goals ✓ Disclosure of information necessary for external parties to evaluate strategies for managing	
Additional measures taken	▸ Conduct quantitative analysis on some risk opportunities	▸ Consideration of synergies and trade-offs with climate change and resource circulation	▸ None (implemented as described in the
Image of	Calculate the impact of each risk opportunity (qualitative and quantitative) 	Define countermeasures 	Drafting for disclosure of 

*This model project utilized the TNFD Scenario Toolkit (https://tnfd.global/toolkit-worksheet/tnfd-scenario-toolkit/) provided by TNFD . Toolkit p.14 was used to place the project / facility on the driving forces, and p.15 was used

Scope Settings

The scope of the scenario analysis was set as a preliminary step . was made

scope	Scoping Questions	**Description in the TNFD Scenario Analysis Guidance** (The text in brackets [ ] has been added by the Ministry of the Environment for convenience)	**Model project response policy**
Target businesses	Which businesses should be analyzed using scenario analysis?	Scenario analysis can be performed a focus on one or more facilities or functions with core exposures or dependencies may be most revealing, necessitating aggregation and **upscaling of the analysis at a later stage.** * (p.34)	In consultation with the supported companies, select businesses, regions and value chains where **core exposure** and **dependency** is expected, with a view to targeting all businesses, regions and value chains in the future.
region	What is the range of the target area?		
Value Chain	How far down the value chain will you cover?		
Timeline	What year do you envision the scenario?	When setting the time horizon for scenario analysis, organizations should consider the definition of short-term, medium-term, and long-term periods and how those time horizons align with the organization's strategic planning horizon and capital allocation plans. The TNFD refers to scenario analysis and forward-looking exercises as part of its core planning, suggesting that organizations generally need to look beyond five years to clearly plan three years into the future. To plan for the next five years, organizations should look To use the TNFD scenarios outlined in this document [TNFD Scenario Analysis Guidance], we **recommend** adopting the 2030 time frame **, as** this is the agreed timeline established at the policy level in the GBF for "halting and reversing nature loss". Users may wish to consider the longer time horizon of the GBF 's " living in harmony with nature by 2050 " as a second reference point for the transition. (p.20)	Basically, **the year 2030** is assumed.
Scenario Selection	How should the scenario be set? (Original scenario /TNFD example scenario) (Integration with climate change scenarios / Independent)	scenario users **can frame their scenario analysis using a variety of driving forces** , the TNFD suggests structuring scenario analysis around **1. Degradation of ecosystem services** : This is most closely correlated with physical risks and is linked to climate change as a driver of nature loss, as global climate regulation is a key ecosystem service. **2. Consistency between market and non-market forces** : This is most closely correlated with transition risks and is relevant to actions to address climate change. (p.16)	The decision was made in

*TCFD's Scenario Analysis Guide for Non-Financial Companies notes that ideally scenario analysis should include the entire company, including supply and distribution chains. However, before broadening the scope of scenarios, an initial focus may be on specific significant business units, product lines, geographies, ecosystems/biomes, assets, or inputs that may be significantly affected by climate-related risks or opportunities. This narrower focus (e.g., one or two specific biomes where nature-related risks are deemed to be the highest) allows a company to gain experience with scenario analysis while focusing on the climate change-critical aspects of its business. However, in a mature scenario analysis process, a company should rapidly expand its scope to all operations, biomes, and across its value chain.

Identifying the relevant driving forces

In STEP 1, the clients identified driving forces are most relevant to explore in its scenarios. The guidance also provides examples of driving forces.

STEP1: Identifying the relevant driving forces

The exercise should start with narrative descriptions of possible business environments in which the organisation may have to pursue its strategic objectives.

In order to define the most pertinent uncertainties, the organisation should **assess which driving forces are most relevant to explore in its scenarios.** There are a number of driving forces that can be considered in a scenario to explore nature-related issues. Table 2 provides an overview of the driving forces used as the basis for the two critical uncertainties in the TNFD's scenarios approach.

These categories of driving forces are not mutually exclusive nor comprehensively exhaustive. Market participants may also use **other frameworks like Political, Economic, Social, Technological, Legal and Environmental (PESTLE) or Social, Technology, Economic, Environmental and Policy (STEEP) analyses** to identify driving forces*. The range of variation captured in simple words on a continuum for each driving force is intended as a placeholder for more specific analyses by organisations undertaking scenario analysis.

* In its Guidance on Scenario Analysis for Non-Financial Companies, the TCFD suggests the use of these types of analyses to identify forces of consequence that may vary by scale, highlighting that they are commonly used to gain insight into developments in the external environment during times of uncertainty.

Table 2: Categories of driving forces in the TNFD scenarios frame

Driving force category	Driving force	Continuum of variation
Ecosystem interactions, dependencies and impacts	Changes to the state of nature	Mild <-> severe
	Number of ecosystems impacted	Single <-> multiple
	Changes in ecosystem services provision	Mild <-> severe
	Speed of change (to state of nature and/or ecosystem services)	Slow and incremental <-> fast and threshold
	Climate change (one of five drivers of nature change)	Mild <-> severe
Finance and insurance	Cost of capital	Abundant and cheap <-> scarce and expensive
	Sensitivity of capital	Insensitive to nature impacts and dependencies <-> sensitive to nature impacts and dependencies
Stakeholder and customer demands	Consumer sentiment	Ignore nature <-> incorporate nature
	Consumer attention to impact	Concentrated <-> widespread
	Impact of nature impacts on reputation	Significant <-> marginal
	Impact of ecosystem service delivery on consumer	Indirect through price <-> direct through availability
	Sensitivity to inequity of nature impacts	Low <-> high
	Impact of nature impacts on local communities	Significant <-> marginal
	regime	
Macro and microeconomy	Domestic growth	Stagnant <-> robust
	Globalising markets	Fractured, separating <-> uniform, conforming

Made by EY according to the TNFD "Guidance on scenario analysis"

Identifying the relevant driving forces

After discussion with the clients, the scenario analysis frame was set to the TNFD illustrative scenario (X-axis: degradation of ecosystem services / Y-axis: consistency of market and non-market forces).

STEP1: Identifying the relevant driving forces

While users of scenarios can create a scenario analysis frame using any of the driving forces, the TNFD proposes constructing scenario analysis as a default around the following two critical uncertainties:

1. **Ecosystem service degradation**. This is most closely correlated with physical risk and connected with climate change as a driver of nature loss as global climate regulation is an important ecosystem service.
2. **Alignment of market and non-market driving forces**. This is most closely correlated with transition risk and connected with actions to address climate change.

On one end of the critical uncertainty spectrum of ecosystem service degradation, organisations **experience material disruptions to production as a result of severe degradation in the state of nature and loss in the provision of ecosystem services on which the organisation depends**. The ability of the organisation to adapt to increasing costs or disruptions is limited by a combination of external driving forces, such as the cost of finance, or by systemic nature-related risk.

Disruptions to the organisation could be the consequence of a severe collapse in a single ecosystem service, such as pollination, or of several simultaneous minor, moderate or severe declines in complementary or connected ecosystem services due to ecosystem degradation, such as a moderate decline in water availability intersecting with a moderate reduction in carbon storage and sequestration. On the other end of the ecosystem service degradation spectrum, nature loss is moderate or low and organisations have continued access to the provision of ecosystem services on which they depend.

The second critical uncertainty is **most closely related with the definition of transition risk**. Both the TCFD and the TNFD recognise multiple types of potential transition risks faced by organisations as society takes action to address the twin crises of climate change and nature loss. These market and non-market forces are multifaceted and interact with each other, including stakeholder and customer demands and regulatory, legal and policy regimes (see Table 2 for relevant driving forces).

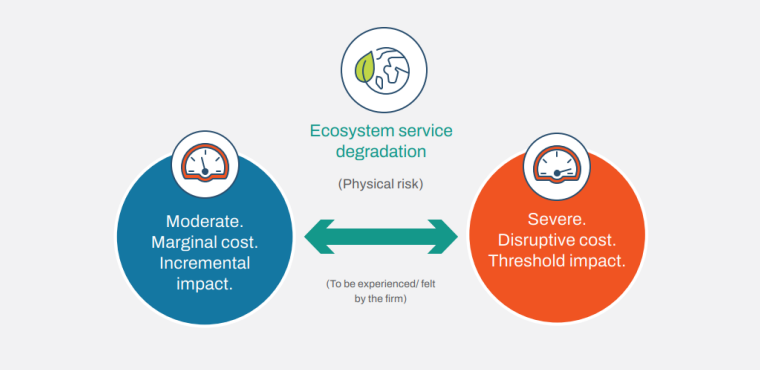
Consequently, making sense of transition risk is not simply a matter of whether that risk in aggregate is high or low, but whether the contributing market and non- market forces interacting with each other are trending in the same direction or pulling in different directions. In other words, **whether there is coherence and alignment among the contributing factors that shape the transition risks facing the organisation**.

For example, consumer attitudes towards a particular environmental issue such as plastic pollution may change quickly, but government policy and regulatory responses may move much slower, or not at all. Organisations operating across multiple legal and regulatory jurisdictions might face very different levels of policy and regulatory uncertainty, creating a low level of alignment, or they might face a high level of alignment if governments across jurisdictions are coordinating closely and consistently due to a new international policy agreement or legal convention. Such lack of consistency or alignment can arise with any of the stakeholders involved, not only consumers and regulators.

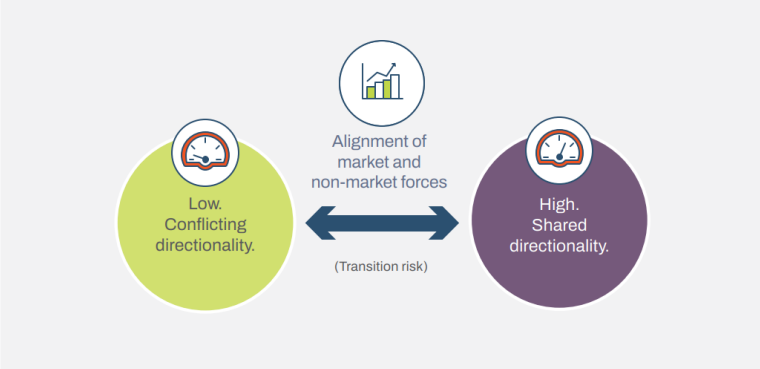
On one end of the alignment of market and non-market forces spectrum, most or all of these categories of driving forces synchronise, creating a clear decision signal for business and finance, and therefore more stability and a lower-risk operating environment.

On the other end of the spectrum, most or all of these categories of driving forces pull in different directions or move at contrasting speeds, creating conflicting decision signals for business and finance, and therefore a more unstable and high-risk context.

Critical uncertainty 1: Ecosystem service degradation
(closely aligned with physical risk)



Critical uncertainty 2: Alignment of market and non-market forces (closely aligned with transition risk)



Made by EY according to the TNFD "Guidance on scenario analysis"

Placing the organisation along the uncertainty axes

The clients place where on uncertainty axis it sits

STEP2:Placing the organisation along the uncertainty axes

When identifying baseline assumptions for the core drivers of change under different scenarios, the organisation should start by deciding a point along these critical uncertainties where it believes the organisation currently sits.

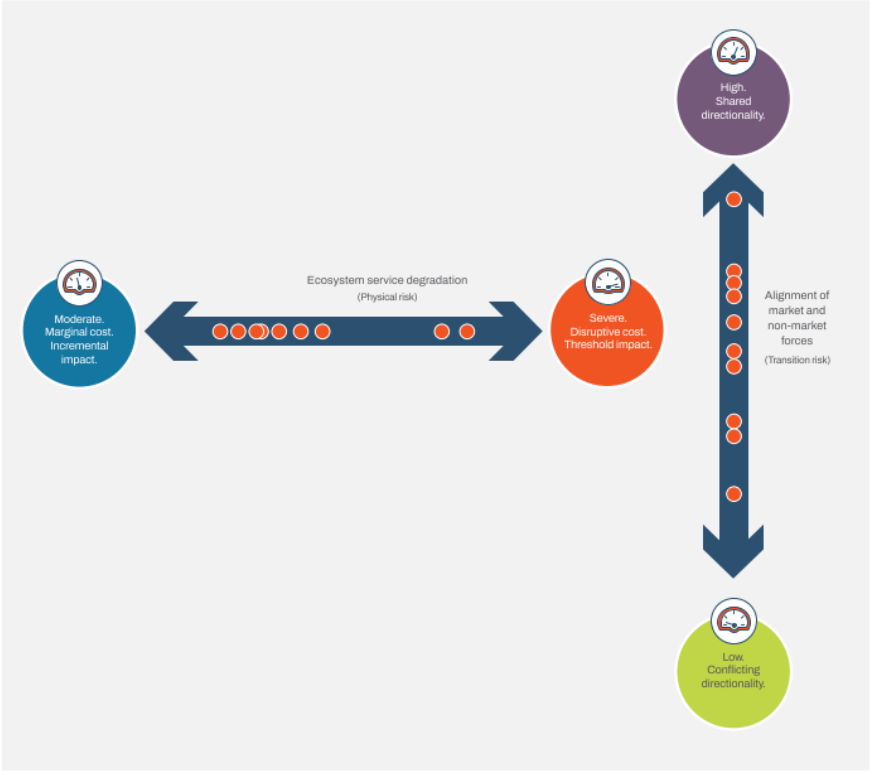
This process could be accomplished by asking each workshop participant to plot on a simple worksheet (a template is provided in the toolbox) **where on each axis they think the organisation currently sits**. This simple exercise should be the basis for a group discussion on whether the participants hold a broadly shared or highly divergent view on the current and expected state of the organisation.

The group should then align around a consensus view of the outlook for the organisation today for the purposes of the scenario exercise. The group should then **think about the possible variations in the business landscape in which the organisation may have to operate going forward**, by practically identifying where on the critical uncertainty axes they believe the organisation would sit in a specified future. More guidance on how to think of this specified future is provided in Box 2.

This step focuses **on qualitative descriptions** of the business environment, rather than quantitative models or numerical targets, to stimulate a conversation on what data (both internal and external) and/or models would be most pertinent and useful to resolve important uncertainties in the decision-making process. It also aims to help the organisation identify the disclosures that would most effectively enable an accurate evaluation from the market.

The output of this step should be a clear overview of the data and tools that are currently available to make these judgments, but also a perspective on which additional tools would be necessary to perform a deeper assessment. The scenario exercise can be useful to identify and refine the organisation's need for quantification and modelling to understand nature- related risks and opportunities further.

Illustrative result of scenario workshop discussion under Step 2



Made by EY according to the TNFD "Guidance on scenario analysis"

Placing the organisation along the uncertainty axes ＞ Utilizing Toolkit

The clients had scenario analysis utilizing TNFD Scenario Toolkit
The secretariat of MoE show how to use it and clients had analysis by themseleves

Understanding and enriching the critical uncertainty axes

Questions for analysis

Taskforce on Nature-related Financial Disclosures

Ecosystem service degradation ('X' Axis)

(1) Today

Where on the axis below does your 'facility' currently locate on dependence to ecosystem service degradation? (Mark X)

Low | High

Ecosystem service degradation (X Axis)

What data sources are being used to make this assessment?

What additional data would you wish to have, in order to improve and refine that assessment?

(2) Future

Consider baseline assumptions for the rate and direction of change. What are the core drivers of that change?

Consider possible impact on baseline assumption of:

	Direction of impact	Magnitude of impact
Climate		
Technology		
Regulating constraints		
Ambient macroeconomic		

Alignment of market/non-market forces ('Y' Axis)

(3) Assessment of major factors shaping market and non-market forces

	Permissive to Restrictive Impact	Magnitude of Impact	Direction of Change	Rate of Change
Local regulation				
National regulation				
Global regulation				
Supply chain price signals (1st + 2nd orders if possible)				
Consumer sentiment (Reputation + Capital)				
Traditional capital + insurance				

Without a formal equation and simply eyeballing the above charts:
Where would you locate currently? (*Mark 2023 on scale below*)
Where would you expect to locate in 2030? (*Mark 2030 on scale below*)

Low | High

Alignment of market/non-market forces (Y Axis)

What are the most valuable data sources used now in your firm to support these assessments?

What additional data what you wish to have in order to improve and refine that assessment?

What are exogenous shocks that could radically increase or reduce coherence?

Shock examples	Likely direction of impact

14

Points

- ✓ Involving not only the TNFD's main department but also business units and others in the analysis.
- ✓ Rather than analyzing all items accurately and time-consumingly, prioritizing the analysis of items considered important to one's own company.

Using scenario storyline descriptions

Clients analised a plausible future state of the world with relevance to its own operations.

STEP3:Using scenario storyline descriptions

When put together as an intersection, the scenario axes selected by the organisation generate **four possible scenarios (or quadrants),** each including a description or storyline of a plausible future state of the world in which the company might find itself operating. The emphasis **is on plausible, not preferred**. The two critical uncertainties might not cause this plausible future state of the world to come about and certainly not on their own. It is up to the scenario analyst to ask and answer the question: *How and why did this plausible future state of the world come about? Or, in other words, what are the causal drivers that would lead to a world where those descriptions are accurate?*

As outlined in Step 1, the TNFD proposes four narratives of plausible futures based on two critical uncertainties, **which can be tailored to maximise the relevance and usefulness to the organisation**, based on its own context and unique characteristics.

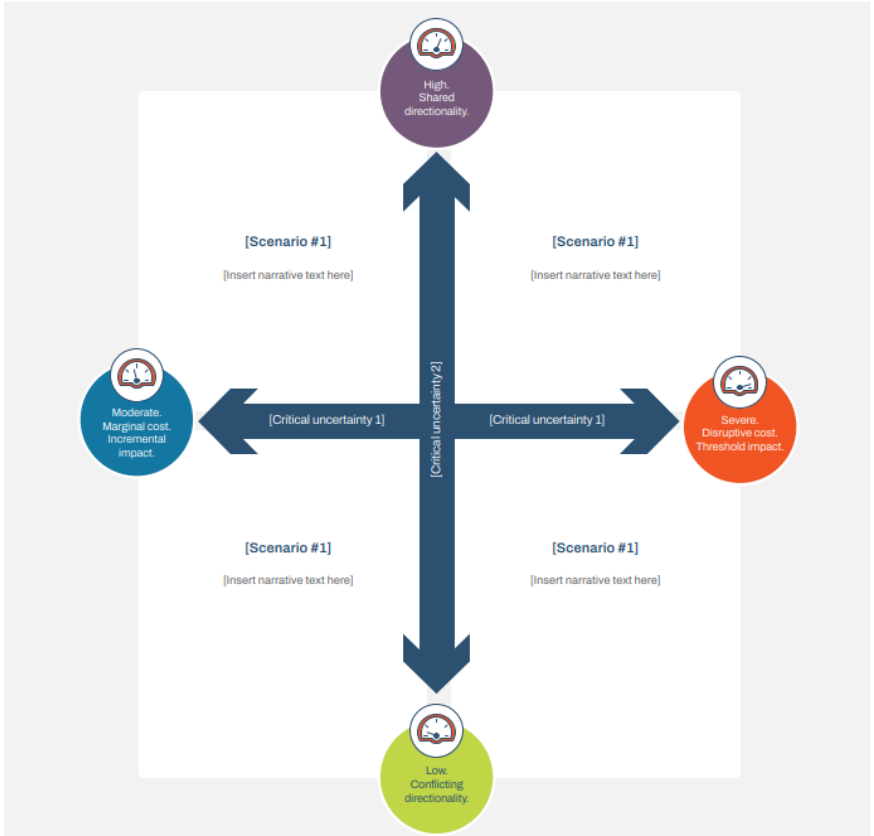
Figure 7 presents a visual representation of the 2×2 frame in which the axes intersect, and to which organisations can add the relevant scenario narratives.

In this step, the organisation explores each of the four pre-defined scenarios to prompt thinking around **what is different from today, and what new risks and opportunities might emerge in each of the scenarios identified**.

Facilitation aids: The TNFD provides facilitation worksheets as templates to help guide these exploratory discussions. The printable toolbox components can be found on the TNFD website, with links provided in Annex 1.

Facilitation format: Ideally the number of workshop participants is sufficiently large (15-25 people is recommended) to enable workshop participants to split into break-out groups with meaningful and diverse representation of different parts of the business, with each group assigned to explore one of the four scenario narratives. Participants in each group can use the TNFD worksheets to provide a structure to their discussion and capture the collective thinking of the group about what that plausible future would look like and its potential implications for the organisation.

A 2×2 scenario frame



Made by EY according to the TNFD “Guidance on scenario analysis”

Using scenario storyline descriptions > Utilizing Toolkit

Described storylines on every scenario Utilizing Toolkit

Understanding and deepening the scenarios

TNFD Taskforce on Nature-related Financial Disclosures

High level narrative

This is a world in which:

Major driving forces

This is happening because (4 most important drivers):

This scenario is credible because...

Existing evidence that people in 2030 will refer back to this as having been and early indication that this scenario was unfolding:

Newspaper headlines that would appear in this scenario:

Newspaper Headlines

Publication	Year	Publication year headline

Descriptors of the nature-business nexus in this world

	Upside risks	Downside risks	Which predominates?
Supply chain			
Cost of capital + insurance			
Product mix			
Technology inputs			
Firm reputation + customer sentiment			
Regulatory			

The biggest difference, from your business' perspective, between today's world and this world is:

The greatest uncertainty about nature assets + services that your business world would confront in this world is:

New business goals & opportunities that would come to focus in this world...	Business goals + opportunities of today that would have to be dropped or radically revised in this world:

The most ambitious vision for business-nature success in this world is:

The most important risk to business-nature success in this world is:

Most valuable data or models that would help to metricize and navigate this world:

If you had a crystal ball and knew for certain this world was coming, what would you put forward as a nature-positive moonshot (at the very edge of realistic):

In 2030, the Economist publishes a "Nature Positive Business" survey.

Draw the cover art:

15

Points

- ✓ Creating for each quadrant (scenario) and ensure that the different states between quadrants are clear.
- ✓ creating a separate document that simplifies the content of this sheet since this sheet will be used as reference material during workshops,

Workshop ＞ summary

A face-to-face workshop was held based on the explanation of the

2. Implementing the TNFD natural scenario approach – The TNFD scenario toolbox

2.2. A participatory workshop-driven approach

Focus: Organizations conducting scenario workshops should focus on testing, refining and extending their thinking, plans and decisions. Emphasis should be on the most relevant aspects of understanding the organization's dependencies and impacts on nature, and the resilience of strategies under different scenarios that may shape the organization **'s nature** - **related** risks

Duration : A full scenario exercise is typically conducted over a multi-day workshop. Many organizations may not be able to commit that level of time and resources, so a **one- or half-day workshop** can generate preliminary hypotheses and findings that can be further developed according to the organization's needs and interests.

Participants : To gain useful insights, scenario workshops should include **staff from diverse professional backgrounds** , as well as **external experts . Additional guidance on designing successful scenario workshops** is outlined in

Step2: Placing the organization along the uncertainty axes

This process can be accomplished by having each workshop participant plot their organization's current position on each axis on **a simple worksheet** (see the Toolbox template). This simple exercise can then be used to spark **a group discussion** about whether participants have a broadly shared view of the current and desired state of the organization, or whether they have very different views .

Step 3: Using scenario story descriptions

Ideally, workshop participants are large enough (**15-25 recommended)** to split into groups with representatives from various business functions, with **each group** assigned **to explore one of the four scenarios .** Participants in each group use the worksheet to discuss and gather the group's thoughts on what plausible futures might look like and how they might affect the organization.

Workshop case study (excerpt)

Dow Chemical
Workshop duration: **6 hours** of **face -to** -face workshop
Scope: Chemical manufacturing business on the US Gulf Coast
Participants: **15** people

Stockland
WS Time: **4 hour** face **-to** -face workshop
Scope: Australian property development business
Participants: **20** people from **multiple business divisions**

Workshops held in this model project

Duration : 2 hours
Format : Face-to-face
Participants : 15-20 people , cross-
WS objective : To identify (1) the impact and likelihood of occurrence of nature-related risks and opportunities for each scenario, and (2) any omissions in risk opportunities.
Workshop flow :

Contents	time
TNFD and purpose of the workshop	20 min
Work to refine risks and opportunities in each quadrant	45 min
Sharing the results of the study	25 min

WS placement :

Workshop > Images of the workshop deliverables

In the workshop, participants were divided into groups into quadrants, and the following were identified for nature-related risk opportunities: 1) the impact and likelihood of occurrence, plus the reasons for them, and 2) any omissions or gaps in risk opportunities.

Analyze based on your company's natural capital-related risks and opportunities

Create each of the first to fourth quadrants

Illustrative

category		Risks and Opportunities (Examples)	First quadrant	
			Impact	Likelihood
Physical Risks	acute	Deforestation has reduced the disaster prevention capabilities of the base	Medium Medium small large small Because we have determined that... Because we have determined that...	Medium Medium Low Medium Low Because we have determined that... Because we have determined that...
	Chronic	Excessive water use leads to a decline in water resources	small small small Medium small Because we have determined that... Because we have determined that...	Medium Medium small High small Because we have determined that... Because we have determined that...
	…	…	… …	… …
Transition Risk	policy	Strengthening of regulations on mining and soil contamination	large large Medium large Medium Because we have determined that... Because we have determined that...	High High High Medium Medium Because we have determined that... Because we have determined that...
	market	Increasing consumer pressure to address natural capital	large large large large Medium Because we have determined that... Because we have determined that...	High High large small small Because we have determined that... Because we have determined that...
	…	…	… …	
opportunity	Products & Services	Increasing need for natural ca related services	large Medium lar ave... B...	
	reputation	Increasing interest in natural capital among companies	large large large large Medium Because we have determined that... Because we have determined that...	High High large small small Because we have determined that... Because we have determined that...
	…	…	… …	… …

② List any missing risks and opportunities

①Write an assessment of the impact and likelihood of risk and the reasons for it

- ✓ Divide into groups by quadrant and evaluate the impact and likelihood of occurrence of natural capital-related risks and opportunities in the quadrant for which you are responsible.
- ✓ Each member of the group presents the impact, likelihood, and reasons for it to the other members.
- ✓ Discuss within the group and come up with a unified assessment of the impact and likelihood of occurrence.

Examples of roles of

It is important to hold a workshop with members from a variety of positions and occupations, and when assembling the members, it is important to convey an image of what will be said at the workshop.

example

Classification	Department (General classification)	role	Comment image from WS
Business Division	**XX Division**	▸ XX business on natural capital	▸ the XX project uses a lot of groundwater, isn't there a significant risk of water pollution and depletion?
	XX Division	▸ XX business on natural capital	▸ the XX project uses a lot of groundwater, isn't there a significant risk of water pollution and depletion?
Corporate	**Corporate Planning business administration**	▸ It is a multifaceted opinion on the expected impact on business. ▸ Participation with an awareness of integration into business strategies ▸ Participation with an awareness of business development, such as new businesses	▸ As regulations and public attention towards natural capital become stricter, it seems necessary for the company to respond, but what is the priority compared to other management agendas?
	Business Planning	▸ Providing opinions on nature-related risks and opportunities from a business strategy perspective	▸ Whether natural capital advances or lags, opportunities to utilize our own technology will increase, and business opportunities will expand.
	production	▸ Opinions regarding the impact of natural capital on logistics / manufacturing, etc.	▸ The tightening of water usage in manufacturing is a big risk, and there seem to be limitations to the measures that can be taken to address it.
	Procurement	▸ Opinions regarding the impact of natural capital on procurement, etc.	▸ The prices of mineral resources from which we procure them may rise in the future due to stricter regulations, but we can expect stability if we are willing to accept the costs and pay them.
	Store Sales	▸ Opinions regarding the impact of natural capital on store design / development and customer behavior	▸ Customers who visit the store have recently become more nature-conscious, and if we don't cater to their interests, they'll likely drift away.
	R&D/ Technology	▸ Opinions regarding product and technology development, etc., with a view to responding to natural capital	▸ Product development that reduces the use of natural resources is currently at a high level, so no drastic improvements are expected in the future.
	Financial Accounting	▸ Opinions regarding	▸ With other important business agendas, we are skeptical that capital will be allocated to cover the increased procurement costs associated with taking natural capital into consideration.
	public relations	▸ Consideration of information disclosure content / dissemination method to stakeholders, including IR	▸ Investors are also increasingly watching the company, so if they don't take action quickly, there is a possibility that they will be divested.
	Sales / Marketing	▸ Designing communication strategies in environmental aspects	▸ XX country, which accounts for XX % of sales , has a stronger awareness of natural capital than Japan, not taking early action is a big risk.

Workshop > basis for judging the impacts and possibilities

Carried out a workshop with other business unit using LEAP approach and risk and opportunity analysis

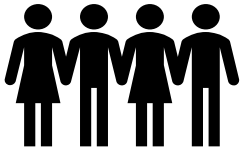
LEAP approach

Result of LEAP approach

Risk-opportunity analysis

Result of Risk-opportunity analysis on nature capital

Other business unit



Used for the analysis

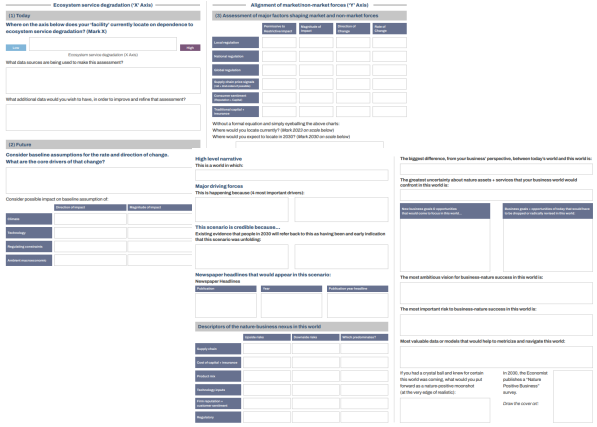
Preparing the sheet as far as possible in discussion with other business unit

Carried out workshop using the knowledge of other business units

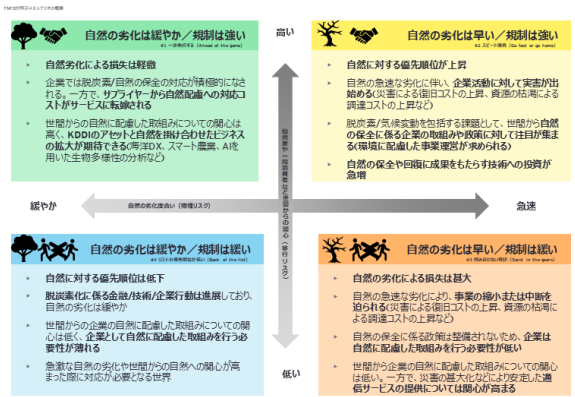
・

Enlightenment through involvement of other business units

TNFD Toolkit



Description of 4 quadrants



Carried out workshop based on the stories

Workshop

Finalize the risk and opportunity assessment

↓

Assess the impact

↓

Define the plan

↓

・・・

Workshop Tips

In order to ensure that the workshop proceeds smoothly, it is important to plan carefully from the preparation stage to the day itself and to stimulate discussion.

category	overview
Preparation	Workshop participants will **gain a deeper understanding** if they are involved in the discussion from **the scenario description stage onwards** (if they only participate in the discussion at the workshop, it will be difficult for them to understand the scenario, and it will take time to agree on various definitions and assumptions, which can easily lead to discrepancies in the discussion).
Preparation	If it is difficult for workshop participants to participate in the pre-conference discussions, providing **an opportunity to explain** the TNFD and scenario details, the overview of the workshop, etc. **in advance** will help the workshop proceed smoothly on the day.
General	in **person** using **poster boards and sticky notes** stimulates risk and opportunity assessment in TNFD scenario analysis **relies heavily on participants sharing their opinions** , the success of the workshop depends greatly on "stimulating discussion."
General	Although it is possible to hold workshops in an online format using **online tools ,** it is difficult to stimulate discussion because it can be **difficult to speak at the same time . Therefore, we** recommend
General	to set aside a total of about
How to proceed with	**intuitively decide** on the degree of impact (**large, medium, small**) and the likelihood of occurrence (**high, medium, low**) is easy for participants to follow.
How to proceed with	For all risk opportunities , first evaluate **them as "large, medium, small" or "high, medium, low," and then give opinions on the reasons for each** . This is a smooth procedure (if the evaluations of "large, medium, small" and "high, medium, low" and the reasons are discussed together, the time may run out before all risk opportunity items can be evaluated).
How to proceed with	**If we get too hung up on the basis for** judging whether something is "large, medium, small" or "high, medium, low" at the workshop , the discussion will not progress, so it is advisable
system	Natural capital-related risk opportunities are closely related to business operations and locations, so **recruiting participants from business divisions with on-site experience** will deepen the analysis.
system	**A facilitator with knowledge of natural capital will be assigned** to each scenario to facilitate discussion.

Business impact evaluation

The business impact assessment was conducted

Illustrative

category		risk	First Quadrant		Second Quadrant		Third Quadrant		The fourth qu...	
			Impact	Likelihood	Impact	Likelihood	Impact	Likelihood	Impact	Likelihood
Physical Risks	acute	Deforestation has reduced the disaster prevention capabilities of the base	small	Low	Medium	Medium	Medium	Low	large	High
	Chronic	Excessive water use leads to a decline in water resources	small	Low	Medium	Medium	Medium	Low	large	High
	…	…	…	…	…	…	…	…	…	…
Transition Risk	policy	Strengthening of regulations on mining and soil contamination	small	Low	large	Medium	small	Low	small	High
	market	Increasing consumer pressure to address natural capital	large	High	Medium	Medium	Medium	Low	large	High
	…	…	…	…	…	…	…	…	…	…
opportunity	Products & Services	Increasing need for natural capital-related services	small	Low	Medium	Low	Medium	Medium	Medium	Medium
	reputation	Increasing interest in natural capital among companies	large	High	small	Medium	small	Medium	small	small
	…	…	…	…	…	…	…	…	…	…

- ✓ The support organization summarizes the results of the workshop and identifies the impact and likelihood of risk opportunities for each quadrant.
- ✓ Evaluate by being conscious of the difference in impact and likelihood for each quadrant

Countermeasure definition

were defined in order of priority based on the response policy (do nothing / wait and see / take action gradually / take action immediately) set based on the impact and likelihood of occurrence.

Illustrative

category		risk	First Quadrant				Second Quadrant				Third Quadrant				The fourth qu			
			Impact	Likelihood	Response Policy	Solution	Impact	Likelihood	Response Policy	Solution	Impact	Likelihood	Response Policy	Solution	Impact	Likelihood	Response Policy	Solution
Physical Risks	acute	Deforestation has reduced the disaster prevention capabilities of the base	small	Low	Do nothing	…	Medium	Medium	Respond quickly	…	Medium	Low	Wait and see	…	large	High	Respond quickly	…
	Chronic	Excessive water use leads to a decline in water resources	small	Low	Do nothing	…	Medium	Medium	Respond quickly	…	Medium	Low	Wait and see	…	large	High	Respond quickly	…
	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
Transition Risk	policy	Strengthening of regulations on mining and soil contamination	small	Low	Do nothing	…	large	Medium	Respond quickly	…	small	Low	Do nothing	…	small	High	Wait and see	…
	market	Increasing consumer pressure to address natural capital	large	High	Respond quickly	…	Medium	Medium	Respond quickly	…	Medium	Low	Wait and see	…	large	High	Respond quickly	…
	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
opportunity	Products & Services	Increasing need for natural capital-related services	small	Low	Do nothing	…	Medium	Low	Wait and see	…	Medium	Medium	Respond quickly	…	Medium	Medium	Respond quickly	…
	reputation	Increasing interest in natural capital among companies	large	High	Respond quickly	…	small	Medium	Start in stages	…	small	Medium	Start in stages	…	small	small	Do nothing	…
	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…

✓ Prioritize countermeasures based on risk opportunities that are highly important in terms of both impact and likelihood of occurrence

Documentation and Disclosure

In the documentation and disclosure process, we interpreted the analysis results, organized the information that should be disclosed , and reviewed the disclosure manuscripts prepared by the supported companies.

XXXX Corporation TNFD Report 2024

table of contents

1. **XXXX Corporation's approach and initiatives regarding natural capital p.XX**
2. **Governance p.XX**
   1. Sustainability Promotion Structure p.XX
   2. Stakeholder Engagement p.XX
3. **strategy p.XX**
   1. risk p.XX
      1. ... p.XX
      2. ... p.XX
   2. opportunity p.XX
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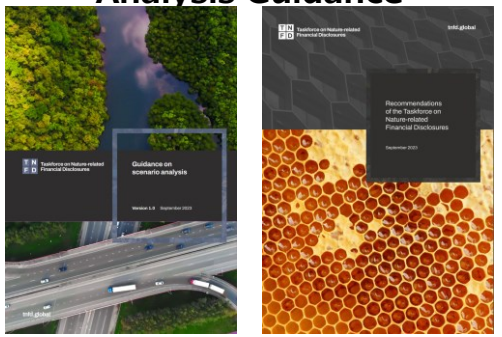
4. **Managing risks and opportunities p.XX**
   1. Natural capital-related risk identification and assessment process p.XX
   2. Integration into enterprise risk management p.XX
5. **Indicators and goals p.XX**
   1. index p.XX
   2. the goal p.XX
6. **.... p.XX**
   1. ... p.XX
   2. ... p.XX

TNFD Recommendations / Scenario Analysis Guidance



Examples of scenario analysis disclosure by other companies

Company A
Company B
Company C
Company D

- ✓ We considered how to incorporate the results of the analysis into disclosure documents based on the
- ✓ In doing so, we referred to the TNFD recommendations and examples of other companies that have already disclosed TNFD scenario analyses.

The benefits of conducting TNFD scenario analysis include building a resilient management system by digging deeper into natural capital-related risks and opportunities, and raising awareness of natural capital within the company.

Benefits of conducting

Building a resilient management system by digging deeper into natural capital-related risks and opportunities

- By drawing up multiple scenarios and analyzing the impact, likelihood, and gaps of risk opportunities, you can dig deeper into your company's natural capital-related risk opportunities.
- By analyzing the relationship between business and nature based on multiple scenarios, we can build a resilient management structure no matter what the world holds.

Raising awareness of natural capital within the company

- It is advisable to involve many departments in scenario analysis, and as the analysis progresses, the members involved will inevitably gain a deeper understanding of the relationship between business and natural capital.
- In particular, the workshops will involve participants from a variety of occupations and levels, and through dialogue, will increase understanding and awareness of the natural capital-related risks and opportunities that the company's business faces.

Key points in the Approach

Don't get too hung up on evidence and quantitative data

- TNFD scenario analysis is based on the premise that it is an "exploratory scenario" and that quantitative data on natural capital scenarios is very limited. It is important to paint a broad picture of possible future worlds based on a variety of relevant external information and your own company's own perceptions.
- to use tools such as the Toolkit to identify driving forces and depict scenario stories , and in the process reach a common understanding with various stakeholders inside and outside the company regarding natural capital-related risks and opportunities, the external environment surrounding them, and possible scenarios (precise analysis based on evidence and quantitative data is extremely difficult with current data sources).

Involvement of management and business divisions

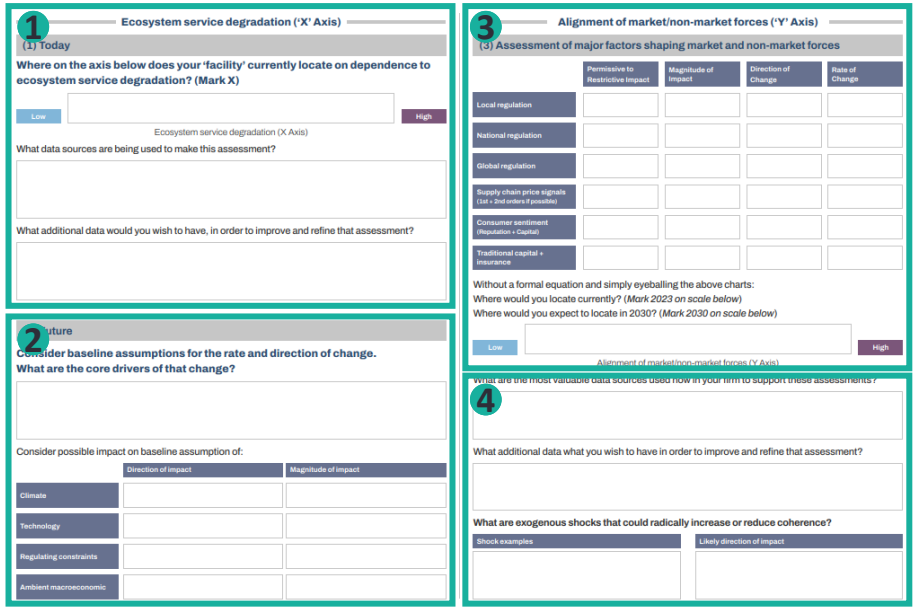
- TNFD scenario analysis is to accurately grasp a company's natural capital-related risk opportunities and build a resilient management system based on that understanding, so the involvement of management is essential.
- Because the relationship with natural capital varies greatly depending on the characteristics of each business and the region in which it operates, it is advisable to involve various business divisions in the analysis and evaluate the company's natural capital-related risks and opportunities from multiple perspectives (in particular, it is recommended to invite members from various job areas and positions to workshops, regardless of their knowledge or experience regarding natural capital).

TNFD Tool kit

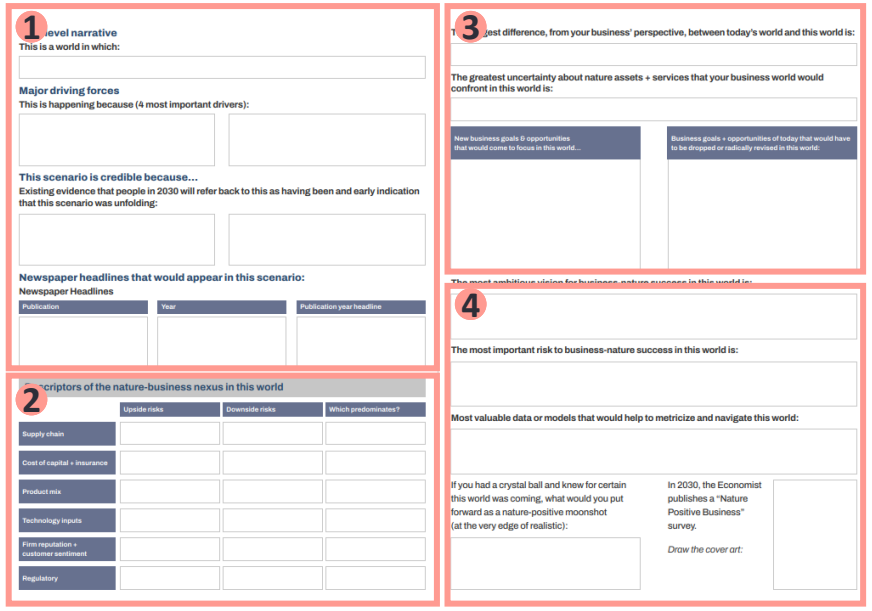
Introducing an example of how to use the TNFD Scenario Toolkit

Toolkit Overview	 • Toolkit for conducting scenario analysis issued by the TNFD • The guidelines recommend that this be used when analyzing
for analysis *	• Determine whether there is a widely shared or differing view within the organization about the current and future state of the business • Discuss which data (internal and external) and models are most appropriate and useful • Focus on qualitative descriptions of the business environment, rather than quantitative models and numerical targets. (Note: the TNFD does not recommend rushing into quantitative analysis in scenario analysis.) • It is advisable to create it in consultation with other business divisions and corporate divisions.

Worksheet 1 — Create only one



Worksheet 2 — Create 4 copies for each quadrant



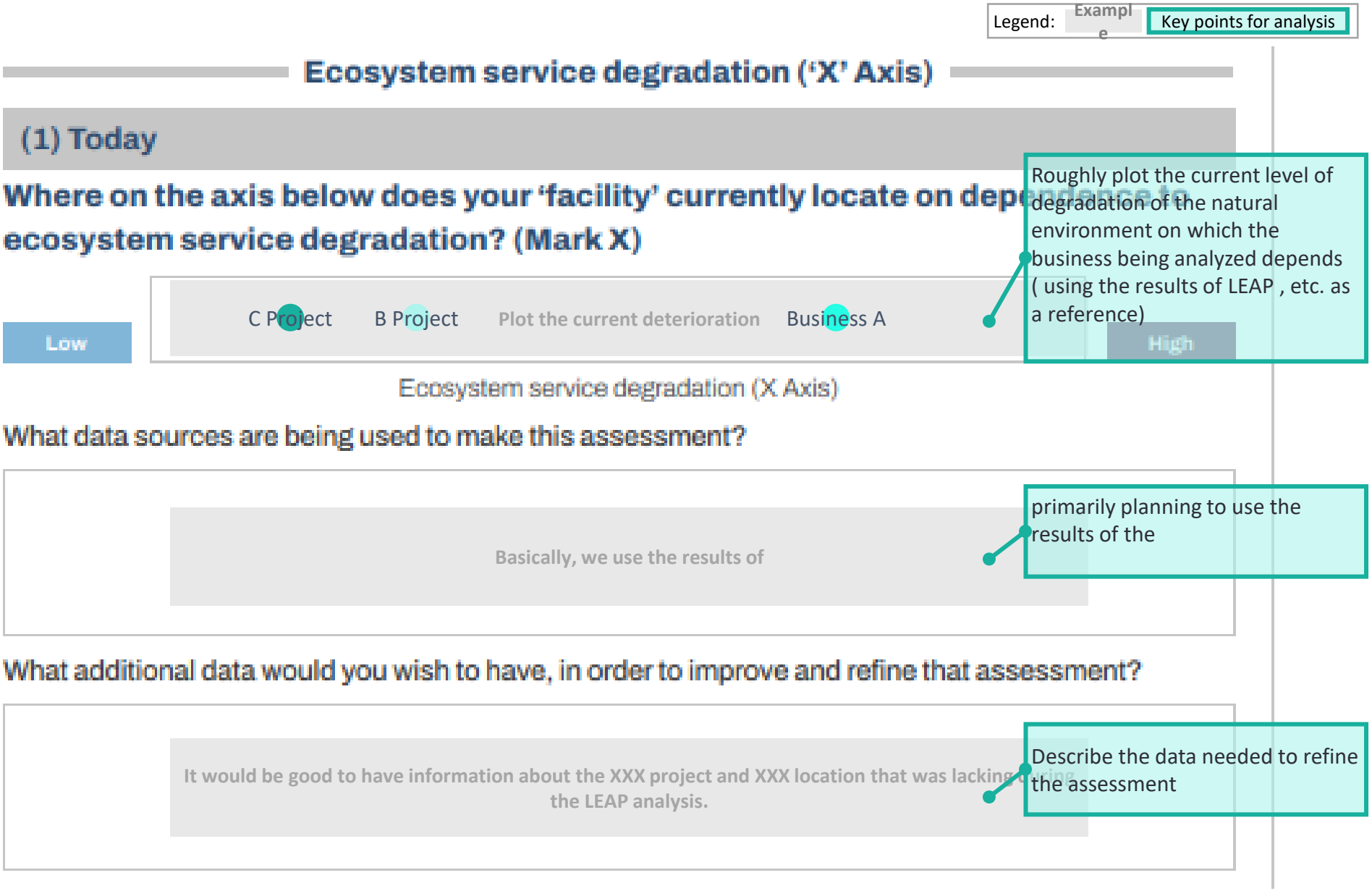
STEP 2 : Used for arranging businesses and facilities along the uncertainty axis

STEP 3 : Used in describing the scenario story

* Excerpted from the

Example of Worksheet ❶

level of degradation of ecosystem services will be identified using past TNFD studies, etc.



Example of Worksheet ❷

Examining factors that bring about changes in the degradation of ecosystem services and the direction and magnitude of their impacts

Legend: Example | Key points for analysis

(2) Future

Consider baseline assumptions for the rate and direction of change. What are the core drivers of that change?

Forest degradation and the contamination and depletion of groundwater and surface water are likely to be the main drivers.

Target ecosystem services on which your business depends and describe the core drivers of their degradation
(With reference to the results of the

Consider possible impact on baseline assumptions

	Direction of impact	Magnitude of impact
Climate	1.5 ℃: Forest degradation and the pollution and depletion of water resources will occur slowly 4 ℃: Forest degradation and water resource pollution and depletion are accelerating.	1.5 ℃: Medium 4 ℃: Large
Technology	Technological development: Prevention and monitoring can be strengthened Technological stagnation: (This impact is unlikely)	Technology Development: Large Technology stagnation: -
Regulating constraints	Strengthening regulations: Forest degradation and water resource pollution/depletion are gradual Deregulation: Forest degradation and water resource pollution and depletion are accelerating	Regulatory tightening: Large Deregulation: Medium
Ambient macroeconomic	Retreat: Forest degradation and water resource pollution/depletion are gradual Growth: Forest degradation and water resource pollution and depletion are accelerating	Retreat: Medium Growth: Large

Break down the impact on the above core drivers into factors based on the categories below and describe them.

Roughly describe the magnitude of each change (without worrying too much about the certainty of the evidence)

Example of Worksheet ❸

Similarly , the current and future position of market/non-market forces is identified by analyzing multiple factors.

Legend: Example | Key points for analysis

Alignment of market/non-market forces ('Y' Axis)

(3) Assessment of major factors shaping market and non-market forces

	Permissive to Restrictive Impact	Magnitude of Impact	Direction of Change	Rate of Change
Local regulation		small	XXX regarding natural capital is likely to become stronger/weaker	
National regulation		small	XXX regarding natural capital are likely to become stronger/weaker (in the country where the project is implemented)	
Global regulation		large	(Globally) XXX regulations regarding natural capital are likely to become stronger/weaker	
Supply chain price signals (1st + 2nd orders if possible)	Omitted	large	XXX regulations regarding natural capital throughout the supply chain are likely to become stronger/weaker	Omitted
Consumer sentiment (Reputation + Capital)		Medium	Consumer interest in natural capital is likely to increase/decrease	
Traditional capital + insurance		large	Assessment of natural capital in investment and lending decisions is likely to become stricter/looser	

Without a formal equation and simply eyeballing the above charts:
Where would you locate currently? (*Mark 2023 on scale below*)
Where would you expect to locate in 2030? (*Mark 2030 on scale below*)

Plot current and future positions

Low — Future Position — Current location — Future Position — High

Alignment of market/non-market forces (Y Axis)

The magnitude of change is
Roughly describe the magnitude of each change (without worrying too much about the certainty of the evidence)

The direction of change is
We will assume a direction toward either extreme and also consider the consistency between markets

"From permissive impact to restrictive impact" and "rate of change" are difficult to interpret, and can be supplemented with "magnitude of change" and "direction of change." Therefore, it is not necessary to include them in the scenario analysis for the first year.

Roughly assess and mark market and non-market alignment
- ✓ Current: Identify the position based on the above work items (columns) etc.
- ✓ Future: Identify the location of the poles based on the results of the above work.

Example of Worksheet 4

Identify the data used in the analysis and what data is needed to improve it
We also consider exogenous shocks that could dramatically increase or decrease consistency.

Legend: Example | Key points for analysis

What are the most valuable data sources used now in your firm to support these assessments?

XXX in reports by IPCC , IPBES , IEA , etc. can be useful.

First, I will list some references that can be used to evaluate the consistency between markets and non-markets.

What additional data what you wish to have in order to improve and refine that assessment?

There are many abstract descriptions, so quantitative figures are needed.

Specify the data needed to further refine your analysis

What are exogenous shocks that could radically increase or reduce coherence?

Shock examples	Likely direction of impact
A new administration has come to power in the United States that prioritizes economic growth and ignores the damage to the earth that comes with exploiting natural resources, and the financial industry is following suit.	The financial industry and other sectors are collapsing their systems for nature positivity, and we are heading towards a dystopian world.

Describe exogenous shocks (hard-to-anticipate) that could have a significant impact on the market
For example, natural disasters, currency crises, conflicts, pandemics, cyber terrorism, runaway AI , etc.

If an exogenous shock, as outlined in the left box, occurs, describe how it will affect the market - non-market alignment of natural capital.

Example of Worksheet 1

To understand and explore the scenarios, we consider high-level worldviews, key driving forces, evidence from the 2030 perspective, and newspaper headlines.

Legend: Example | Key points for analysis

High level narrative

This is a world in which:

climate change is actively addressed and the trend towards nature-positive policies and a healthy global environment accelerates

Roughly describe the world view with reference to

Major driving forces

This is happening because (4 most important drivers):

Stronger regulations will encourage companies to take action on natural capital and climate change, resulting in a slower rise in temperatures and a slower deterioration of nature.

Advances in technology are improving the accuracy of prevention and monitoring, and market demand is growing

List two to four driving forces that will shape that world (you don't need to list

This scenario is credible because...

Existing evidence that people in 2030 will refer back to this as having been and early indication that this scenario was unfolding:

As natural deterioration begins to cause real damage, companies begin to feel a sense of crisis in promoting their own businesses.

Increased engagement from investors on natural capital issues

Describe the first signs that this world will emerge in

Newspaper headlines that would appear in this scenario:

Newspaper Headlines

Publication	Year	Publication year headline
	Write freely	

Write freely
(The analysis itself is possible even if the information is omitted.)

How to use the worksheet > 2

Analyze the relationship between your business and nature in this world from the perspective of both upside (profit side) and downside (loss side) based on the given categories.

Legend: Example | Key points for analysis

We will discuss how these categories will change in this world and how they will be affected by it.

Discuss and write down which is more prevalent for your business: upside risks (profits) or downside risks (losses)

Descriptors of the nature-business nexus in this world

	Upside risks	Downside risks	Which predominates?
Supply chain	Suppliers that cannot comply with nature-related regulations will be eliminated, and stable procurement will be possible only from suppliers that are advancing their compliance with regulations.	If only stable suppliers that can comply with nature-related regulations survive, procurement costs from them will become higher.	The survival of only stable suppliers is likely to have a greater impact on our business than rising procurement costs.
Cost of capital + insurance	By taking measures to address natural capital, your company's financing costs will decrease and the supply of capital will become more stable.	If we do not proceed with this initiative, our evaluation by financial institutions will decline and it will become difficult to raise funds.	Given the state of play in addressing natural capital to date, the risk of capital funding becoming more difficult seems to be greater than the risk of capital supply stabilization.
Product mix	By expanding the range of products, we can reduce the risks associated with the establishment of natural capital-related regulations and systems and ensure a stable supply of products.	Expanding our product range will require new raw materials and suppliers, increasing our procurement costs for product manufacturing	The risk of stable supply being hindered by regulations and systems is likely to be greater than the risk of rising procurement costs.
Technology inputs	Natural capital-related technological developments and growing market demand will drive down the costs of natural resource management.	Due to technological developments such as improved monitoring accuracy, combined with stricter regulations and systems, assessments of a company's natural capital will become more stringent.	Profits are likely to be higher as the costs of monitoring many suppliers related to base stations and mobile devices will fall.
Firm reputation + customer sentiment	Management that takes natural capital into consideration increases customer appreciation	a V/C that is in line with consumer awareness and focuses on natural capital will lead to higher product prices, which will in turn alienate customers.	B2C businesses, consumer awareness of sustainability is paramount, so profits are likely to be greater.
Regulatory	If regulations increase and the company responds quickly, but competitors are slow to act, competition will slow down and the market will become favorable for the company.	Failure to comply with regulations could pose a risk as operations will be halted	In companies with complex

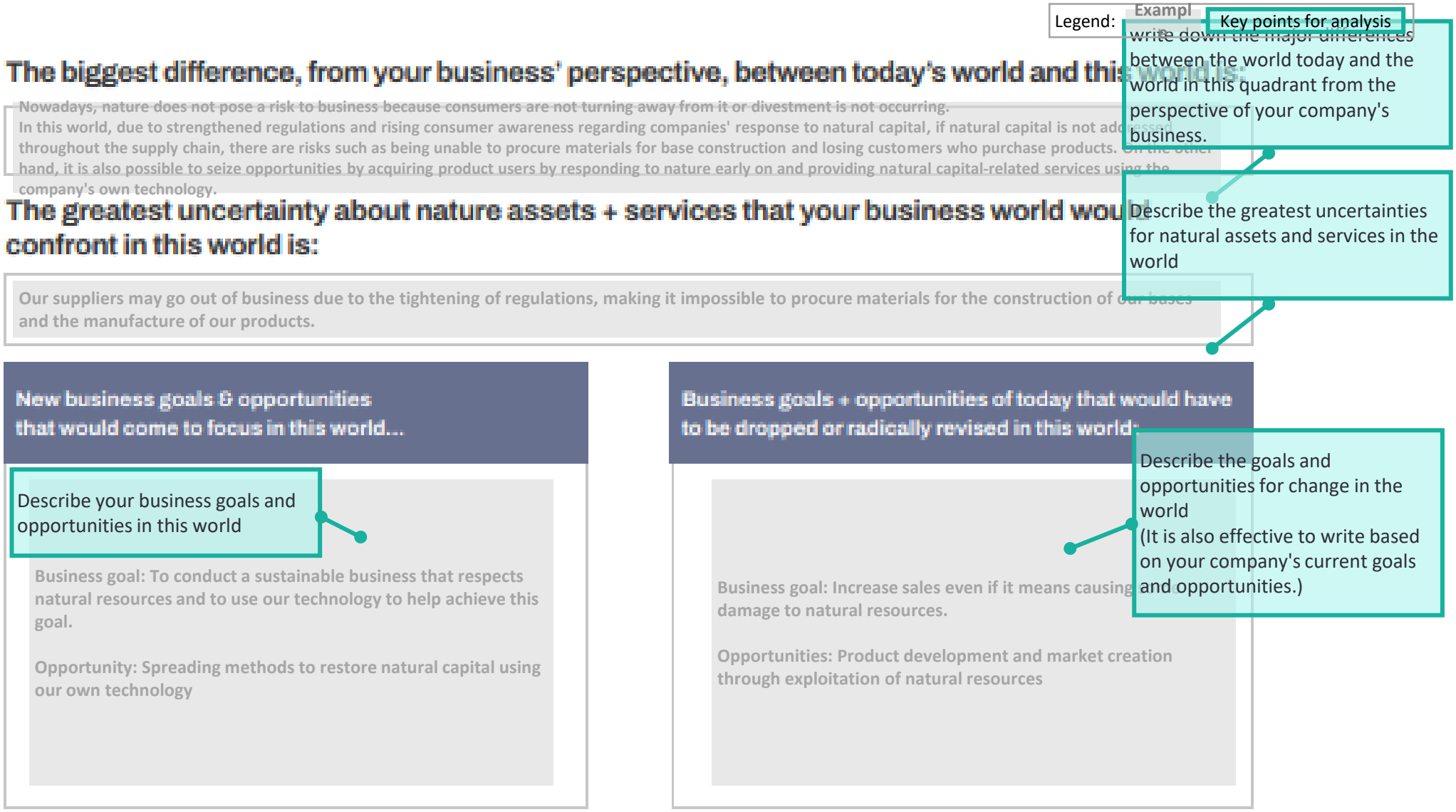
With all the changes happening in these categories in our world... → **There are upside and downside risks in our own business...** → **Comparing the two, I think XXX is superior.**

When explained narratively

In this world, regulations on natural capital will become stricter throughout the supply chain, so ① the upside risk is that "suppliers that cannot comply with nature-related regulations will be eliminated, allowing stable procurement from stable suppliers," and ② the downside risk is that "if only stable suppliers that can comply with nature-related regulations survive, procurement costs from them will increase." When comparing the two, we judge that ③ the impact of only stable suppliers surviving will be greater than the impact of higher procurement costs (the upside is dominant).

How to use the worksheet > 3

Examine the business and nature implications of the scenarios in terms of differences from the current world, uncertainties surrounding natural assets and services, and business goals and opportunities.



Examine the business and nature implications under scenarios, including the most ambitious vision for business and nature success, the most significant risks, and valuable data and models

Legend: Example | Key points for analysis

The most ambitious vision for business-nature success in this world is:

In addition to promoting our own natural capital response, we aim to expand the scale of our business while achieving nature positive on a global scale by popularizing our own natural capital-related technologies in the market.

Describe the ambitious businesses in this world

The most important risk to business-nature success in this world is:

Regulations regarding natural capital may become stronger than expected, making it impossible to procure many of our suppliers.
The system design for restoring natural capital and people's awareness of nature will collapse, and investments in natural capital will not be returned, and as a result, businesses will become passive in their efforts to protect nature.

Describe risks from a variety of perspectives

Most valuable data or models that would help to metricize and navigate this world:

XXX data in the XXXX report of the IPCC or IPBES may be useful.

Describe the data and literature used to estimate this worldview.

Write freely
(The analysis itself is possible even if the information is omitted.)

If you had a crystal ball and knew for certain this world was coming, what would you put forward as a nature-positive moonshot (at the very edge of realistic):

Write freely

In 2030, the Economist publishes a "Nature Positive Business" survey.

Draw the cover art:

Write freely

Write freely
(The analysis itself is possible even if the information is omitted.)

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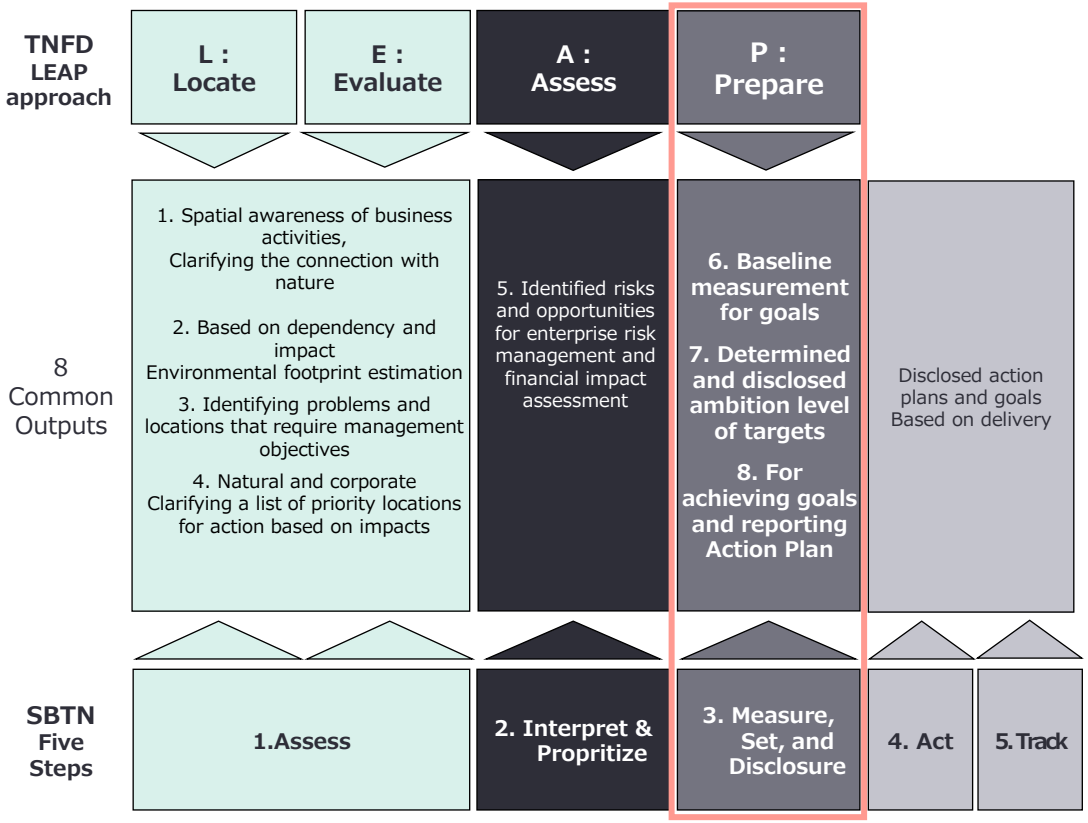
The Relation between The Project and the TNFD Recommendations and SBTs for Nature

In this project, we supported target setting based on the methodology of SBTs for Nature as an approach to Prepare(target setting) stepin the TNFD LEAP approach.

Target setting sections of the TNFD

TNFD Disclosure Recommendations	
Strategy B	Describe the effect nature-related dependencies, impacts, risks and opportunities have had on the organisation's business model, value chain, strategy and financial planning, as well as any **transition plans or analysis** in place.
Metrics & targets C	Describe the **targets and goals** used by the organisation to manage nature-related dependencies, impacts, risks and opportunities and its performance against these
TNFD LEAP Approach	
Prepare P2: Target setting and performance	How will we **set targets** and define and measure progress?

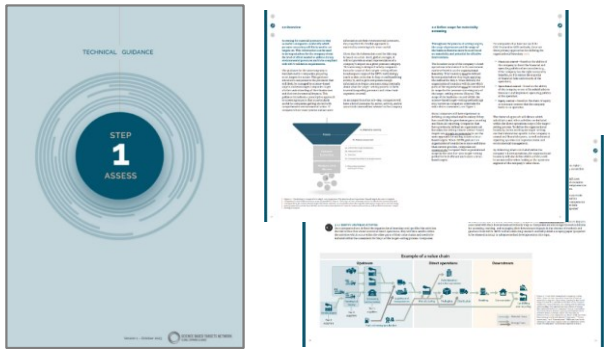
8 common outputs from TNFD LEAP approach and SBTs for Nature methodology



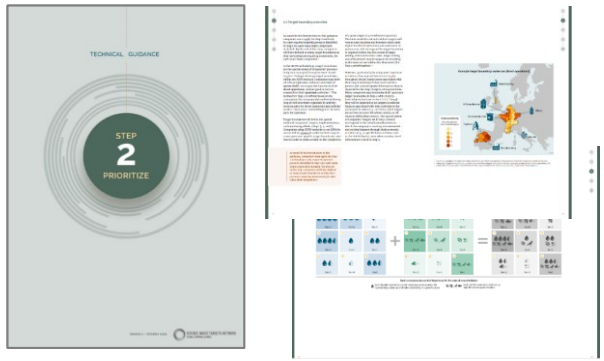
- This project will help companies that have already conducted a LEAP analysis set goals in line with **SBTs for Nature 's target setting approach.**
- This project will mainly supports to implement **Step 3 (freshwater) of** the SBTs for Nature guidelines.

SBTN is currently developing guidances for setting targets for companies. This project set targets for water quantity and quality based on Step 3 (Measure, Set, Disclosuree) Freshwater Guidance.

Technical guidances

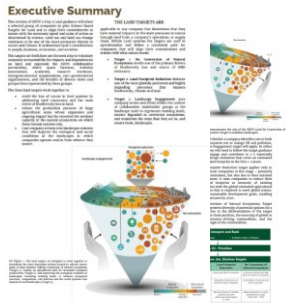


Step 1 (Assess)

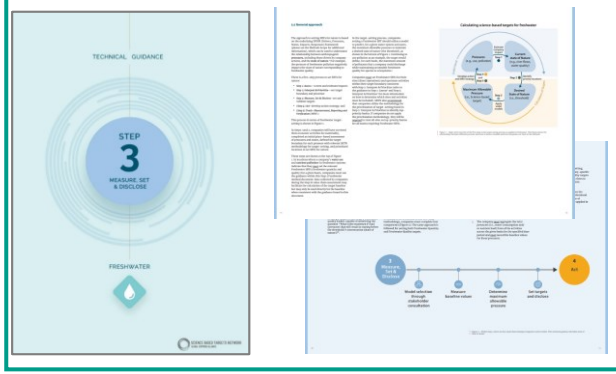


Step 2 (Interpret & Prioritize)

Land (v1.0)



Freshwater (v1.1)



Step 3 (Measure, Set, and Disclosure)

Compliant with this project

Step 3 Other Freshwater Guidances

- Stakeholder consultation for model selection
- Illustrative Case Study
- Corporate water stewardship and freshwater SBTs

* Step 3 marine and biodiversity guidance, and Step 4 and 5 technical guidance are currently under development.

Source: Science Based Targets Network Resource Library (Accessed 2024/9/3)

Scope of taeget setting for this project

Considering the current state of development of the guidance, the water quantity target was set only for water intakes from surface water sources, and the water quality target was set for nutrient salt (nitrogen, phosphorus) emissions.

Scope of target setting methods included in current SBTN freshwater guidance (partial excerpt)

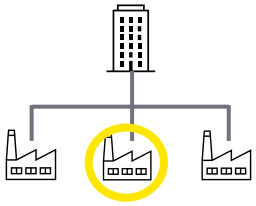
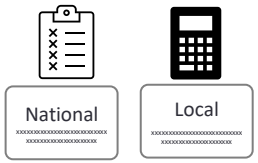
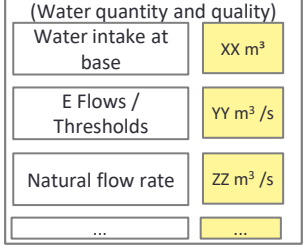
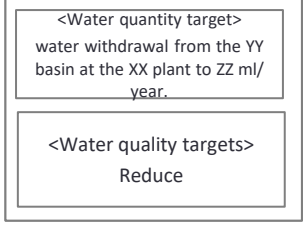
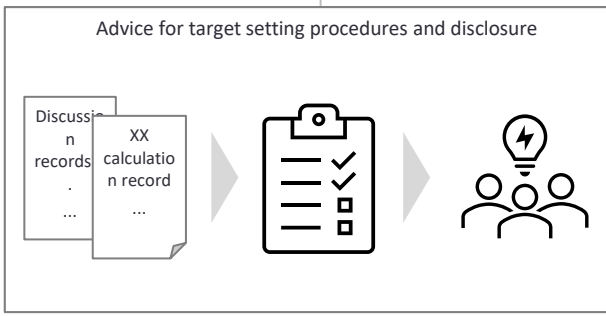
Content included	**Content not included** (i.e., to be included in subsequent versions)
Freshwater Quantity	
• Surface water flows • Groundwater levels (only basins where local model/thresholds exist)	• Groundwater levels (basins where local model/thresholds do not exist)
Freshwater Quality	
• Nutrient pollution (nitrogen and phosphorus)	• Toxic chemicals • Other freshwater quality parameters

Regarding groundwater, since it is stated that subsequent versions will include explanations on target setting for basins where local model / thresholds do not exist, it was deemed appropriate to begin after the guidance is updated, and **in this project, only surface water was included in the scope of target setting.**

Source: Based on "Step 3 Freshwater Technical Guidance (V1.1)" (SBTN)

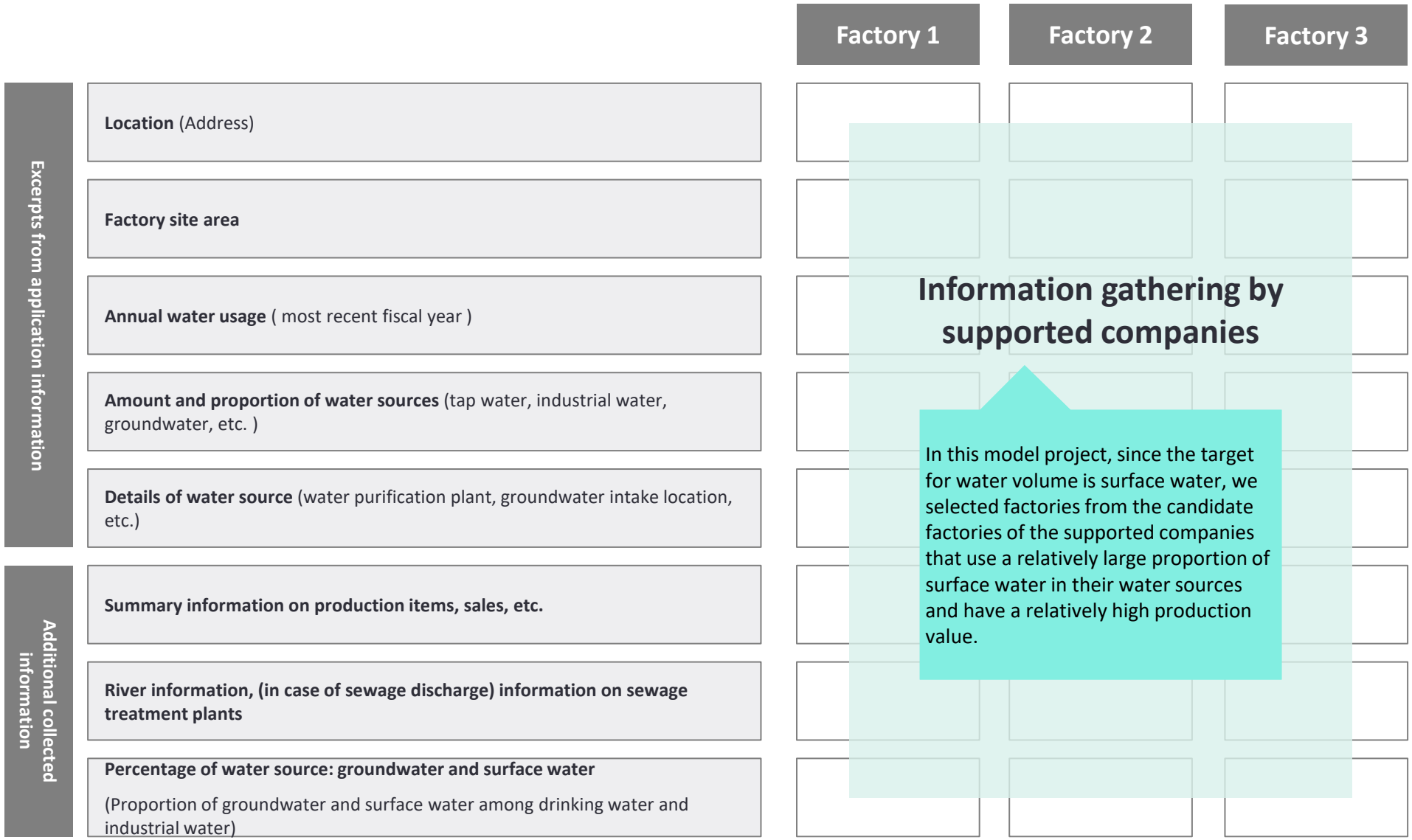
Implementation steps of this project

In this project, we first reviewed existing data to determine the priority factory, then set targets following the SBTs for Nature Step 3 Freshwater Guidance. Afterward, we identified and organized the challenges and information for expanding to other factories.

Steps of the Project	SBTN Freshwater Guidance Steps	1. Data check and select priority factory	2. Each setting value Discussion and Agreement		3. Target Setting	4. "Consideration of Deployment Methods to Other Factories	5. Information Disclosure
Steps		Step 2 Understanding and prioritization	Step 3a Model Selection	Step 3b Baseline setting	Step 3c&3d Identifying thresholds and setting targets	No detailed explanation in SBTN freshwater guidance	
Reference to the SBTs for Nature Step 3 Freshwater Guidance		▸ Based on Step 2 (Interpret & Prioritize), it is necessary to determine the priority of locations for target setting.	▸ Check whether appropriate local models and thresholds exist for national and local stakeholders. ▸ If local models cannot be confirmed, choose to use the global model.	▸ Organize business locations according to the basin level of the model used ▸ Calculate the water intake and nutrient load for all bases located in the target basin, and use these values as the base values for calculating the company's target values.	▸ Using the model, calculate the water withdrawal rate and nutrient load rate that should be reduced in the basin ▸ Calculate the company's water withdrawal and nutrient load targets for the basin	▸ Not specified	
Implementation method in this project		▸ Based on the basic information of the factory and the results of the previously conducted LEAP analysis, determine the priority factory for target setting.	▸ For the use of the global model, a unique approach is planned to be applied.	▸ Calculate the water intake and nutrient load for the priority factory, and use these as the baseline for calculating the target values	▸ Follow the guidance	▸ Organize the target setting procedure and consider the deployment methods to other factories.	▸ Interpret the analysis results and organize the information to be disclosed.
Output image		Select the priority factory for target setting 	Model Selection (Record of discussions and agreements with stakeholders) 	Determination of baseline values (Water quantity and quality) 	Freshwater target (for Water quantity and quality) 	Advice for target setting procedures and disclosure 	

Method for selecting the factory to be targeted in this project

Based on the water usage, water source information, production items, sales, and other relevant data for each candidate factory, we made a comprehensive decision and selected the priority factory for this project.



Target Setting Process for SBTs for Nature Step3 Freshwater Guidance

Set water quantity and quality targets for one target factory in the order of Steps 3a to 3d (Tasks 1 to 10) indicated in the SBTs for Nature Step 3 Freshwater Guidance.

Model Selection (Step 3a)

* Used for goal setting Logic and numbers Collect

Task 1&2

Use the SBTN basin threshold tool to identify local models and thresholds
⇒As the tool is still under development at the Guidance v1.1 stage, this task is skipped.

Task 3

Consulting national stakeholders : Check whether appropriate local models and thresholds exist
⇒Contact government ministries and agencies , SBTN Freshwater Hub partner organizations , environmental non-profit organizations, etc. to confirm whether there are local models and thresholds necessary for target setting. If they are identified, proceed to Task 6. If they are not identified, proceed to Task 4 .

Task 4

local stakeholders : Check whether appropriate local models and thresholds exist
public institutions, researchers, NGOs , local communities, etc. that manage the water in the basin to confirm whether they have local models and thresholds necessary for setting targets. If they can be identified, proceed to Task 6. If they cannot be identified, confirm the appropriateness of applying the global model and proceed to Task 5 .

Task 5

Choose to utilize global models
⇒ Decide to utilize the global model. Even if a local model cannot be identified by Task 4 and the appropriateness of applying the global model cannot be confirmed with local stakeholders , it is possible to decide to utilize the global model.

Baseline calculation (Step 3b)

Task 6

Organize business locations according to the basin level of the model used
⇒ Organize business locations located in the target basin of the model identified by Task 5 .

Task 7

Calculation of standard values (water quantity and quality)
⇒Calculate the total water intake and nutrient load for all business locations located in the target basin, and use this as the base value when calculating the company's target values in Task 10 .

Environmental thresholds identification and Freshwater Quantity target setting (Step 3c&3d)

Task 8&9

Using the model, calculate the water withdrawal rate and nutrient load rate that should be reduced in the basin
⇒ Using the models and thresholds identified by Task 5, calculate the required reduction rates for each basin model for water volume and water quality

Task 10

Calculate the company's water withdrawal and nutrient load targets for the basin
⇒ Multiply the benchmark value set in Task 7 by the reduction rate calculated in Tasks 8 & 9 to calculate the company's water withdrawal target and nutrient load target.

Source: Based on "Step 3 Freshwater Technical Guidance (V1.1)" (SBTN)

About the "model" of SBTs for Nature

The term 'model' refers to the calculation method used to determine the water intake reduction and nutrient discharge in the basin, as outlined in Task 8 & 9 on the previous page.

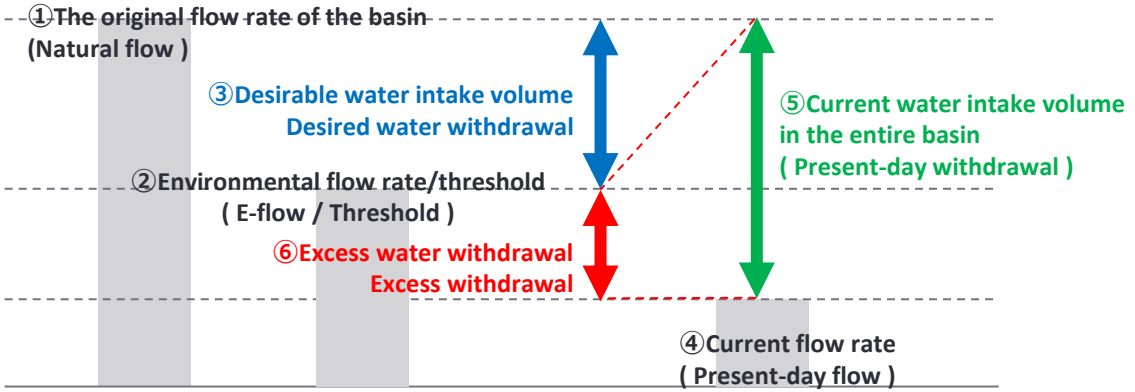
- In the SBTs for Nature guidance, the term 'model' can be understood as a calculation method used to determine the required reduction in water intake and nutrient discharge in the basin.
- According to the steps outlined in the Step3 Freshwater Guidance, after confirming the availability of models with national (country-level) and local (regional-level) stakeholders, the model to be used for target setting is determined.
- The models to be confirmed with stakeholders are the following two types.
  - **Existing models originally present in the basin/region**
  - **Model using the formula provided by SBTN**

Explained on the next page

The method for calculating the required reduction in water intake and nutrient discharge in the target basin using existing data

Determine the percentage of water intake and nutrient concentration reduction required in the watershed based on the natural flow, flow/water quality thresholds, and current flow/water quality data in the target basin.

Water quantity reduction rate calculation method



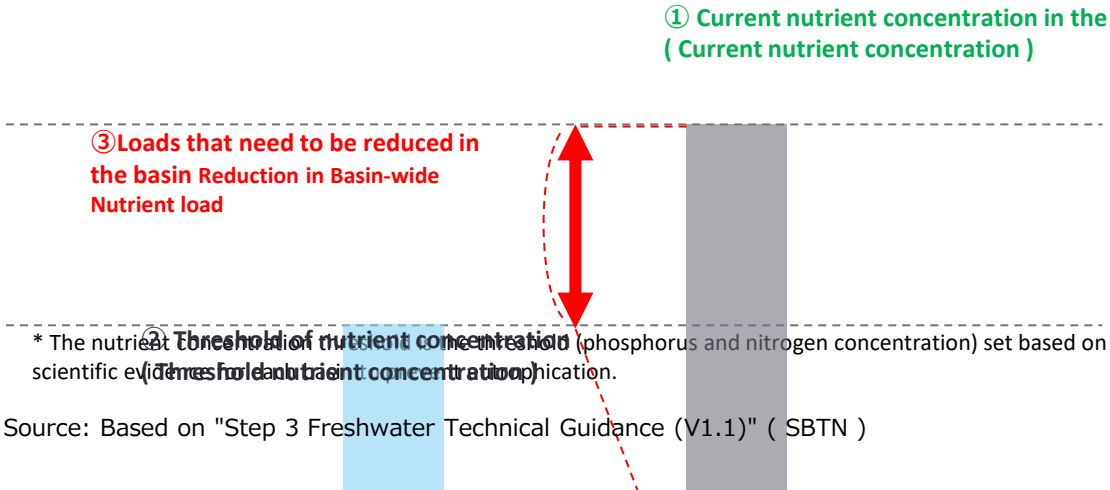
* Environmental flow/threshold is not the limit amount during drought, but the flow amount that should be supplied to rivers, wetlands, etc. to maintain ecosystems.

Reduction rate of required water intake (%)

$$= \frac{\text{⑥Excess water withdrawal}\ (\text{② Threshold - ④ Current flow rate})}{\text{⑤Current water intake volume in the entire basin}\ (\text{①Natural flow rate - ④Current flow rate})} \times 100$$

To calculate the required water intake reduction rate (%), which is the ratio of ⑥ to ⑤, it is sufficient to have the following three factors: ① natural flow, ② threshold, and ④ current flow.

Water quality reduction rate calculation method



* The nutrient concentration threshold is the threshold (phosphorus and nitrogen concentration) set based on scientific evidence to prevent eutrophication.

Required emission reduction rate (%)

$$= \frac{\text{③Loads that need to be reduced in the basin}\ (\text{①Current nutrient concentration in the basin - ② Threshold})}{\text{① Current nutrient concentration in the basin}} \times 100$$

To calculate the required nutrient discharge reduction rate (%), it is sufficient to have ① the current nutrient concentration in the basin and ② the threshold.

Source: Based on "Step 3 Freshwater Technical Guidance (V1.1)" (SBTN)

Stakeholder consultation process for model selection

For domestic locations in Japan, national-level stakeholders may include the Ministry of Land, Infrastructure, Transport and Tourism (water quantity) and the Ministry of the Environment (water quality), while local-level stakeholders may involve local governments, universities, and other relevant parties.

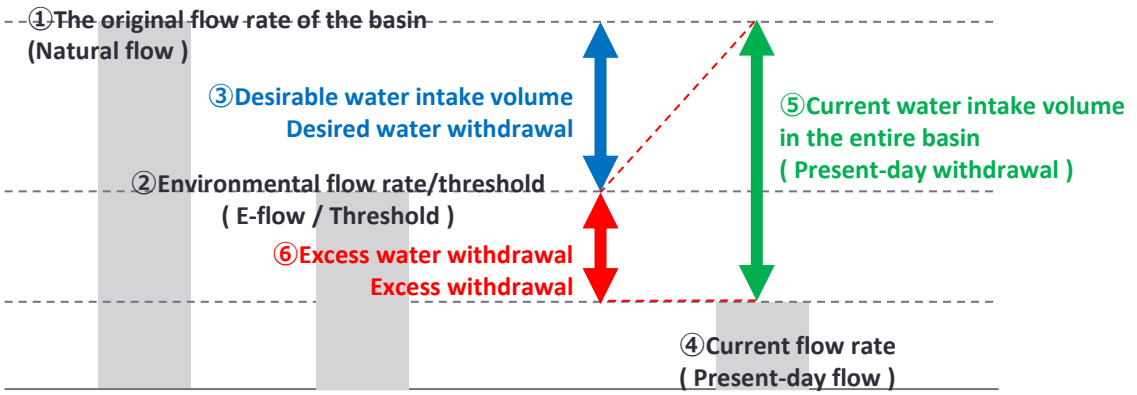
			Water quantity stakeholders (example)	Water quality stakeholders (example)
Model Selection (Step 3a)	Task 1&2	Using the	SBTN basin threshold tool is under development (Skip this step)	
	Task 3	Consulting national-level stakeholders	List national and regional stakeholders and start contacting them at the national level	
			• Ministry of Land, Infrastructure, Transport and Tourism (River Management Office)	• Ministry of Land, Infrastructure, Transport and Tourism (River Management Office) • Ministry of the Environment (Water Environment and Water Quality Management Division) • Fisheries Agency
	Task 4	Consulting stakeholders at the local level	• Municipal water department • Universities and research institutes • Local water-related organizations	• Local Government Water Quality Protection Department • Universities and research institutes • Local water-related organizations
	Task 5	If the regional model cannot be confirmed → In the case of Japan, consider a calculation method using information available at the national level, without using the SBTN-provided tools.		

[Water quantity] Issues for consultation with relevant parties at the national level

For water quantity, national-level stakeholders will be asked to confirm the models they have established and possessed at the national level for the target basin, as well as regional-level models (if available).

Q1. Check for existing models	**Are there existing methodologies to calculate**
Q2. Confirm the settings and data to be applied to the model that uses the formulas **provided by SBTN**	For the target river basin, **are there any settings or data** held at **the national level that correspond to ① to ⑥ in the figures and formulas shown by the SBTN below?**

Water quantity reduction rate calculation method



* Environmental flow/threshold is not the limit amount during drought, but the flow amount that should be supplied to rivers, wetlands, etc. to maintain ecosystems.

Reduction rate of required water intake (%)

$$= \frac{\text{⑥Excess water withdrawal}}{\text{(② Threshold - ④ Current flow rate)}} \times 100$$

$$\frac{\text{⑤Current water intake volume in the entire basin}}{\text{(①Natural flow rate - ④Current flow rate)}}$$

To calculate the required water intake reduction rate (%), which is the ratio of ⑥ to ⑤, it is sufficient to have the following three factors: ① natural flow, ② threshold, and ④ current flow.

- **either** Q1 or Q2 is **Yes** : Apply the answer that is Yes **as the local model** → **Model determination**
- **both** Q1 and Q2 are **Yes** : Apply the appropriate calculation method **as the local model** → **Model determination**
- If neither Q1 nor Q2 is answered "No": Check Q3 below and **consult with local stakeholders (next page).**

Q3. Confirmation of regional level model	Q1 and 2, are there any **regional** settings or possessions (if available)?

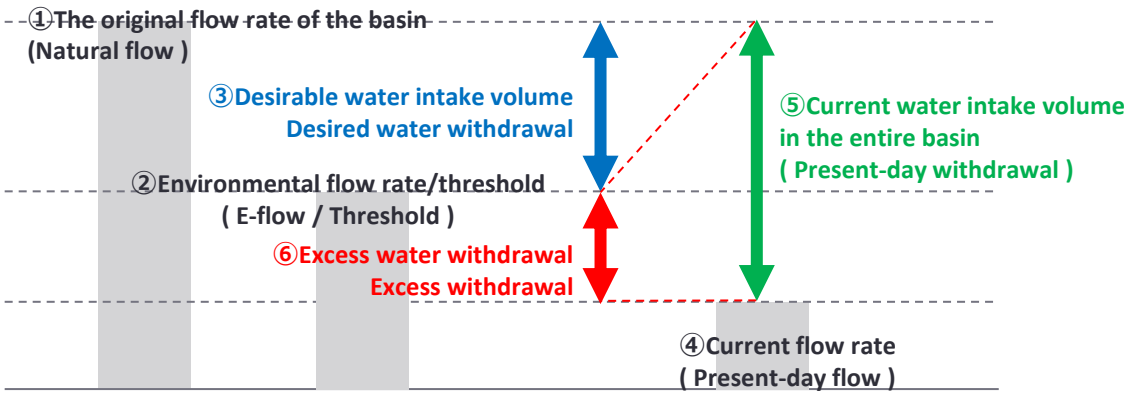
Source: Based on "Step 3 Freshwater Technical Guidance (V1.1)" (SBTN)

[Water quantity] Issues for consultation with local stakeholders

For water quantity, local stakeholders will be asked to confirm the models they have set up and possessed at the local level for the target basin.

Q1. Check for existing models	**Are there existing methods to calculate**
Q2. Confirm the settings and data to be applied to the model that uses the formulas **provided by SBTN**	For the target basin, **are there any settings or data at the regional level that correspond to ① to ⑥ in the diagrams and formulas shown by the SBTN** below ?

Water quantity reduction rate calculation method



* Environmental flow/threshold is not the limit amount during drought, but the flow amount that should be supplied to rivers, wetlands, etc. to maintain ecosystems.

Reduction rate of required water intake (%)

$$= \frac{\text{⑥Excess water withdrawal}}{\text{(② Threshold - ④ Current flow rate)}} \times 100$$

$$\frac{\text{⑤Current water intake volume in the entire basin}}{\text{(①Natural flow rate - ④Current flow rate)}}$$

To calculate the required water intake reduction rate (%), which is the ratio of ⑥ to ⑤, it is sufficient to have the following three factors: ① natural flow, ② threshold, and ④ current flow.

- **either** Q1 or Q2 is **Yes** : Apply the answer that is Yes **as the local model** → **Model determination**
- **both** Q1 and Q2 are **Yes** : Apply the appropriate calculation method **as the local model** → **Model determination**
- both Q1 and Q2 **are No** : **Consider applying a global model (using a tool)** → **Model determination**

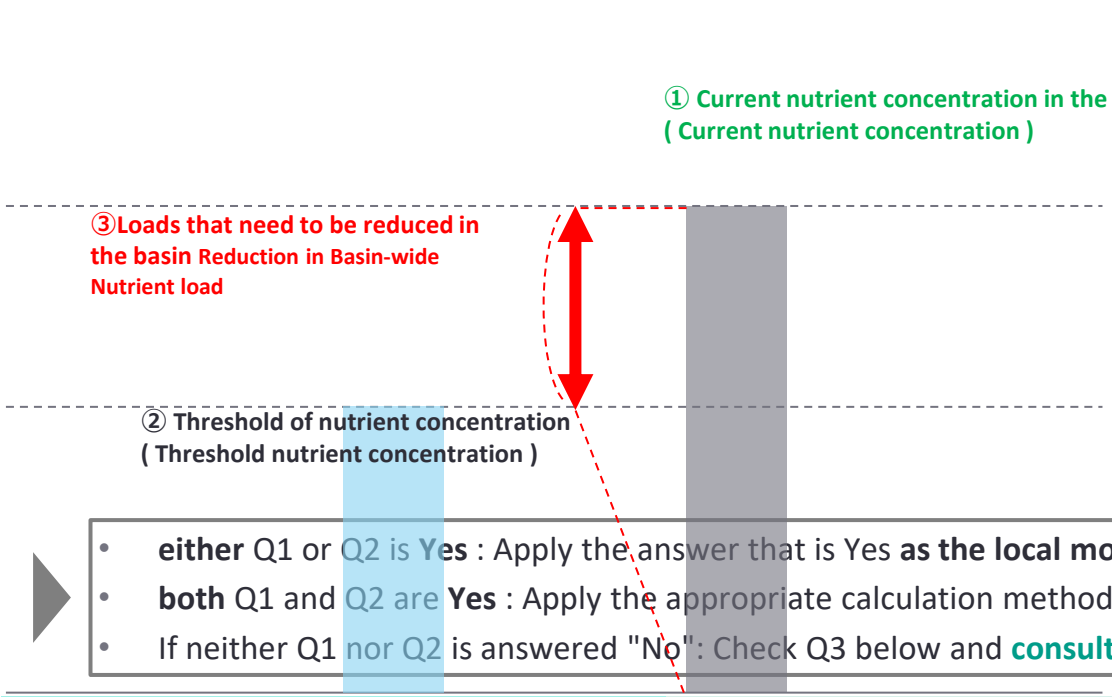
Source: Based on "Step 3 Freshwater Technical Guidance (V1.1)" (SBTN)

[Water quality] Consultation items for relevant parties at the national level

For water quality, national-level stakeholders will be asked to confirm the models they have established and possessed at the national level for the target basin, as well as regional-level models (if available).

Q1. Check for existing models	**Are there existing methods for calculating the nutrient emissions to be reduced in a**
Q2. Confirm the settings and data to be applied to the model that uses the formulas **provided by SBTN**	For the target river basin, **are there any settings or data** held at **the national level that correspond to ① and ② in the diagrams and formulas shown by SBTN below?**

Water quality reduction rate calculation method



Required emission reduction rate (%)

$$= \frac{\text{③Loads that need to be reduced in the basin}}{\text{(①Current nutrient concentration in the basin - ② Threshold)}} \times 100$$

① Current nutrient concentration in the basin

To calculate the required nutrient discharge reduction rate (%), it is sufficient to have ① the current nutrient concentration in the basin and ② the threshold.

- **either** Q1 or Q2 is **Yes** : Apply the answer that is Yes **as the local model** → **Model determination**
- **both** Q1 and Q2 are **Yes** : Apply the appropriate calculation method **as the local model** → **Model determination**
- If neither Q1 nor Q2 is answered "No": Check Q3 below and **consult with local stakeholders (next page).**

Q3. Confirmation of regional level model	Q1 and 2, are there any **regional** settings or possessions (if available)?

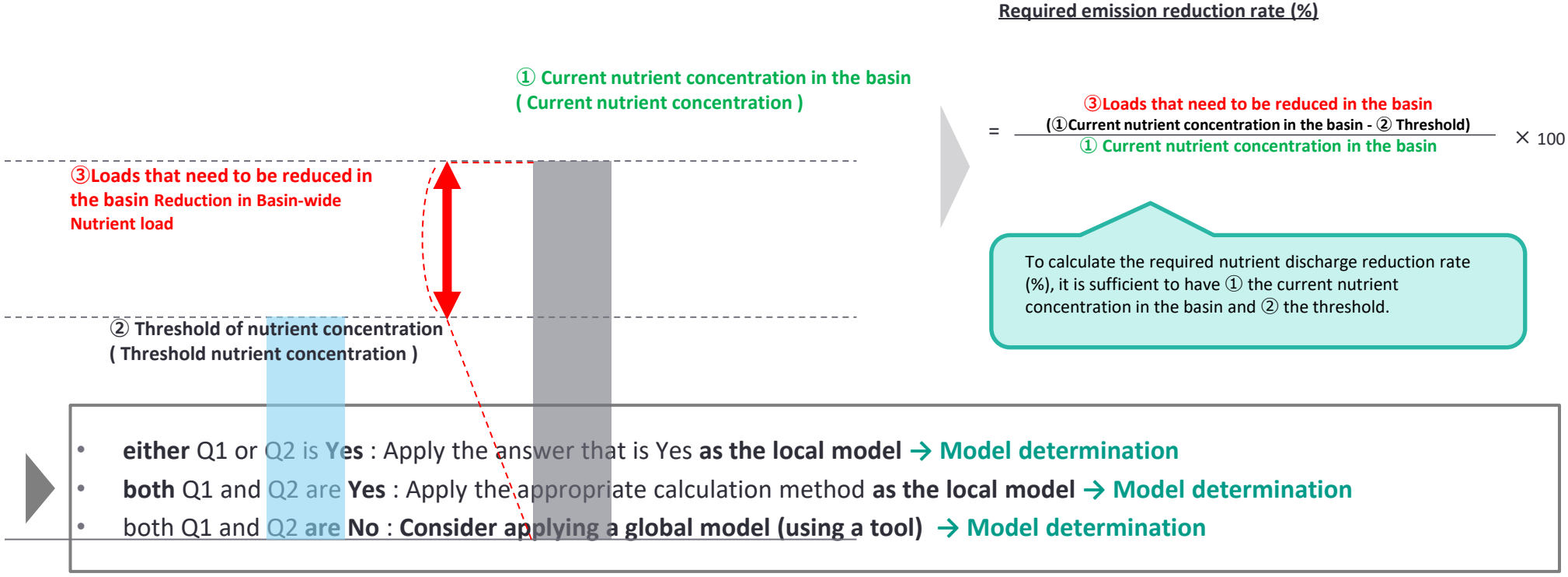
Source: Based on "Step 3 Freshwater Technical Guidance (V1.1)" (SBTN)

[Water quality] Consultation items for local level stakeholders

For water quality, local stakeholders will be asked to confirm the models they have set and possess at the local level for the target basin.

Q1. Check for existing models	**Are there existing methods for calculating the nutrient emissions to be reduced in a**
Q2. Confirm the settings and data to be applied to the model that uses the formulas **provided by SBTN**	For the target basin, **are there any settings or data at the regional level that correspond to ① to ② in the diagrams and formulas shown by SBTN** below ?

Water quality reduction rate calculation method



Required emission reduction rate (%)

$$= \frac{\text{③Loads that need to be reduced in the basin}}{\text{(①Current nutrient concentration in the basin - ② Threshold)}} \times 100$$

① Current nutrient concentration in the basin

To calculate the required nutrient discharge reduction rate (%), it is sufficient to have ① the current nutrient concentration in the basin and ② the threshold.

- **either** Q1 or Q2 is **Yes** : Apply the answer that is Yes **as the local model** → **Model determination**
- **both** Q1 and Q2 are **Yes** : Apply the appropriate calculation method **as the local model** → **Model determination**
- both Q1 and Q2 **are No** : **Consider applying a global model (using a tool)** → **Model determination**

Source: Based on "Step 3 Freshwater Technical Guidance (V1.1)" (SBTN)

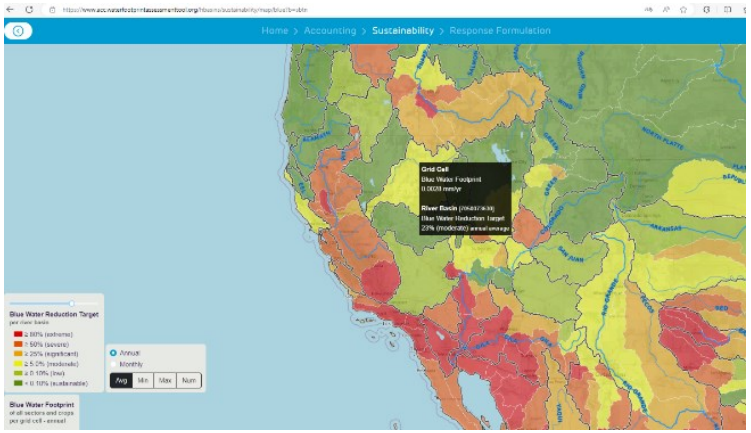
Cases where the global model can be applied

If local models cannot be identified after checking with relevant national and regional stakeholders, the following global modeling tools provided by SBTN will be used:

Water quantity

Water Footprint Assessment Tool

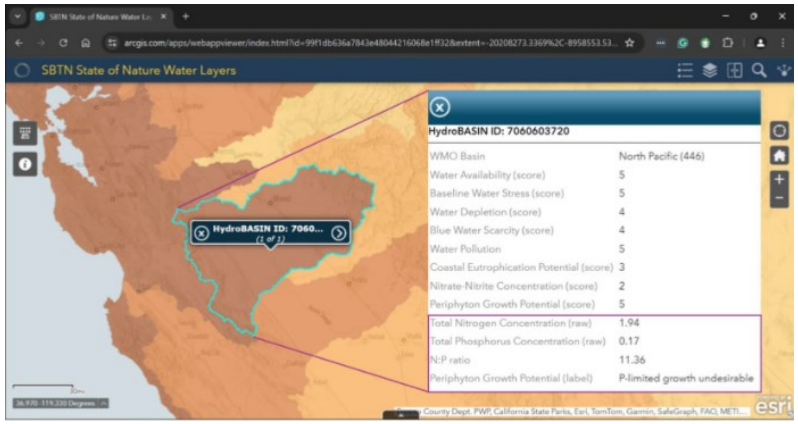
Identify the annual reduction rate required in the basin



Water quality

SBTN State of Nature Water Layers app

Identify current nutrient concentrations in the basin. Compare with global model thresholds to calculate the percentage of nutrient discharge that should be reduced in the basin.



- In the current tool, **the required reduction rate in Japan** is zero for both water quantity and water quality. In this case, the natural flow rate, water quantity threshold, and current flow rate are unknown from the tool, so **it is not possible to know how much room there is left for water quantity or water quality** .
- For this reason, when setting targets for **domestic bases** or regions where the reduction rate in this tool **is zero , it is more effective to apply conceptually similar data based on the formula** provided by SBTN mentioned above , in order to compare the gap between the current situation and the target, than to use this tool.

Source: Water Footprint Assessment Tool , based on SBTN State of Nature Water Layers (accessed February 5 , 2025)

[Water quantity] Setting baseline values (standard values) and targets

Calculate the water withdrawal target from the baseline value and the target reduction rate, set the target year, and create a statement.

Water quantity

1. Identifying the standard values

- Water quantity standard value = Water intake volume at the site (m^3/s)
- The standard value is the average value for the past

2. Calculation of target reduction rate (%)

- **If the standard value is an annual value, calculate the annual reduction rate** .
- **If the baseline is monthly, calculate the reduction rate by month, season, or year** . If you want to set a target on an annual basis, **set the maximum reduction rate among the months** . For example, if a certain month is 50% and other months are 0% , set a reduction target of
- When data covering multiple years is obtained, the required reduction rate for each year is calculated and the 75th percentile value is used as the target reduction rate. However, since data for each year is not available this time, year-by-year calculations will not be performed.

Required emission reduction rate (%)

$$= \frac{\text{3) Loads that need to be reduced in the basin}}{\text{(①Current nutrient concentration in the basin - ② Threshold)}} \times 100$$

$$\frac{}{\text{① Current nutrient concentration in the basin}}$$

Calculate monthly, seasonal or annual savings

3. Calculation of water withdrawal target (ML/ year (or month))

- Multiply the base water withdrawal volume (m^3/s) by (100% - target reduction rate (%)) /100 to calculate the water withdrawal volume target (ML/ year (or month)).

4. Setting target year

- **If** the target reduction is **25% or less,** the target will be **5 years** from the date the target is submitted (up to 10 years with sufficient justification). **If it is more than 25% , the target will be 10 years** from the date the target is submitted .

5. Goal template

- Setting a target on an annual basis: **" Company X will reduce water withdrawals from the basin by ML/ year by year ."**
- Setting a monthly or seasonal target: **" Company X will reduce water withdrawals from the ● ● basin by ● ● ml/ month for each of the following months, with reductions to be completed by year ● ●."**

[Water quality] Setting baseline values (standard values) and targets

Calculate the nutrient discharge target from the baseline value and the target reduction rate, set the target year, and create a statement.

Water quality

1. Identifying the standard values

- Water quality standard value = Nutrient discharge amount at the site (kgP (or N)/ year (or month))
- The standard value is the average value for the past

2. Calculation of target reduction rate (%)

- **If the standard value is an annual value, calculate the annual reduction rate** .
- **If the threshold is a monthly value, calculate the reduction rate for each month, season, or year** . If you want to set a target on an annual basis, **set the maximum reduction rate for each month** . For example, if there is a threshold only for the summer and the reduction amount is 25% , the target is a
- When data covering multiple years is obtained, the required reduction rate for each year is calculated and the 75th percentile value is used as the target reduction rate. However, since data for each year is not available this time, year-by-year calculations will not be performed.

Required emission reduction rate (%)

$$= \frac{\text{3) Loads that need to be reduced in the basin}}{\text{(①Current nutrient concentration in the basin - ② Threshold)}} \times 100$$

$$\text{① Current nutrient concentration in the basin}$$

Calculate monthly, seasonal or annual savings

3. Calculation of nutrient discharge target (kgP (or N)/ year (or month))

- the base value of nutrient discharge (kgP(or N)/ year (or month)) at the base station by (100% - target reduction rate (%)) /100 to calculate the nutrient discharge target (kgP(or N)/ year (or month)) .

4. Setting target year

- **If** the target reduction is **25% or less,** the target will be **5 years from** the date the target is submitted (up to 10 years with sufficient justification). **If it is more than 25% , the target will be 10 years** from the date the target is submitted .

5. Goal template

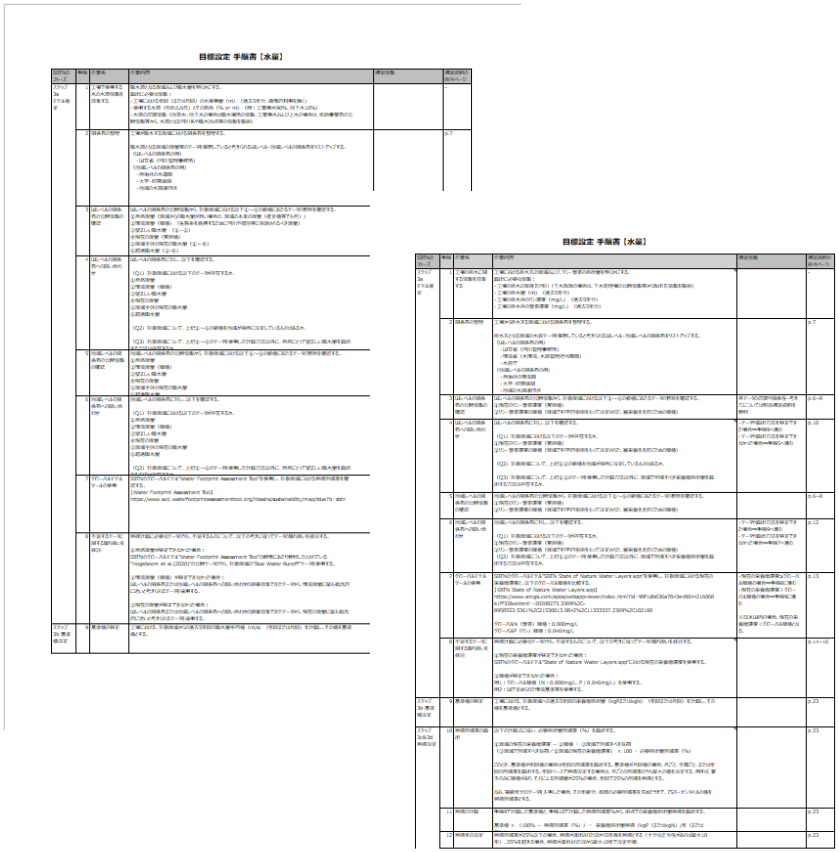
- Setting a target on an annual basis: **" Company X will reduce nutrient discharges in the ● ● basin by ● ● kgP (or N)/ year by ● ● year."**
- Setting a monthly or seasonal target **: " Company X will reduce nutrient discharges to the ● ● basin by ● ● kgP (or N)/ month for each of the following months, with reductions to be completed by year ● ●."**

Preparation of procedure manuals and supplementary explanatory materials

We created a procedure manual and supplementary explanatory materials outlining the procedures for setting goals, with the aim of expanding the system to other factories and disclosing the information.

Instructions

(Excel table format)



Supplementary Material

(PowerPoint format)

The advantage of setting goals based on SBT for Nature is that it allows for the setting of quantitative goals based on scientific evidence, and makes clear the data required for such goals.

The benefits of setting goals based on SBTs for Nature

Setting quantitative targets based on scientific evidence

- SBT for Nature has developed a methodology for setting targets that are science-based and measurable, so that companies can set quantitative, science-based targets when setting nature-related targets.

Clarifying the data needed to set goals

- In the process of setting goals based on SBT for Nature , checking the status of existing data ownership will identify data that is lacking and provide material for considering future data

Key points for setting goals based on SBTs for Nature

First, you can use the Step 3 guidance as a framework for setting your company's targets, and as a subsequent step, aim for obtaining SBTN validation

- To obtain validation from SBTN (scheduled to begin after 2025), it is necessary to carry out the process from Step 1 and meet the mandatory requirements. On the other hand, in order to set and disclose your own targets, one option is to first apply the guidance to the extent possible and set targets. In that case, it is important to note that the sites targeted in Step 3 may differ from the target setting sites identified later through

Future updates to the guidance may broaden its scope and improve target-setting methods.

- The current Step 3 Freshwater Guidance has been developed to version 1.1 , but further updates are planned to expand the scope of coverage, including the development of tools for local models and specific target setting methods for water quality items other than groundwater and nutrients. It is important to keep an eye on the status of updates, as future updates may improve the target setting methods.

In order to set more effective goals, it is important to involve stakeholders outside your own company.

- In this project, the target values were calculated on the assumption that all stakeholders in the entire basin would achieve the same reduction rate, but SBTN believes that it is important to coordinate and allocate reduction rates among all stakeholders in the entire basin, if possible. In addition, when setting its own targets, if there is any public information or model that is lacking, calling on the government, etc., may lead to improvements in the development of information and models in the future.

Reference

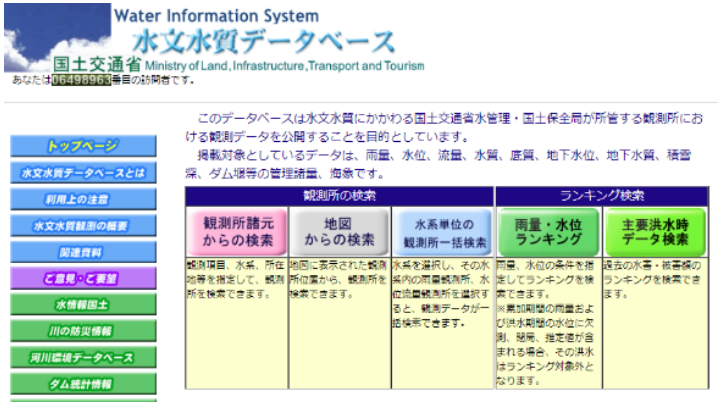
Key points in the stakeholder consultation process for model selection

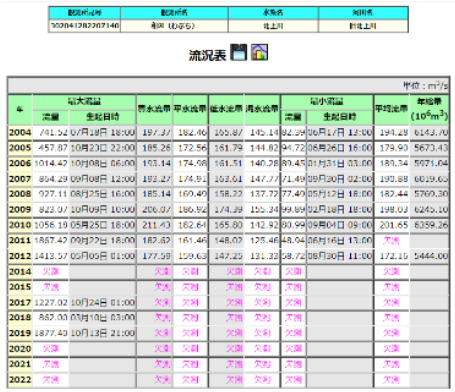
Before consulting with stakeholders, it is important to check publicly available information to see whether there is data that can be applied to existing models or mathematical models, which will help clarify the issues to be discussed.

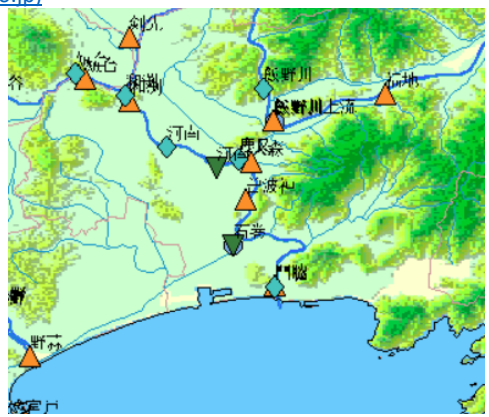
Examples of public information:

- Ministry of Land, Infrastructure, Transport and Tourism Hydrology and Water Quality Database (current flow data is available)

Ministry of Land, Infrastructure, Transport and Tourism Hydrological Water Quality Database (river.go.jp)







- Ministry of the Environment public water body water quality measurement results (current nutrient salt concentration data of oceans and lakes are available)

Public water areas | Water quality measurement results | Water, soil, ground and marine environment conservation | Ministry of the Environment

Created based on "Hydrology and Water Quality Database" (Ministry of Land, Infrastructure, Transport and Tourism) and " Public Water Areas | Water Quality Measurement Results " (Ministry of the Environment)

Water quantity model selection results for the target locations of the model project

The model project was carried out at bases in the Tone River basin. There was no existing model for water quantity, so each data item was applied to the mathematical model provided by SBTN .

- Regarding water quantity, after checking publicly available information and consulting with stakeholders, for the mathematical model presented by SBTN , "① Natural flow rate" uses the publicly available data from the research referenced by SBTN . For "② Environmental flow rate / threshold value", the maintenance flow rate, which is the required flow rate that takes environmental aspects into consideration, is used. For "④ Current flow rate", data is available.

Water quantity

Required Fields	Details of confirmation results from stakeholders	Adopted data proposal	Reasons for adoption
Natural flow rate	• not clear	Among the publicly available data from Hogeboom et al. (2020) , which is said to have been used as a reference in the development of the SBTN global model, the "Water Footprint Assessment Tool," the natural flow rate of the Tone **River basin,** " Blue Water Runoff" (608 m^3 /s) >>See the slides below for details	• This is the only natural flow data available at this time.
Environmental flow rate / Threshold	• After checking with the Ministry of Land, Infrastructure, Transport and Tourism, it was revealed that **when considering the "maintenance flow rate" of a river, the flow rate** required for "habitats of plants and animals and for fishing" is taken into consideration as the minimum flow rate necessary from an environmental perspective. • However, since it is set as the minimum flow rate that should be secured even during droughts, and **not as the desired flow rate during normal times** , it has a different meaning when treated as the same as environmental flow rate.	**"Maintained flow rate"** on page 30 of the " Tone River System River Improvement Basic Policy " (flow rate required to maintain normal flow, location: Kurihashi) 表 6.2 基準地点における流水の正常な機能を維持するため必要な流量の検討総括表 河川名: 利根川 / 地点名: 栗橋 / 流水の正常な機能を維持するため必要な流量 (m^3/s): かんがい期 122, 非かんがい期 86 利根川河口堰下流: かんがい期 30, 非かんがい期 30 *かんがい期は3～10月、非かんがい期は11～2月	• Although not equivalent to environmental flow, this is the only environmentally relevant required flow available at this stage. • Kurihashi is a representative flow control point on the Tone River and is located relatively close downstream from the target factory.
Current flow rate	• After checking with the Ministry of Land, Infrastructure, Transport and Tourism, it was found that the river flow conditions described in the "Tone River System River Improvement Basic Policy" are applicable.	**" Drought flow rate "** stated in the "Tone River System River Improvement Basic Policy" (location: Kurihashi) 表 4.1 平均流況 (m^3/s) 河川名: 利根川 / 地点名: 栗橋 / 統計期間: 75年 S20～R2 / 豊水 252.60 / 平水 155.57 / 低水 110.96 / 渇水 80.45 / 平均 243.09 利根川河口堰下流: 42年 S53～R2 / - / 147.22 / 89.38 / 43.06 / - ※1：豊水流量（1年を通じて 95 日はこれを下回らない流量） ※2：平水流量（1年を通じて 185 日はこれを下回らない流量） ※3：低水流量（1年を通じて 275 日はこれを下回らない流量） ※4：渇水流量（1年を通じて 355 日はこれを下回らない流量） ※5：平均流量（1年の日流量の総計を当年日数で除した流量）	• By adopting drought flow rates, it is possible to set a goal of not falling below the environmental flow rate for

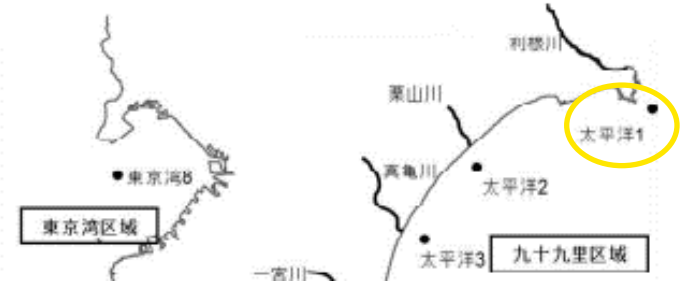
Based on "Tone River System River Improvement Basic Policy: Information on the flow rate required to maintain the normal function of flowing water" (Ministry of Land, Infrastructure, Transport and Tourism, Water Management and Disaster Management Bureau, July 2024)

Water quality model selection results for the target locations of the model project

In the model project, there was no existing model for water quality, so each data was applied to the mathematical model provided by SBTN .

- Regarding water quantity, after checking public information and consulting with stakeholders, the mathematical model presented by SBTN adopted the results of a water quality survey of the outflow destination for "① Current nutrient concentration" and the global threshold set by

Water quality

Required Fields	Results of confirmation with stakeholders	Adopted data proposal	Reasons for adoption
Current Nutrient concentration	• **There are results of water quality tests** on the Pacific Ocean into which the water was discharged.	**Observation results for the "Pacific Ocean 1" point** in the database of water quality measurements by public water area point published by Chiba Prefecture (observations are conducted about four times a year. In fiscal year 2022 , total nitrogen was 0.12-0.32 mg/L , and total phosphorus was 0.009-0.031 mg/L) 	• Since it is the closest point to the outlet of the Tone River
Threshold	• Water quality environmental standards are "standards that are desirable to be maintained," and the water quality environmental standards for total nitrogen and total phosphorus are established for water bodies that have been classified by type in lakes and seas. There are no water quality environmental standards for total nitrogen and total phosphorus for the Tone River (a river) and the Pacific Ocean (it is not appropriate to use the values of Type I water quality environmental standards as thresholds in these cases).	**Global thresholds** set by SBTN (total nitrogen **0.8mg/L** , total phosphorus **0.046mg/L**)	• Since there are no water quality environmental standards for total nitrogen and total phosphorus for the Tone River (a river) and the Pacific Ocean,

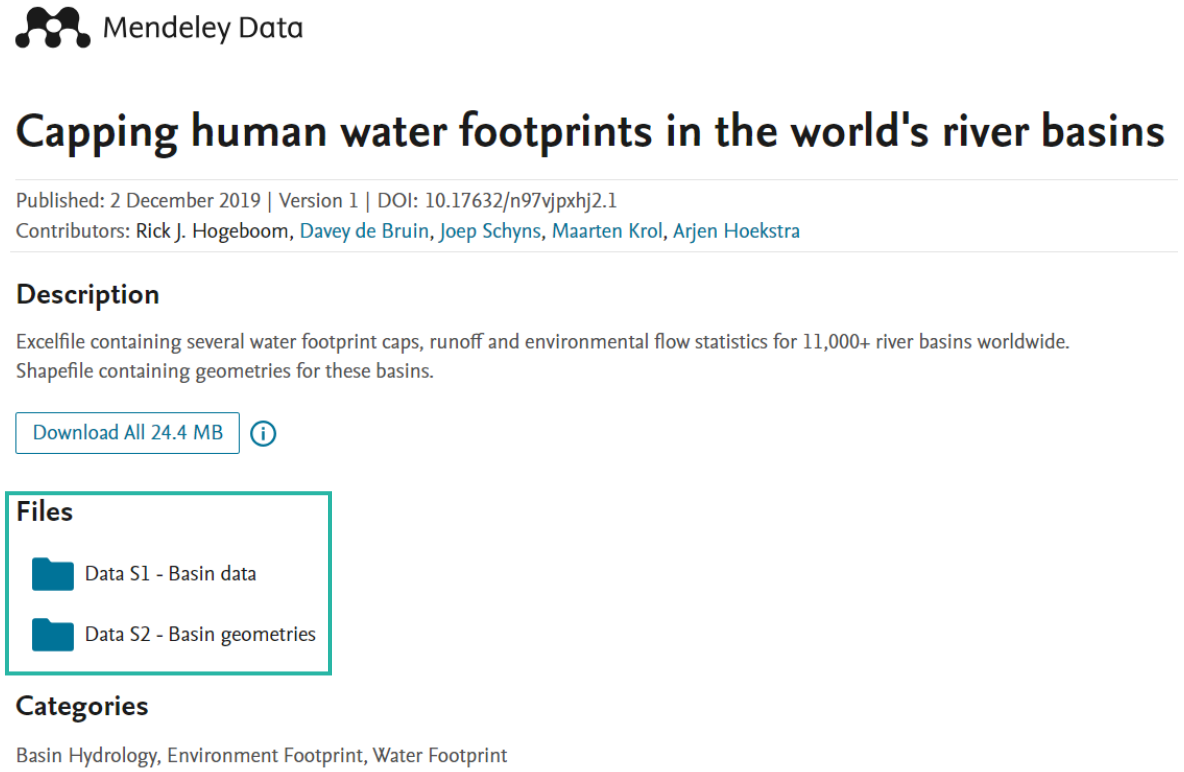
Source: Created based on the "Database of Water Quality Measurement Results by Public Water Area Location" (Chiba Prefecture)

Regarding the data adopted as "natural flow" in this model project

The data applied to the "natural flow" item of the water quantity model in this model project is said to have been referenced in the development of the SBTN global model.

- In this model project, **the natural flow rate of** the target basin , " Blue Water Runoff," was used as a reference in the development of SBTN 's global model , " Water Footprint Assessment Tool, " from the publicly available data of " Hogeboom et al. (2020). " Referred to
- Hogeboom et al. (2020) can be downloaded from the following link (accessed

Capping human water footprints in the world's river basins（https://data.mendeley.com/datasets/n97vjpxhj2/1）

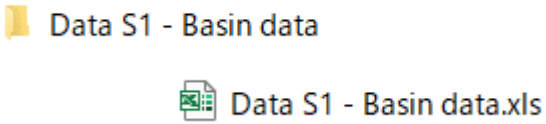


Source: Capping human water footprints in the world's river basins - Mendeley Data (accessed February 5 , 2025)

Regarding the data adopted as "natural flow" in this model project

The data from Hogeboom et al. (2020) includes DataS1 and DataS2 . By referring to both, you can check data such as natural flow rate for the relevant basin.

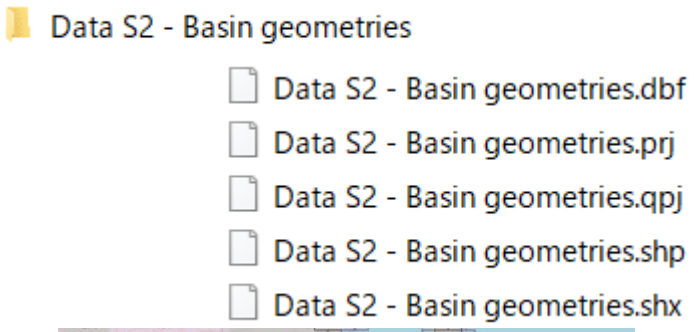
- Data S1 is an Excel file listing data for each river basin around the world .

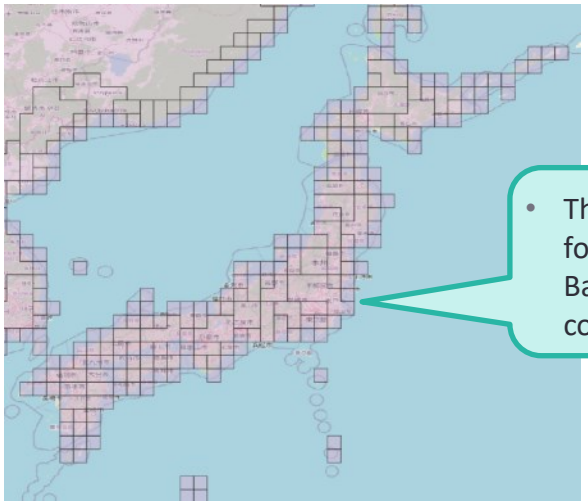


BID	Pop_2017	Area_km2	BWR m3s-1
662	7763044.46	22424.59165	607.9363369

- Check the BID number of the relevant basin from DataS2 , then check the relevant data in DataS1 (in the Tone River basin example, the BID number is " 662 " and the BWR = natural flow rate is 607.9m3/s).

- DataS2 contains shapefiles and other data, and by opening them in a GIS , the location and extent of each basin in DataS1 can be confirmed.





- The BID number for the Tone River Basin can be confirmed

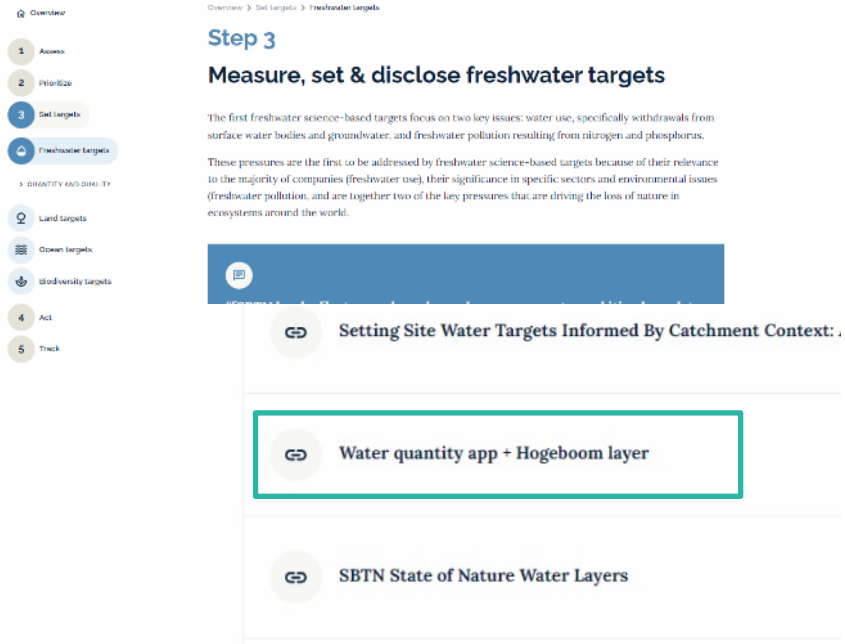
Regarding the data adopted as "natural flow" in this model project

The data from Hogeboom et al. (2020) can also be accessed from the SBTN for Nature website (1/3)

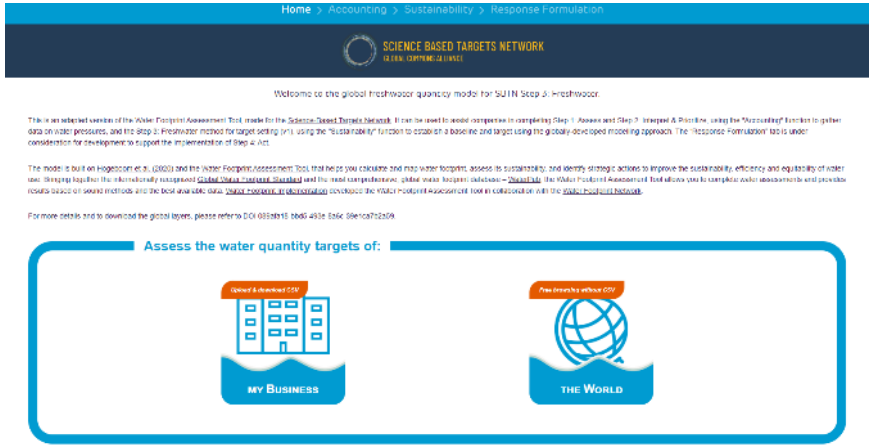
How to access the data from Hogeboom et al. (2020) (1/3)

1. SBTN From the Water for Nature website： Access the “quantity app + Hogeboom layer” page

Freshwater targets – Science Based Targets Network



Water Footprint Assessment Tool



Source: Based on SBTN" Freshwater targets - Science Based Targets Network " , SBTN" Water Footprint Assessment Tool (accessed February 5 , 2025)

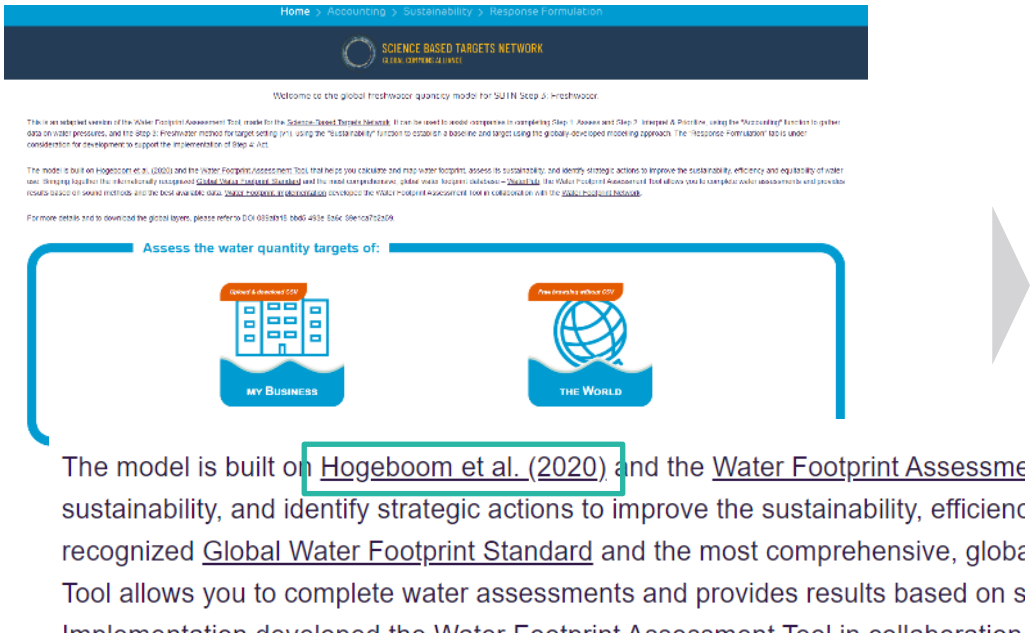
Regarding the data adopted as "natural flow" in this model project

The data from Hogeboom et al. (2020) can also be accessed from the SBTN for Nature website (2/3)

How to access the data from Hogeboom et al. (2020) (2/3)

2. "Water Access the "Hogeboom et al. (2020)" page from "quantity app + Hogeboom layer"

Water Footprint Assessment Tool



Capping Human Water Footprints in the World's River Basins - Hogeboom - 2020 - Earth's Future - Wiley Online Library

Source: Based on SBTN " Water Footprint Assessment Tool ", Capping Human Water Footprints in the World's River Basins - Hogeboom - 2020 - Earth's Future - Wiley Online Library (accessed February 5 , 2025)

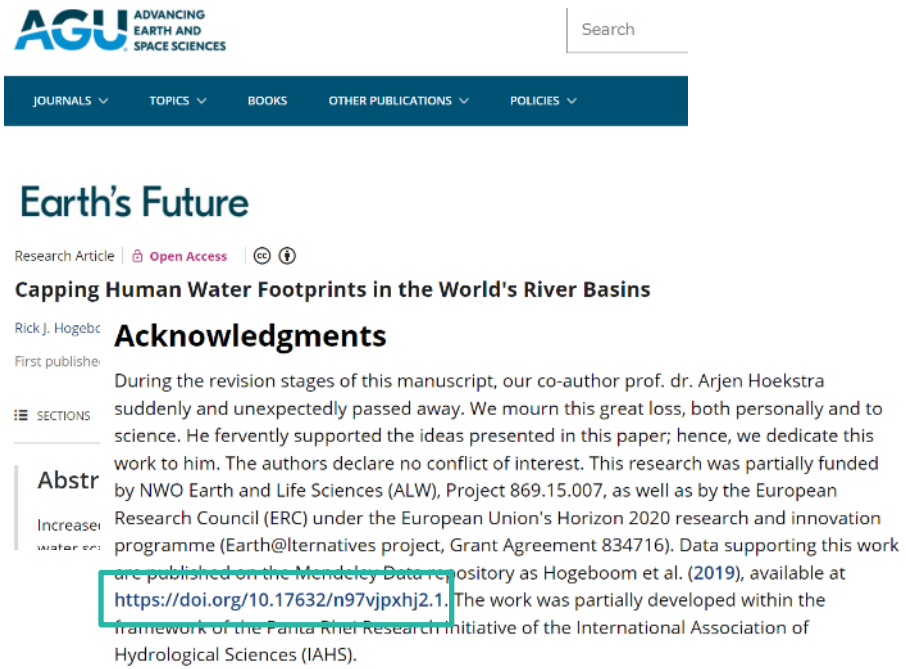
Regarding the data adopted as "natural flow" in this model project

The data from Hogeboom et al. (2020) can also be accessed from the SBTN for Nature website (3/3)

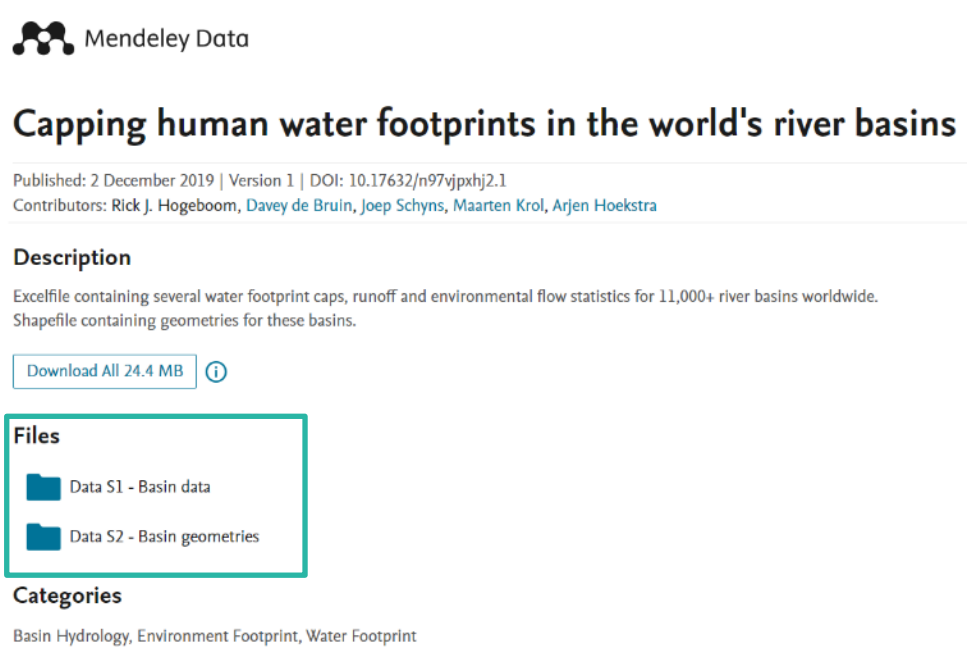
How to access the data from Hogeboom et al. (2020) (3/3)

3. Access the public data page from the link in the “Acknowledgments” section of “Hogeboom et al. (2020)” and download the data from “ Files” on the public data page.

Capping Human Water Footprints in the World's River Basins - Hogeboom - 2020 - Earth's Future - Wiley Online Library



Capping human water footprints in the world's river basins - Mendeley Data



Source: Based on Capping Human Water Footprints in the World's River Basins - Hogeboom - 2020 - Earth's Future - Wiley Online Library , Capping human water footprints in the world's river basins - Mendeley Data (accessed February 5 , 2025)

How to record and organize procedures

The goal setting process was carried out by recording and organizing steps in a table format, such as the list of relevant stakeholders, the results of stakeholder consultations, and the results of data collection.

Example of how to record procedures

Stakeholder organization

No	National / Local Stakeholders	ステークホルダーの名称	コンタクト先・URL	水量/水質	公開情報 有/無	メモ
1	National Stakeholders	国土交通省	https://www.mlit.go.jp/	水量	有	
2	National Stakeholders	環境省	https://www.env.go.jp/	水質	有	
3						
4						

STEP3a Identifying the model (water quantity)

作業期間				
作業内容		【作業No1】	【作業No2】	【作業No3】
	実施日			
	作業実施担当者			
	STEP3淡水ガイダンスにおける該当ステップ・タスク			
	参照した公開情報／コンタクトした関連ステークホルダーの名称			
	判明したこと、検索・コンタクトの結果			
	参照URL等			
	コンタクト先詳細（電話番号、メールアドレス、担当部署、担当者名等）			
	所要時間			

STEP3b Setting the reference value (water volume)

作業期間		
作業内容		
	実施日	
	作業実施担当者	
	STEP3淡水ガイダンスにおける該当ステップ・タスク	
	実施したこと ・収集した各種データとその収集方法 ・使用するモデルに合わせたデータ加工の実施等	
	目標設定計算時の基準値(㎥/月or年)	
	参照URL等	
	所要時間	

STEP3c&d target setting (water amount)

作業期間		
作業内容		
	実施日	
	作業実施担当者	
	STEP3淡水ガイダンスにおける該当ステップ・タスク	
	実施したこと ・使用した各種数値と計算式等	
	導いた最終の取水量目標(㎥/年or月)	
	目標年	
	参照URL等	
	所要時間	