

Life Insurance Association of Japan

Climate Change Starter's Guide



**Impacts and Key
Considerations for the
Life Insurance Industry**



Climate Change Starter's Guide

Impacts and Key Considerations for the Life Insurance Industry

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About this publication

- The response to climate change has become a major challenge for the world. Companies everywhere, life insurers included, need to see it as an important management issue.
- Meanwhile, climate change is a specialized topic that many people in the industry may not have learned about previously. It is a challenge at levels that require cross-departmental and comprehensive discussions spanning across any organization's vertical structures from top management to line personnel as well as horizontal coordination between different corporate departments. Until now it has been difficult to find publications on this topic written at the introductory or beginner level.
- That is why this guide was prepared. It is for people who have been given some responsibility to deal with climate change and need introductory-level information on what is important and how to respond. It is designed as a beginner's guide, with summaries of basic knowledge, actions, and important points. We hope that companies will find it useful.
- This publication was prepared by Green Pacific Co., Ltd., a company with expertise on the subject of responses to climate change.

I Why is climate change important?

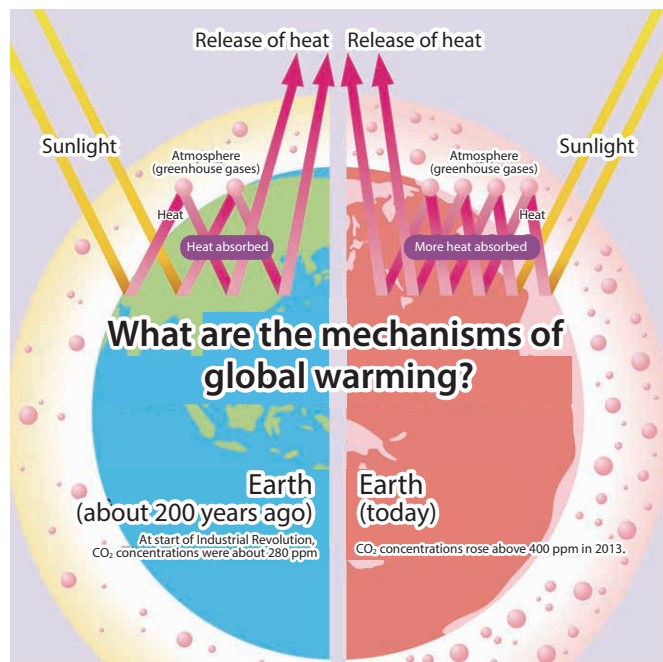


- Climate change is fundamentally not about identifying who is the cause and who is the victim.
- Everyone's daily actions are a factor in climate change.
- Climate change impacts also affect every one of us.
- In other words, we are all part of the cause and we are all victims.

1 What is climate change?

Carbon dioxide and other greenhouse gases (GHGs) in the Earth's atmosphere maintain surface temperatures at levels that support life. As a result of human activities, these GHGs emissions have increased rapidly over the past century, leading to a rise in the Earth's average atmospheric temperatures, and the climate is beginning to change as a result.

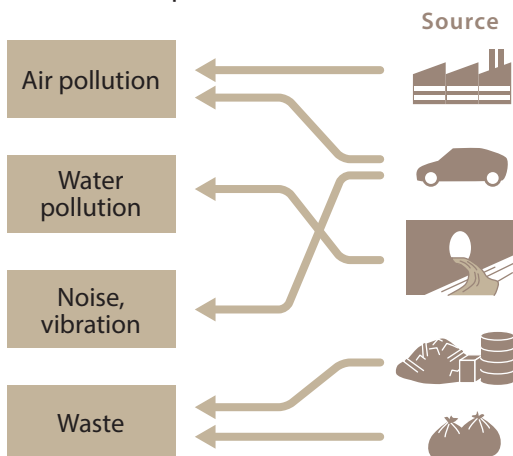
GHGs that cause climate change are emitted from all activities associated with our daily lives, and those impacts, as described below, are affecting every aspect of our lives. In other words, we are part of the cause and we are also victims.



Source: Japan Center for Climate Change Actions website (<http://www.jccca.org>)

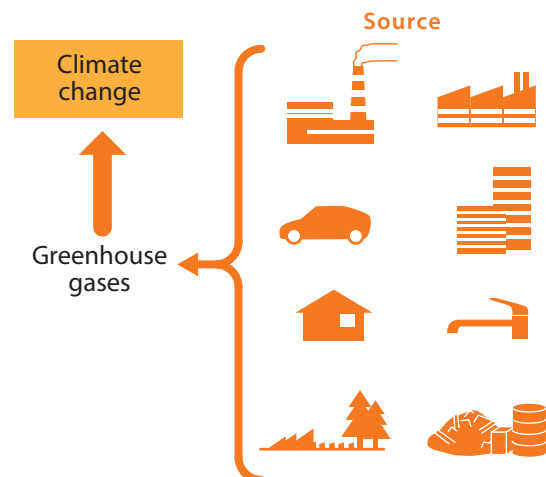
Past environmental issues...

Easier to identify sources (causes) and location of impacts



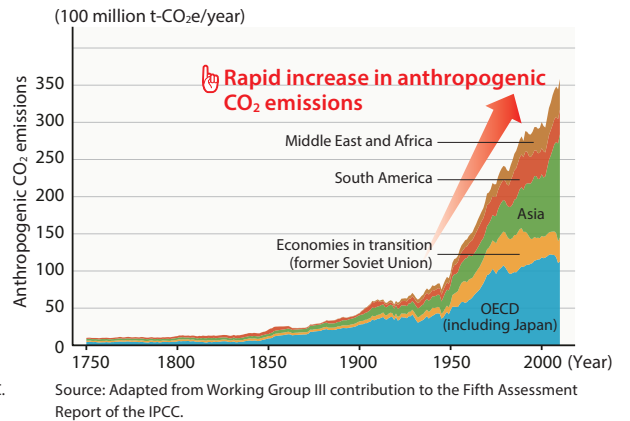
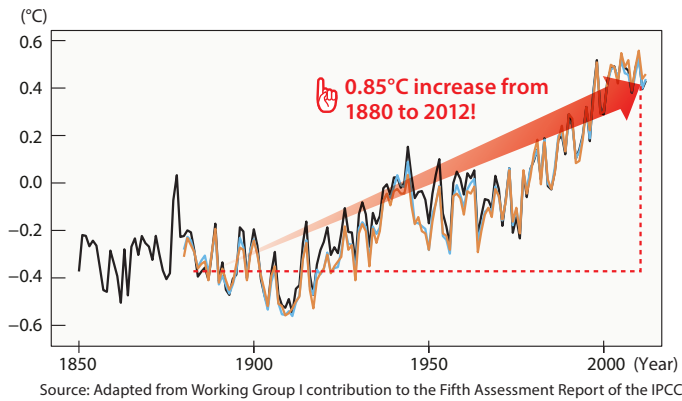
Now with climate change...

Our own activities are a cause, and every aspect of our lives is affected.



Climate change is moving steadily ahead. But the pace of change often makes it difficult for humans to notice. For example, it is not unusual for air temperatures to rise and fall by more than 10°C each day.

But, on the scale of the Earth, a one degree change of average temperatures for our entire planet represents a huge change. And on top of that, the warming that is occurring, over spans ranging from decades to centuries, is extremely rapid for the Earth.

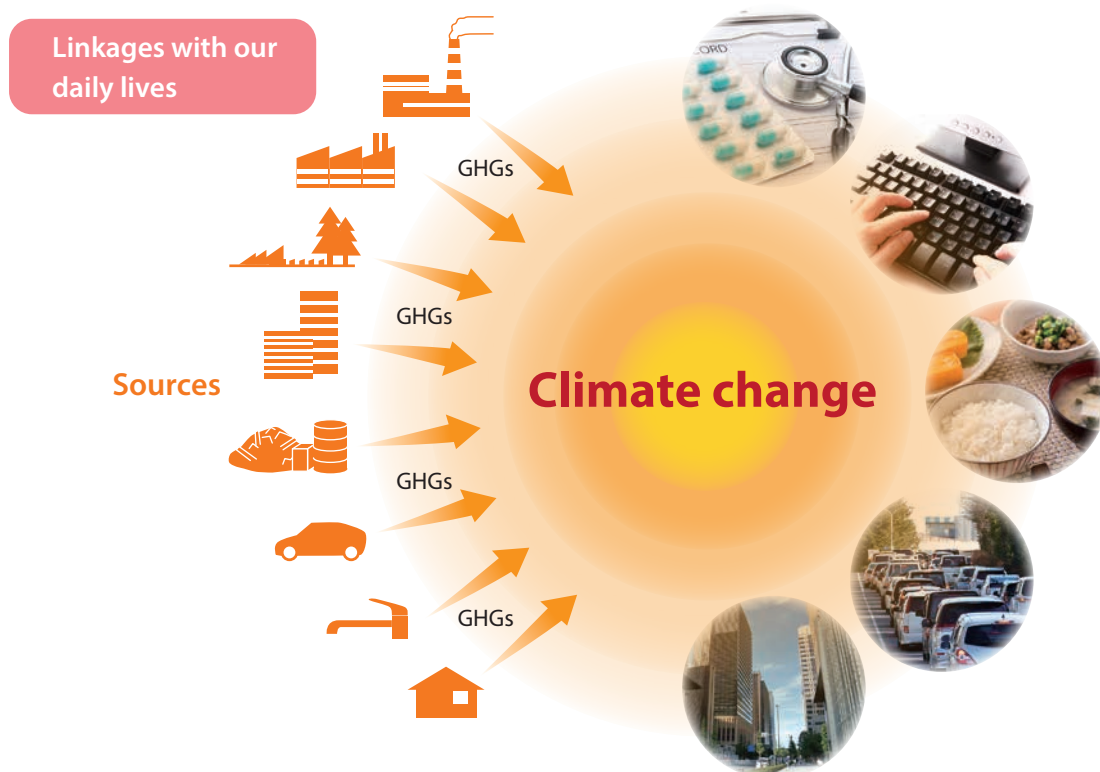


GHGs are emitted from every aspect of our lives.

Therefore, it is often difficult to take immediate action, and it also takes time to really take action.

However, because the Earth is an enormous system, it takes time for actions to take effect. That is another reason why it is difficult to take immediate action. The longer we delay, the bigger will be the impacts facing future generations.

So, what is happening in our society today?



I Why is climate change important?

To begin with, is the Earth really warming? Is the climate changing as a result of the warming? And if both are true, is it being caused by humans, not a natural occurrence? It has taken some time to get answers to such questions.

Even after it became clear that warming is under way and climate change is occurring, it still took time to determine what to do about it, to decide on targets, and to start taking action.

During the past thirty years, events like the following have occurred with increasing frequency around the world.



2 What if climate change continues?

If GHGs continue to build up in the atmosphere and global warming continues, the climate will change even more. A variety of impacts will be felt around the world, but let's have a look at some of the main impacts in Japan so far.

► Temperatures rise

With warming, it is not only the average temperatures that rise throughout the year, but also the maximum and minimum temperatures. Hot summers and warm winters will become more common. Extremely hot periods will last longer, with more intense heat in summer, higher daytime maximum temperatures, and less cooling at night. During the winter, less snow will fall where snow once fell every winter, or snowfall patterns may change.

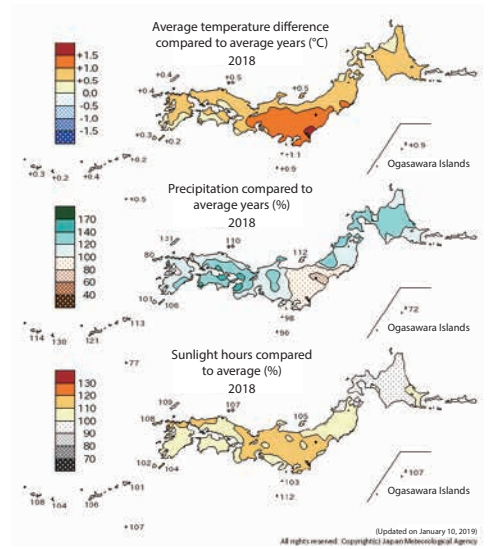
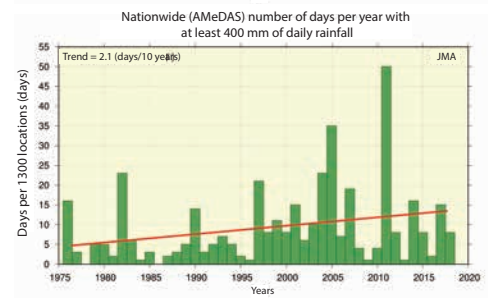
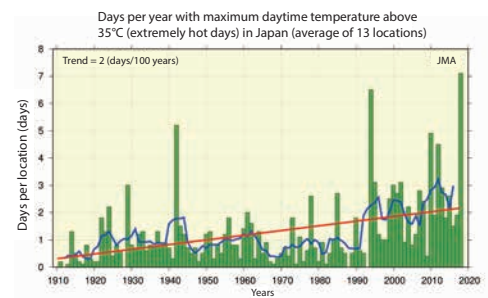
► Rainfall patterns change

In particular, the timing and amounts of rainfall will change. In the past, intense and torrential rainfall events, prolonged rain, and shortages of rain (droughts) have caused extensive damage.

But now it is likely that ever larger typhoons will be generated earlier in the year, and more of them will approach and make landfall in Japan.

► Sea levels rise

When sea temperatures rise due to warming, the warmer seawater expands in volume. Another impact of warming is the melting of glaciers on the continents and ice sheets in Greenland, and the amount of water flowing into the sea will increase. When sea levels rise from these impacts, areas with coastal erosion and flooding will increase, and there will be more damage from storm surges.



Source: Japan Meteorological Agency website

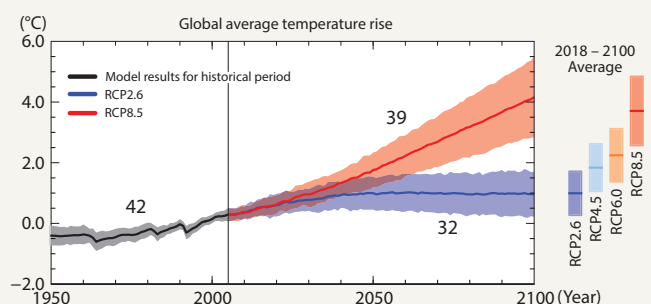
✎ IPCC Reports

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the United Nations Environment Programme (UNEP) and World Meteorological Organization (WMO). With researchers participating from 195 countries and regions around the world, it consists of three Working Groups (I The Physical Science Basis; II Impacts, Adaptation and Vulnerability; III Mitigation), and issues assessment reports every five to seven years.

The Fifth Assessment Report (AR5) was issued in 2014 and projects future climate change based on "scenarios" envisaging different paths for future society.

It projects that global average temperatures will rise by 2.6°C to 4.8°C by the end of the twenty-first century if GHG emissions continue to follow current trends (orange band in graph).

However, if emissions reach near zero at the end of the twenty-first century (blue band), the range of projected temperature rise is 0.3°C to 1.7°C.



Source: Adapted from Working Group I contribution to the Fifth Assessment Report of the IPCC.

Projected impacts, by topic

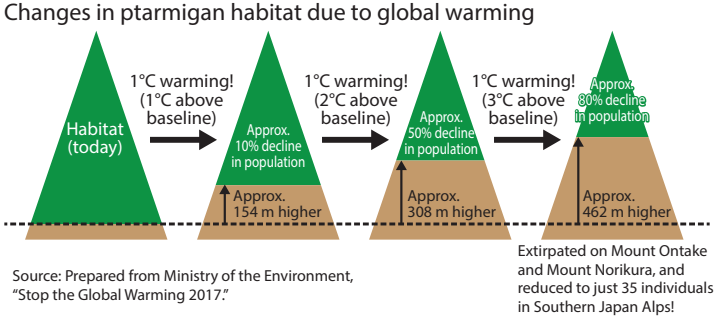
▶ What will happen to nature?

If rainfall patterns change due to climate change, plants and animals may no longer survive in their original habitats. Plants whose seeds are dispersed by the wind or animals can eventually become established in new locations if they have a suitable habitat. Animals can seek and migrate to livable habitats.

However, alpine plants and animals are limited in terms of the environments to which they can adapt, and may have no place to find refuge.



Source: Ministry of the Environment, "Stop the Global Warming 2017."



▶ What will happen to water?

While torrential rains are becoming more common, the annual number of days with rainfall has been declining. As a result, water use restrictions are nearly an annual occurrence, and there are concerns about water shortages. In the future, decreases in rainfall and snow accumulation will result in droughts, and there are concerns about durations becoming longer and shortages more severe.

Water temperatures are increasing in 70% of rivers and lakes in summer and 80% in winter. As a result, eutrophication and other water quality problems are expected to worsen.

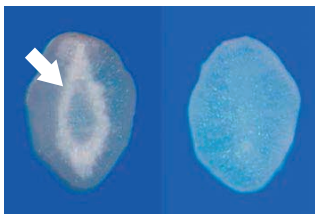


The dry Sakamoto Dam reservoir along the Higashino River, a tributary of the Kitayama River system (photo April 2011).

▶ What about agriculture?

Agriculture has always survived by adapting to a variety of natural conditions, but if parameters such as temperature and rainfall change significantly, there will be many impacts on farming.

Warming has already resulted in lower rice quality and increases in diseases and pests, declines in fruit production, and less robust livestock that are more susceptible to disease. Water is a crucial input for agriculture, so droughts and torrential rains can have serious impacts on agriculture in the relevant regions.



Rice grains appear white and cloudy due to inadequate starch accumulation



Rice grains with cracked endosperm

FY 2015 Global Warming Impact Study Report, Ministry of Agriculture, Forestry and Fisheries. (<http://www.maff.go.jp/j/seisan/kankyoo/ondanka/attach/pdf/index-3.pdf>)



Good color



Discolored

Ministry of Agriculture, Forestry and Fisheries, "Global Warming Impact Study Report 2014"

Source: Prepared from Ministry of the Environment, "Stop the Global Warming 2017."

Projected impacts, by topic

► What about major infrastructure?

Stronger typhoons mean greater risk from storm surges in coastal areas, so there are projections of impacts such as greater damage to seawalls. Also, there could be direct and physical damage to industrial production and distribution facilities in coastal areas. More frequent typhoons and flooding lead to concerns about impacts on essential infrastructure that serves day-to-day life such as highways, rail lines, and water supply systems.



► What about urban living?

Populations are concentrated in urban areas, so incidents of flooding of underground shopping areas, power outages, and rail and air travel service disruption due to record heavy rains can affect large numbers of people and cause enormous and costly damage to facilities.

There are also concerns about negative impacts on low-lying land and slopes from increases in the frequency of disasters such as floods and landslides. Also, where the urban heat island effect happens in addition to climate change, the temperatures rise even higher in urban areas. In Japan, in less than a hundred years from 1931 to 2014, the temperature rise was 1.4°C in small and medium-sized cities, and 2.0°C to 3.2°C in large cities.



► What about human health?

As temperatures rise, mortality risk also rises, and this phenomenon has already been confirmed around the world. In Japan as well, the number of hospitalized heat stroke patients every summer has been increasing.

Going forward, the frequency of heat waves is projected to increase, as well as the numbers of heat stress-related deaths and sufferers, in Tokyo and many other Asian cities. In Japan, heat stress mortality risk is projected to be 1.8 to 2.2 times higher in the 2050s relative to the period 1980 to 2000, and 2.1 to 3.7 times higher in 2100 (Climate Change Adaptation Information Platform).



3 What factors affect climate vulnerability?

Differences in vulnerability, by region

► Developing countries are particularly vulnerable

The negative impacts of climate change tend to be particularly serious for developing countries that lack sufficient response technologies and funds. Small island states such as Tuvalu and Kiribati in the South Pacific, which only have a maximum elevation of about two meters above sea level, are facing the threat of land loss due to climate change-induced sea-level rise. That has already been widely reported, but they also face a variety of other vulnerabilities and impacts.



Vulnerability to climate change impacts

Developing countries

- Infrastructure is not adequately developed.
- Cannot quickly recover from climate disaster damage.
- Inadequate medical and health care facilities.
- Cannot respond quickly to health impacts when they occur.
- Agriculture is a core industry that employs many people.
- Vulnerable to direct impacts of climate change.

► Developed countries also feel impacts

Looking at examples of impacts that have already occurred, no one can say that developed countries are safe from climate change. For example, homes in Europe typically did not have air conditioners because summer temperatures rarely got extremely hot, but more than 35,000 people died due to a heat wave in 2003. In the summer of 2019, there were many reports of maximum temperatures exceeding 40°C around Europe.



Vulnerability to climate change impacts

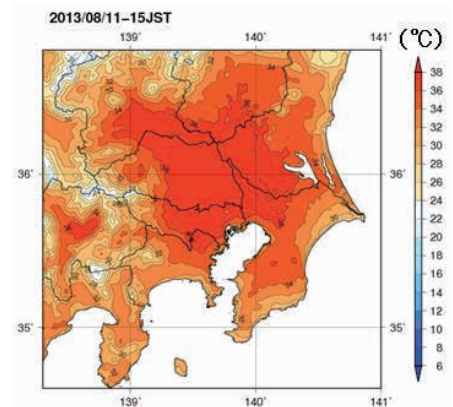
Developed countries

- Better equipped to deal with impacts of extreme weather, but it still takes time to recover from large-scale climate disasters.
- Infrastructure has a difficult time keeping up with rapid changes in climate.
- An aging society means a growing population will be vulnerable to health impacts, including elderly persons living alone in cities.

► Vulnerability of cities

This map shows ground surface temperatures in Japan recorded at 3 pm on August 11, 2013. In large metropolitan areas including Tokyo, Osaka and Kyoto, the temperature at this hour already exceeded 50°C. It is projected that combined with the heat island effect, the larger the city, the more severe will be the effects of extreme heat due to climate change.

Cities have a concentration of population and industrial activities, so the increased scale and frequency of extreme weather events due to climate change will tend to result in greater numbers of people affected and higher costs of damage. At the same time, cities tend to have many alternative response options if problems arise and recovery from damage can be quicker.



Source: Japan Meteorological Agency website

Vulnerability to climate change impacts

Cities

- Population and economic activity is concentrated in cities, so there is a tendency for the scale of damage to be larger.
- Impacts affecting cities can spread to other regions and countries.
- When transportation is affected, alternative routes or modes may be available, as long as the affected area is partial and limited.
- Cities have many means of communicating information.



► Vulnerability of rural areas

In contrast to cities, rural areas do not have as much population and infrastructure exposed to impacts. However, villages can become isolated if roads are blocked by flooding, and heavy equipment may not have easy access to disaster affected areas to help restore infrastructure, so recovery from damage can take time and be slow to complete.

Economic disparities between urban and rural areas are large particularly in developing countries, so crucial infrastructure improvements might be delayed in some areas. In rural areas many people depend on agriculture, making them more vulnerable to impacts of disasters.

As climate change advances, there are concerns about these kinds of impacts being exacerbated.



Damage from torrential rains in Kyushu (Aso, Kumamoto)

Vulnerability to climate change impacts

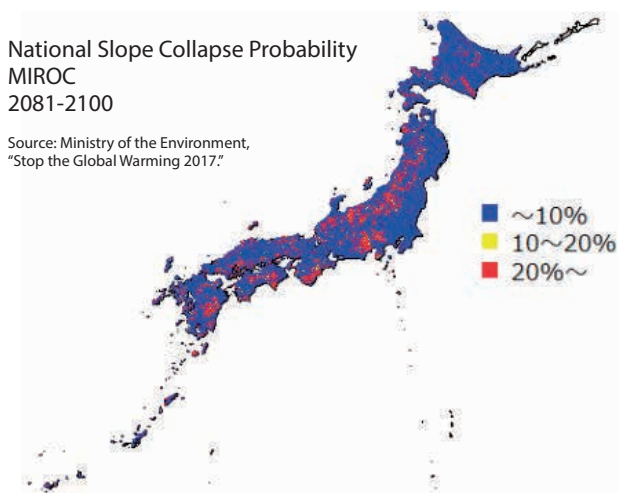
Rural areas

- Disaster recovery may be slower for infrastructure in remote areas.
- Urban-rural economic disparities are larger especially in developing countries.
- The agricultural population is larger in rural areas, making it more vulnerable to impacts.

▶ Mountainous areas

Climate change is not the only factor that could result in slope collapses and landslides. However, the impacts of human activities such as forest logging, land clearing and development, when combined with the impacts of weather-related disasters such as torrential rainfall, can raise the likelihood of a landslide occurring. There are also concerns about combined effects. A major earthquake occurring after torrential or prolonged rain could have a greater chance of causing landslides if the rain has made the ground unstable.

Such threats are typically addressed through existing disaster prevention plans, but climate change can intensify such disasters. If climate change trends continue on the present course, the likelihood of slope failure is projected to increase nationwide in Japan, outside the Kanto region.



▶ Coastal areas

It is predicted that by 2100 more than 80% of sandy beaches in Japan will have disappeared due to coastal erosion from sea-level rise. There are predictions that shorelines will recede by an average of 25 meters, and land area will be lost.

Buildings and structures located in coastal areas could be submerged or more vulnerable to damage from storm surges. There are also concerns about increased salt-water damage to vegetation and buildings as salt water intrudes upstream from estuaries and enters water intakes.



II What are the impacts of climate change in each business sector?



- Where and how are the impacts of climate change affecting us? Let's look a little closer.
- How will the sectors that support our daily lives be affected by climate change? Which of the sectors are most relevant with climate change? We will see some of these impacts in our daily lives.

1 Business sectors directly vulnerable to the physical impacts of climate change

The Intergovernmental Panel on Climate Change (see Chapter 4 for more on the IPCC) classifies the impacts of climate change broadly into eight categories, summarized for this Handbook as shown in Figure II-1.

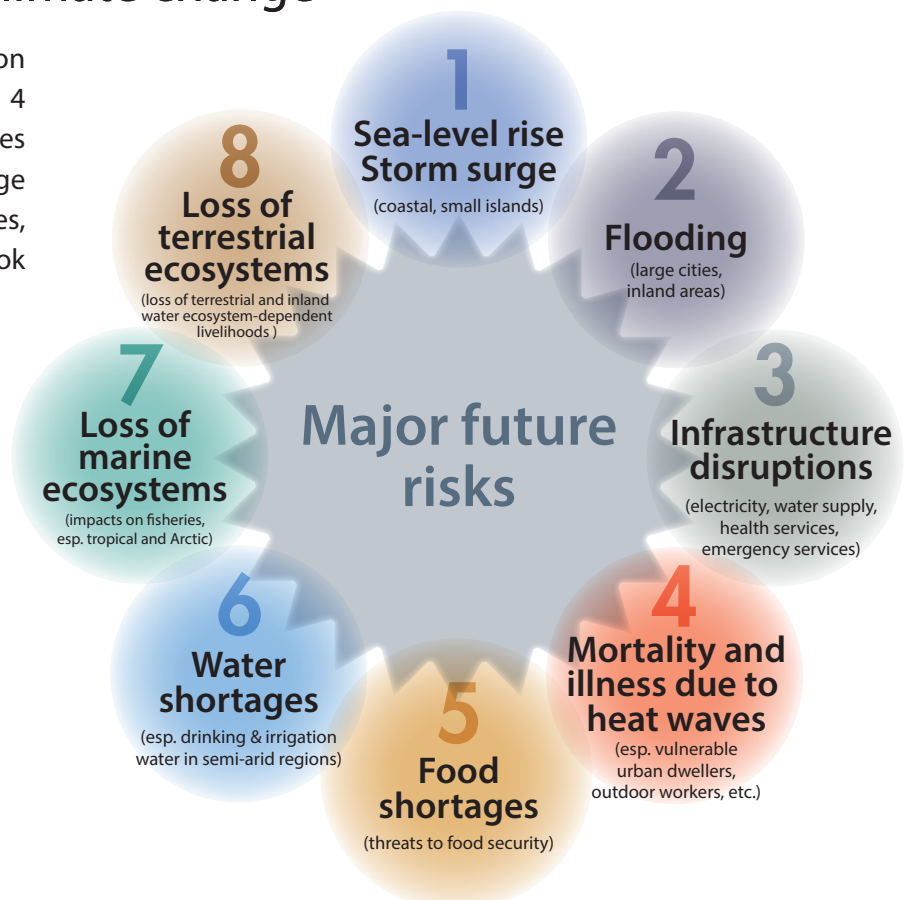


Figure II-1 Major risks to multiple sectors and regions

Source: Working Group II contribution to the Fifth Assessment Report of the IPCC.

There is not just one impact of climate change on industries that support our day-to-day lives. **Individual impacts can combine to have compound impacts, and all together these can have enormous impacts.** For example, floods and heavy rains affect all industry types, and when sea-level rise and storm surges are also considered, it is impossible to say with confidence that you will be safe from impacts if you are located away from a coastal area. The major damage caused by heavy rains and typhoons in recent years has had broader impacts as a result of interruptions in transportation within Japan, as well as the transport of imports and exports. This is still a fresh recent memory.

Continued globalization makes it essential to prepare response with a proper understanding of the extent and scope of impacts on supply chains in Japan and around the world.

II What are the impacts of climate change in each business sector?

Climate change and supply chains

The initial reason for attention being given to the linkages between climate change and supply chains was their importance as a source of GHG emissions. That point is discussed in the latter half of this chapter.

In recent years, the importance of supply chains has also attracted attention as they are also affected by climate change. A version of Figure II-2 will appear again in the second half of the chapter, but here it shows the flow from company procurement of raw materials for the manufacture of products, to processing, and then to the usage stage, and disposal.

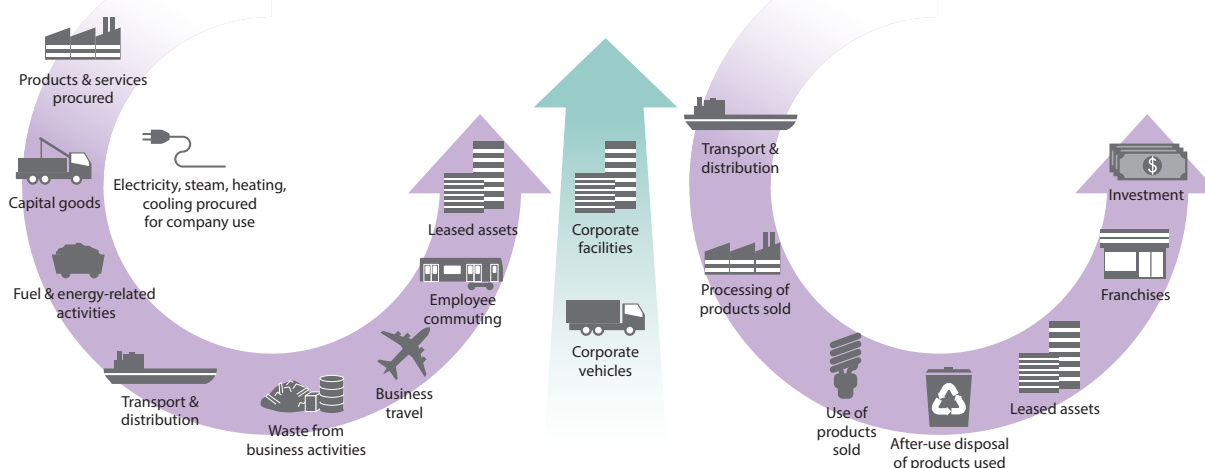


Figure II-2. Conceptual flow of supply chains

Source: Adapted from Ministry of the Environment "GHG Protocol, Technical Guidance on Calculation of Scope 3 Emissions."

How impacts are interconnected

The impacts of climate change, besides arising from changes in the actual climate, also arise due to interconnections with trends of changes in society itself. Among the impacts themselves, there are direct impacts as well as indirect and combined impacts. An overview is provided in Figure II-3, showing their complex interconnections.

Rather than explain each individual impact in detail, here we focus on the supply chain shown above. We look at the sectors that are closely connected to our daily lives, examining how they are likely to be affected by climate change, and also, which sectors are emitting GHGs, which are driving climate change.

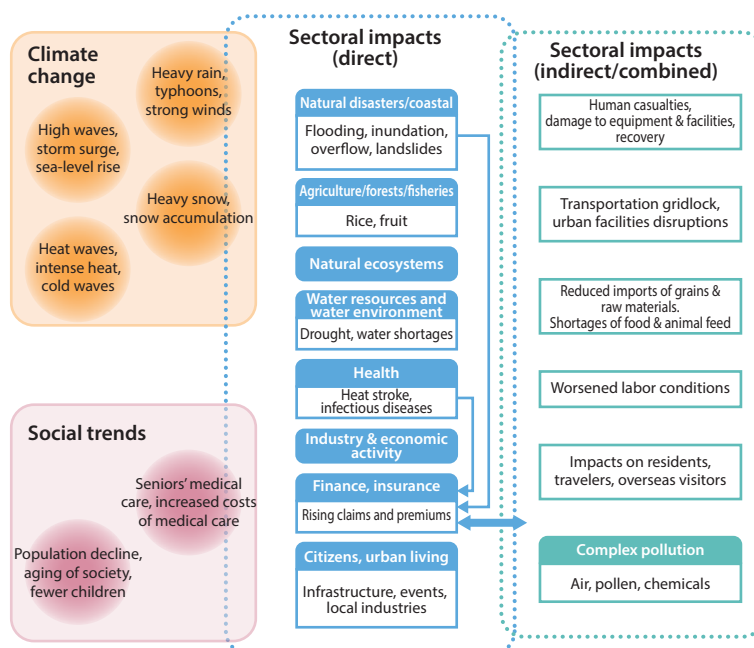
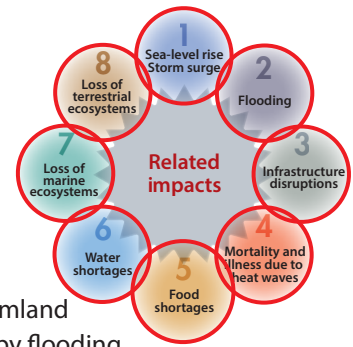


Figure II-3. Inter-connections between climate change, social trends, and sector-by-sector impacts

Primary industries, food industries

Major impacts

Climate change affects all primary industries, such as agriculture, forestry, livestock-raising, and fisheries. All eight of the impacts depicted on the right are involved. Below is a list of just some of the typical types of impacts.



- Sea-level rise and storm surge: Saltwater intrusion of coastal farmland
- Floods and torrential rains: Farmland and forest land damaged by flooding
- Infrastructure disruptions: Unable to transport products, livestock feed, etc.
- Heat stroke: Increased risk of heat stroke when working outdoors
- Food shortages: Cannot produce enough or cannot deliver product
- Water shortages: Cannot produce crops, cannot raise livestock
- Marine ecosystem loss: Fisheries resources negatively affected
- Terrestrial ecosystem loss: Forest products (timber, mushrooms, etc.) negatively affected

Points of concern

● Speed of change

Primary industries have already faced many natural threats in the past. We have benefited from agricultural products with improvements in crop varieties and growing methods to produce products suited to the local environment, but some of this will have to change. Productive zones for high quality rice have shifted northward, but there has also been progress with improved rice varieties adapted to warmer temperatures. With fruit such as mandarin oranges and apples, varieties cannot be changed as quickly, but some research has been under way on this for over ten years. Despite efforts, however, some regions and crops may be unable to keep up with the pace and features of climate change.

● Food importing countries

Japan is a country endowed with abundant water and productive soils, but as is commonly known, it also has a low rate of food self-sufficiency and is heavily dependent on food imports. As a result, climate change impacts that occur in countries that produce crops for

Japan to import will also affect Japan directly. For example, what will happen if there is a prolonged drought in a region of the world that serves as a “food basket” for Japan?

Figure II-4 shows how soybean and wheat harvests were affected by warmer temperatures (climate change) over the thirty-year period from 1981 to 2010. Losses have been estimated at 13.6 billion and 6.5 billion US dollars for wheat and soybean, respectively.

If such losses occur frequently in many places in the future, not only will the industries that manufacture and process foods be affected, there will also be other major impacts. For example, shipping companies and trading firms doing the import and export of those products will also be affected.

Will “food basket” countries like China and the United States have crop failures?

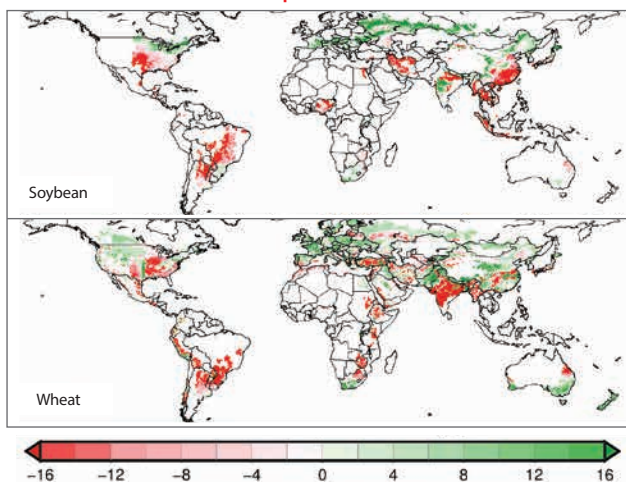


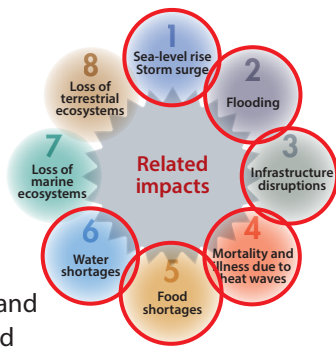
Figure II-4. Percent change in yields under a no-warming scenario (%)

Source: Adapted from Iizumi T, Shiogama H, Imada Y, Hanasaki N, Takikawa H, Nishimori M. Crop production losses associated with anthropogenic climate change for 1981–2010 compared with preindustrial levels. *Int J Climatol*. 2018;38:5405–5417. <https://doi.org/10.1002/joc.5818>.

Infrastructure and distribution

Major impacts

Similar to primary industries, infrastructure and distribution are inter-connected with many other sectors. Sea-level rise, storm surges, floods and heavy rains can cause damage that directly disrupts infrastructure functions, and this could also threaten human security.



- Sea-level rise / storm surge: Damage to buildings, port facilities and other industrial facilities in coastal areas, or the actual loss of land
- Floods and torrential rains: Damage to buildings, transportation, industrial and energy facilities
- Infrastructure disruptions: Above impacts lead to disruptions of infrastructure functions, leading to major impacts on daily life
- Heat stroke: Electricity cannot be supplied due to damage to power facilities, leading to more cases of heat stroke in summer and illness due to cold in winter
- Food shortages: Disruptions to the food supply chain
- Water shortages: Reduced rainfall and damage to water supply facilities lead to shortages in drinking water and industrial water supplies

Points of concern

● Intensified impacts and infrastructure service life

The infrastructure and distribution functions that support our daily lives have survived many disasters in the past. But, weather disasters much larger than experienced in the past are increasing in frequency today. Also, much of the infrastructure that was built during Japan's period of rapid economic growth in the mid-twentieth century is now half a century old and starting to show signs of their age. The serious damage from a typhoon that made landfall in Chiba in September 2019 may be one example that proves the relevance of concerns about aging infrastructure.

● Global supply chains

Massive flooding in Thailand in late 2011 had ripple effects on industries in many countries of the world, including Japan. Global economic damage was estimated at 3.8 trillion yen. More than half of the approximately 800 companies affected were Japanese corporations or their affiliates.

Going forward, when considering the impacts of infrastructure disruptions it will be crucial to consider how to maintain stable supply chains. This work should not be delegated solely to national and local governments, but must also be considered by each individual company.



👉 **Impacts rippled out from Thailand across the world**

Impacts of massive floods along the Chao Phraya River in Thailand (2011)

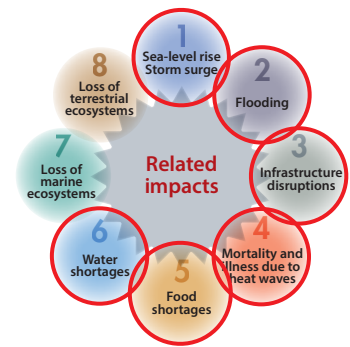
Tourism

Major impacts

There may be a tendency to understate the impacts on tourism, compared to impacts on industries that provide food, electricity, gas and other essentials for living. Nevertheless, countries and regions whose economies depend on tourism can also be affected by climate change.

Pacific island states are finding that not only can their tourism industries be affected by sea-level rise, they also risk the actual loss of land. In other countries, tourist areas that rely on winter sports are being affected by reduced snowfall.

- Sea-level rise and storm surge: Damage to coastal natural areas and towns, and other touristic resources
- Floods and torrential rains: Damage to essential tourist-serving buildings, modes of transport, communications, and energy facilities, etc.
- Infrastructure disruptions: The impacts listed above could lead to disruptions of infrastructure functions, leading to other major impacts on tourism.
- Heat stroke: Changes in temperatures and rainfall in touristic areas could increase harmful health impacts on tourists. Tourist numbers could drop as they seek to avoid risks.
- Food shortages: Negative impacts on local specialty food items and other touristic resources
- Water shortages: Reduced rainfall and damage to water supply facilities can lead to problems including drinking water supply shortages in tourist areas.



Points of concern

The first concern is the severity of impacts on countries and regions with a high ratio of tourism in the economic activity. In some cases new touristic resources can be developed due to climate change, but in most cases, the history and nature of the region is being used as tourism resource. If climate change means losing those resources, it could be very difficult to recover. Also, residents who live or work in touristic areas will have concerns about impacts on themselves and their communities. Another concern is impacts on the people who visit as tourists, who could experience health impacts or be affected by extreme weather at touristic destinations. The magnitude of potential impacts becomes clear when impacts on infrastructure affect core services that support tourism. For example, consider the damage to Kansai Airport from Typhoon 21 in September 2018 and Narita Airport from Typhoon 15 in September 2019. There are concerns that such damage will increase in the future.

Problems in Oze and Nikko National Parks

Japan has many national parks where deer habitat is expanding, including the Southern Alps, Oze, Nikko, and Yoshino Kumano. The parks are experiencing damage from deer eating the vegetation.

Because less snow is falling in areas where previously the snow cover would have been deep, deer are now entering the areas for winter grazing. There are concerns that local ecosystems may not recover from damage caused by grazing deer. The reduced snowfall is seen as one of the impacts of climate change.



Net installed to keep deer out of Ozenuma in Oze National Park

2 Industrial sectors that emit greenhouse gases

GHGs are emitted from human activities of daily life, but many emissions also come from the industries that support them. Figure II-5 shows the latest sector-by sector data on CO₂ emissions, which account for 92% of Japan's total GHG emissions (fiscal 2017).

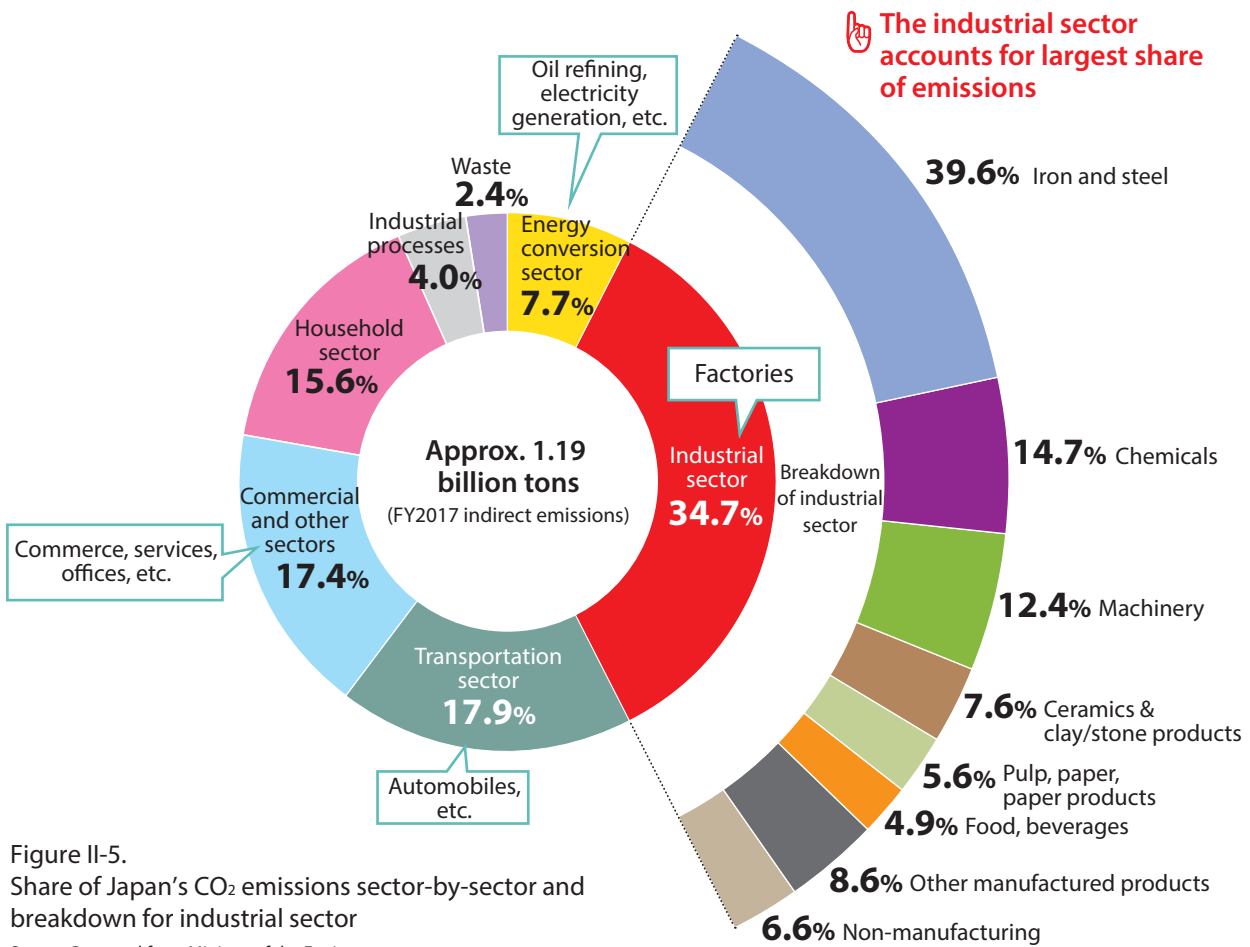


Figure II-5. Share of Japan's CO₂ emissions sector-by-sector and breakdown for industrial sector

Source: Prepared from Ministry of the Environment, "FY2017 Greenhouse Gas Emissions (Confirmed Numbers)."

Let's have a closer look at the breakdown within the industrial sector.

About 40% of the emissions come from the iron and steel industry. Next come chemicals and machinery. But it must be noted that these are only emissions from within Japan. In other words, these numbers only reflect the CO₂ emissions from factories and facilities located in Japan.

GHG emission trends of Japanese companies

Now we return to a figure we introduced earlier in this chapter, *the conceptual flow from company procurement of raw materials for the manufacture of products, to processing, and then to the usage stage, and disposal.*

Emissions from companies are classified as Scope 1, Scope 2, or Scope 3.

<p>Scope 1</p> <p>Emissions from fossil fuels consumed by a company's own factories, offices, and commercial vehicles</p>	<p>For example, a company that uses a lot of heat for manufacturing processes will likely operate boilers. A company that operates its own vehicles for construction or transporting goods will consume gasoline or diesel. The company's Scope 1 emissions are calculated using the quantity of fossil fuels consumed multiplied by an emission factor* for direct consumption of fossil fuels in the company's activities.</p>
<p>Scope 2</p> <p>Emissions from electricity and steam, etc., procured for use by the company</p>	<p>For example, the emission factor for the electricity purchased from a utility will be determined depending on the type of generating plant operated by the power utility that produces the electricity (each power utility publishes its own numbers). Using these emission factors and the amount of electricity the company purchased from the utility, the company's Scope 2 emissions can be calculated.</p>
<p>Scope 3</p> <p>All other emissions generated in the company's value chain</p>	<p>For example, this includes emissions during the use of devices or equipment manufactured and sold. Gradually, an increasing number of companies is now calculating Scope 3 emissions, but there is a large range and scope of activities covered, so calculations are complicated. Thus, it is the progressive companies that are gradually starting to calculate and publish these emissions.</p>

* CO₂ emission factor: Amount of CO₂ emitted per unit when fuel is burned. The ratios of CO₂ emitted for the same amount of thermal energy are 10:7.5:5.5 for coal, oil, and natural gas, respectively.

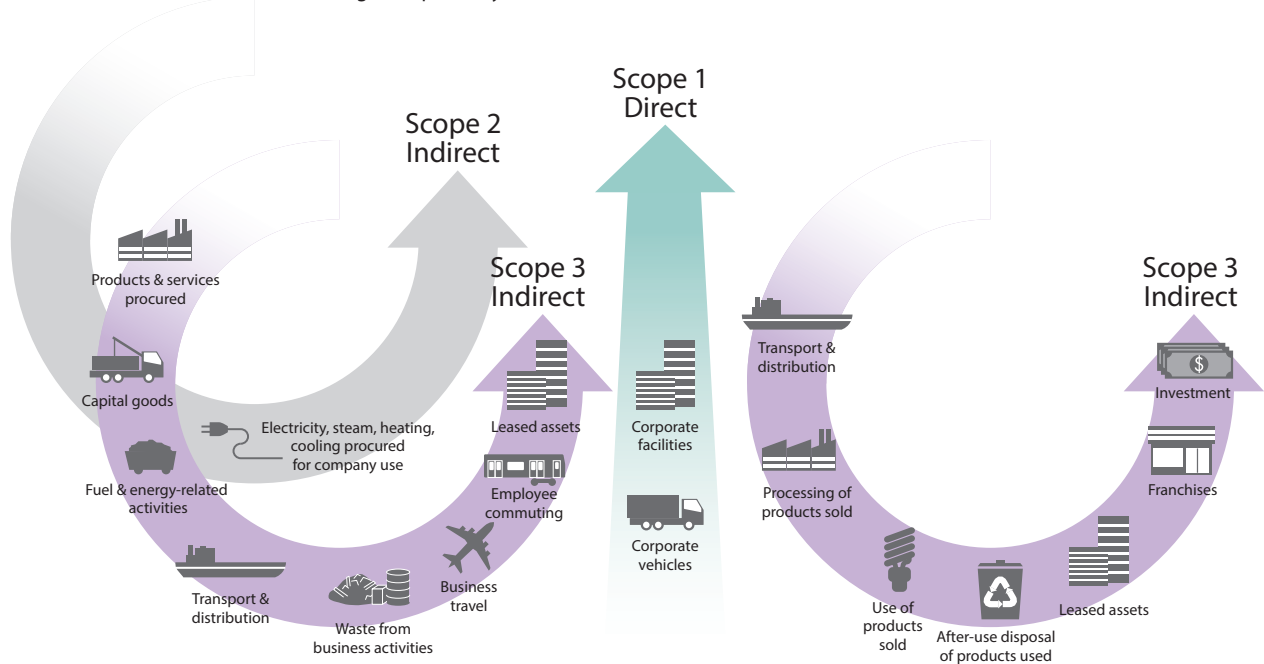


Figure II-6. Scope 1, 2, 3

Source: Adapted from Ministry of the Environment "GHG Protocol, Technical Guidance on Calculation of Scope 3 Emissions."

Seen in terms of these three scopes, what are the emission trends for Japanese corporations?

II What are the impacts of climate change in each business sector?

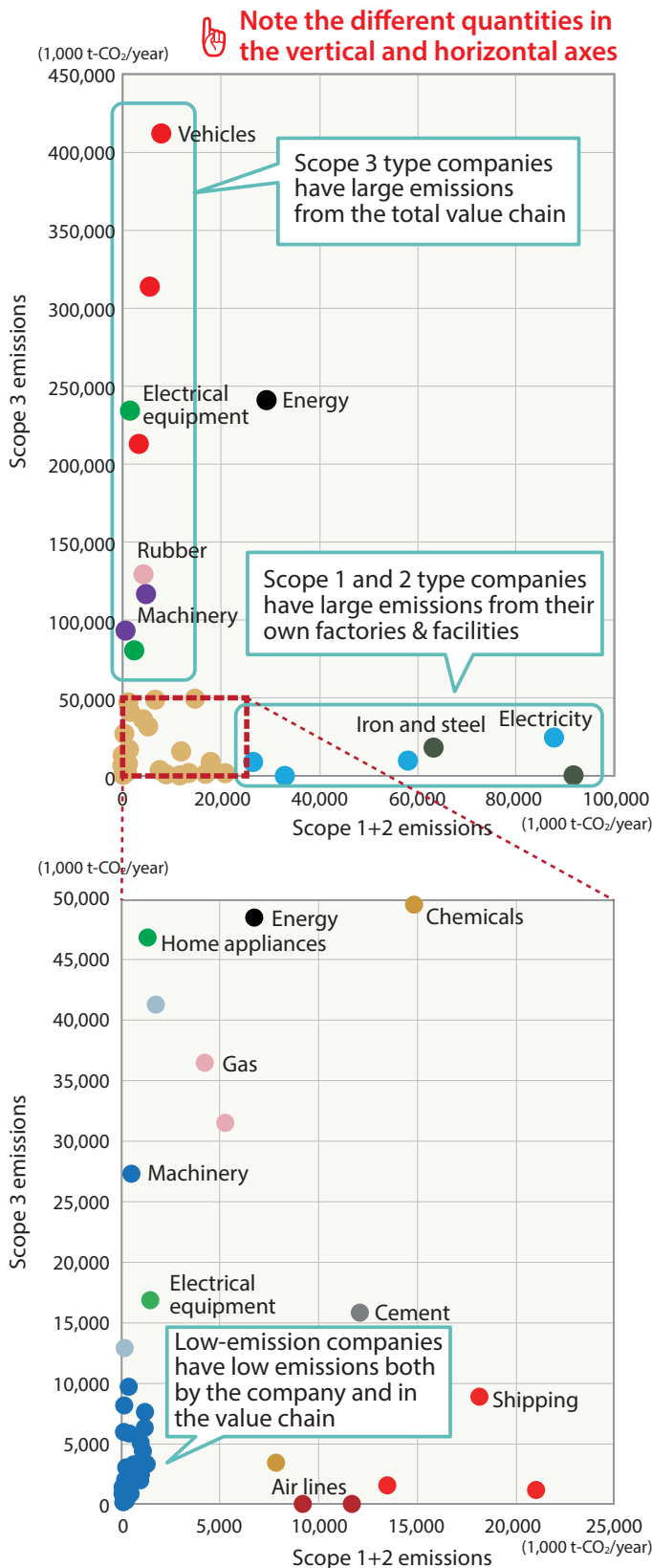


Figure II-7. Emission trends of Japanese companies

The graph on the left shows the CO₂ emissions in 2017 from major tier-1 listed companies in Japan. The vertical axis shows Scope 3 and the horizontal axis Scope 1 and 2 emissions.

Companies with high levels of Scope 1 and 2 emissions are those that have high CO₂ emissions from their own factories and facilities in Japan. For these companies, emissions arising from the total value chain are not large compared to their Scope 1 and 2 emissions.

Meanwhile, Scope 3 type companies have low emissions from their own factories and facilities, but may have high emissions from the total value chain, which may include emissions from their products being used around the world.

The lower graph is an enlargement of the collection of yellow dots concentrated in the lower left corner of the upper graph.

This group as well shows a divergence between Scope 1 and 2 versus Scope 3 type companies. Note the collection of blue dots in the bottom left.

The low-emission companies here are companies that besides having almost no emissions from their own factories, have almost no emissions from the use of their products.

Starting on the next page, we will look at examples of each type of company.

Scope 1 and 2 company examples

Detailed examples are also presented in Chapter VI.

Iron and steel

An enormous amount of coal is used as a raw material in the processes of manufacturing iron and steel. As a result, the actual GHG emissions from these industries are significant. However, the production efficiency of Japan's iron and steel industry has been the highest in the world for many years. A variety of energy saving equipment has been developed and installed, and Japan also offers technical assistance to improve the energy efficiency of companies in other countries. It is also important to pay attention to the manufacturing processes and energy efficiency depending on the quality of the steel produced.

The topic of "avoided emissions" has attracted attention in recent years. For example, cars built using strong, light steel produced through efficient processes will have better fuel efficiency than cars built using heavier steel. This means avoiding a corresponding amount of CO₂ emissions.

Progress is under way for practical applications of technologies using hydrogen instead of coal, and the Japan Iron and Steel Federation has stated a goal of zero CO₂ emissions from the iron and steel industry by 2100. In Europe as well, demonstration projects have started to test steelmaking technologies that do not use fossil fuels.

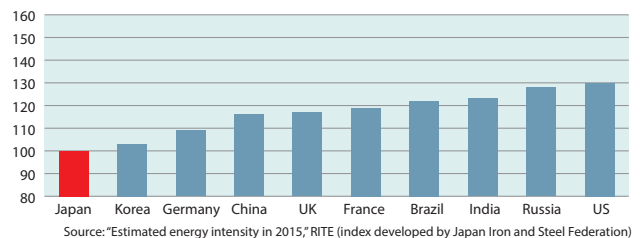


Figure II-8. International comparison of energy intensity in iron and steel industry (Japan = 100)

Source: Japan Iron and Steel Federation, "The challenge for zero carbon steel."



Night view of steel factory

(Photo: JFE Holdings)



Blast furnace plant



Examples of benefits of high-quality steel: Automobiles



Examples of benefits of high-quality steel: Ships
(Photo: NYK)

Examples of Scope 3 companies

Detailed examples are also presented in Chapter VI.

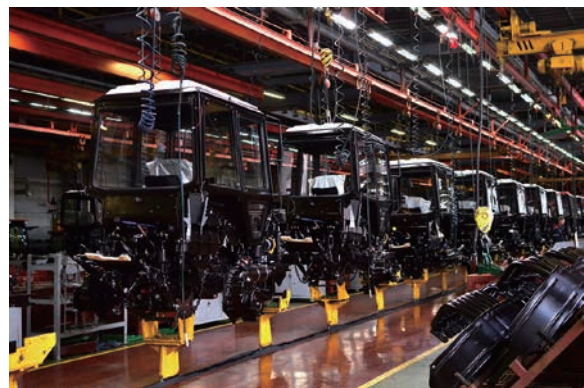
Electrical equipment manufacturing

For companies that manufacture electrical equipment such as air conditioners and televisions, the energy used at their factories is not that large. Many processes involve assembling parts, and the factories and processes themselves are very efficient. Companies like these are characterized by high Scope 3 emissions that occur when the equipment is used.

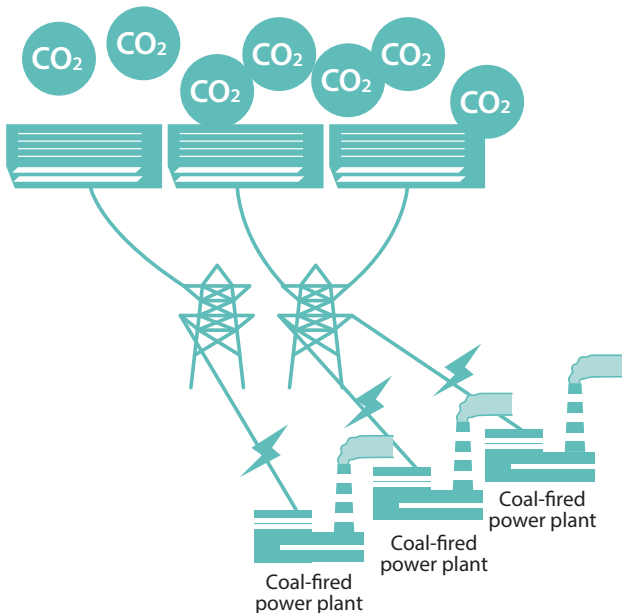
Scope 3 emissions began attracting more attention around the time of the Paris Agreement in 2015. Until then, constraints such as excessively broad coverage and the complexity of calculations hindered progress, so above all, domestic emissions in each country have been the main focus in setting CO2 reduction targets and measures.

But today, companies that manufacture products are expected to be more aware of their global emissions, not just domestic emissions. The TCFD Recommendations stated that information regarding Scope 3 emissions should be disclosed if they are significant, so more attention is being directed toward these emissions. In other words, the preparedness of companies to deal with Scope 3 emissions is becoming very important.

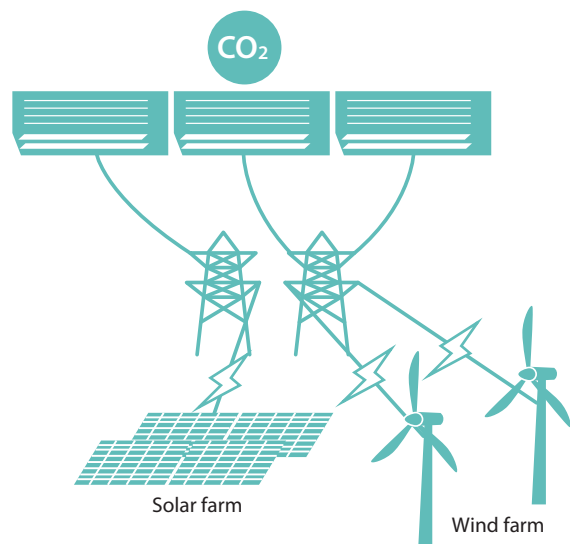
This company has low emissions at the plant during manufacturing.



Assembly line



Scope 3 emissions when products are used in a country with a high ratio of electricity from coal-fired power generation



Emissions when products are used in a country with a high ratio of renewable energy

If electricity supplied around the world shifts to low-carbon or zero-carbon, these Scope 3 emissions will also decline.

Examples of low-emission companies

 Detailed examples are also presented in Chapter VI.

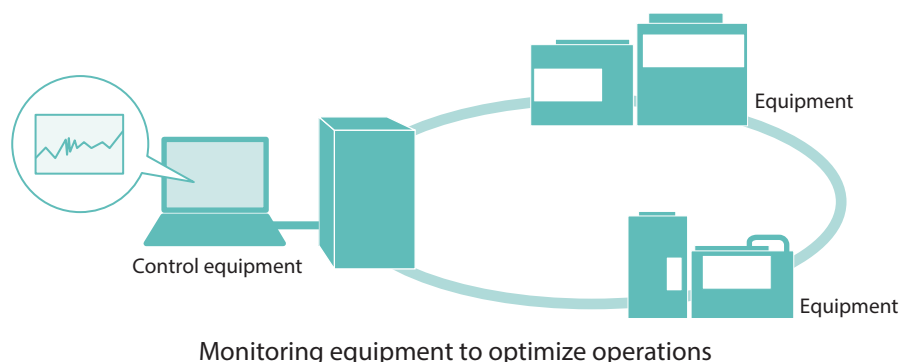
Food industries, information industries, etc.

These types of companies do not emit much CO₂ when manufacturing their products. Some companies do not have their own factories. The products they manufacture and sell also do not account for a large share of the CO₂ emissions in the value chain. This type of company includes food and beverage manufacturers, and information services providers.

Such companies probably find it less difficult to tackle climate change than those that have higher Scope 1, 2, and/or 3 emissions. Many are already making efforts to switch their power consumption to 100% renewable energy, or to offset their CO₂ emissions by purchasing renewable energy.

Some companies are also encouraging other companies in their supply chain to make efforts to reduce CO₂. For example, some are including emissions in their criteria for choosing parts suppliers.

Some companies can also use their products and services to help other companies reduce their own CO₂ emissions and/or adapt to climate change. Examples include tools that optimize the operating efficiency of energy-consuming equipment to achieve significant energy savings, and systems that monitor river water levels to detect a potential flood and generate an alarm. Such measures and technologies are expected to make further advances as more companies engage in businesses based on climate change measures.



Source: NEC (<https://www.nec.com/en/global/eco/climatechange/adaptation/02.html>)

III What are the impacts of climate change on the life insurance industry?



- The impacts of climate change on human life are a major issue for the life insurance industry. These topics continue to be studied.
- At the same time, climate change is a relevant factor for the assets held by insurers in their role as institutional investors.

Life insurance companies have two major aspects of their business—as life insurers and as institutional investors. This chapter gives an overview of the impacts on both aspects.

1 Impacts on life insurers (mainly physical risks)

Climate change impacts on human life and health

As shown in Chapter 1, climate change has impacts on everything from human health to mortality rates. Figure III-1 shows the situation of impacts of changes due to climate change on many aspects of human health. In addition to things like increases in illnesses and mortalities due to extreme heat and disease vectors, some of the many other examples include deterioration of air and water quality, and impacts on mental health and potential forced migration.

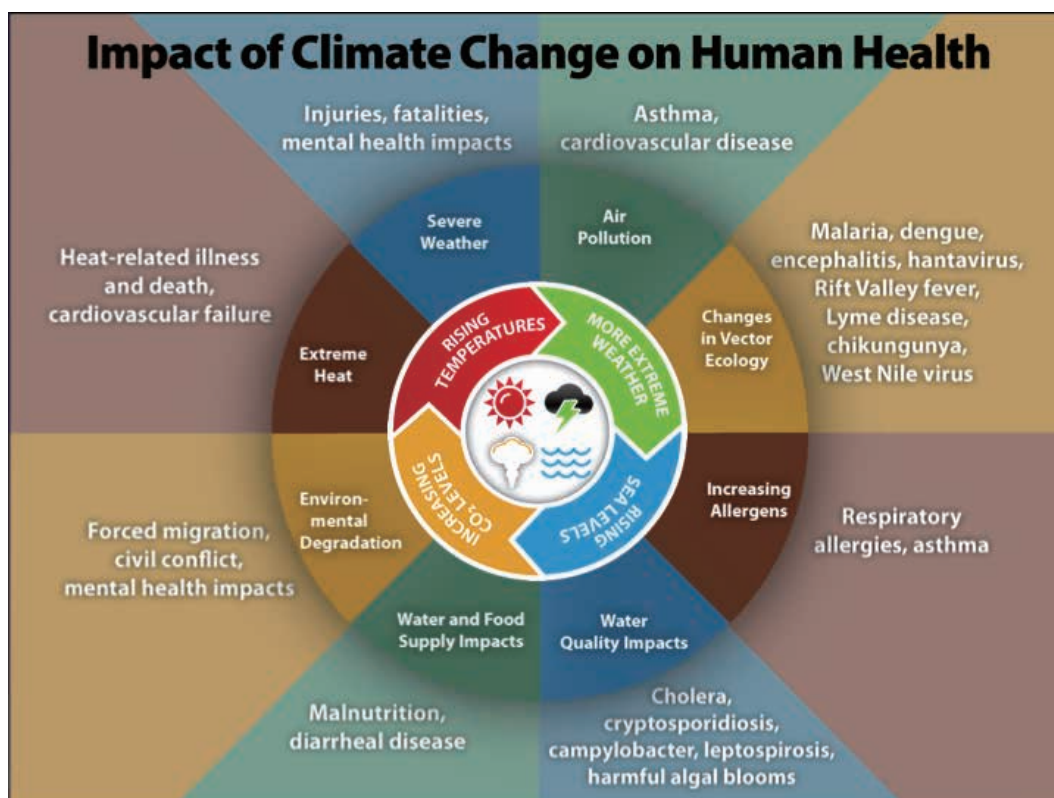


Figure III-1. Impact of climate change on human health

Source: Adapted from Center for Disease Control and Prevention (<https://www.cdc.gov/climateandhealth/effects/default.htm>)

Ninety percent of major natural disasters that occur around the world are weather-related disasters (Figure III-2). As climate change progresses, these kinds of weather disasters are expected to increase everywhere. Many factors besides climate change can affect human life and health. Some are natural and some are human-caused, but the impacts of these factors could be further intensified by climate change, and new impacts not seen before could also arise.

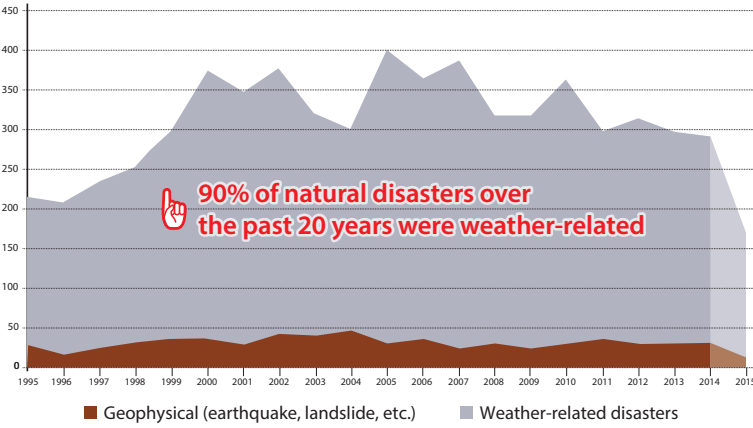


Figure III-2. Trends in the number of disasters by major category
Source: CRED, UNISDR, "The Human Cost of Weather-Related Disasters 1995-2015."

What has the greatest impact?

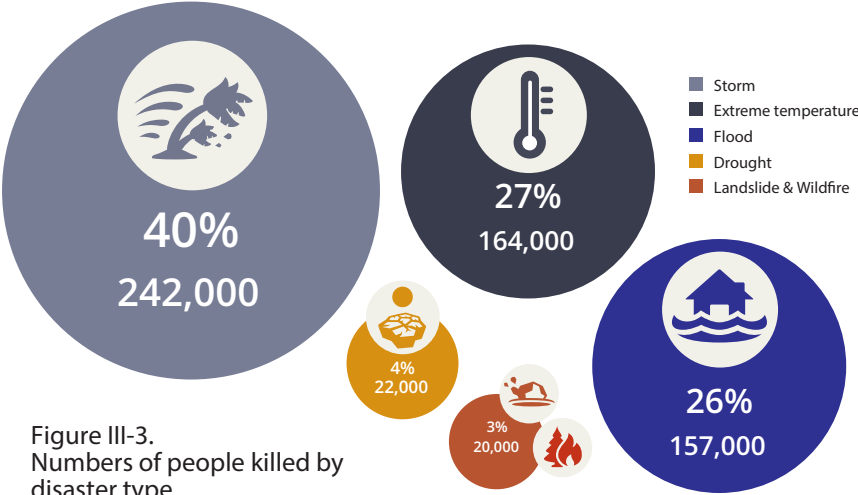


Figure III-3. Numbers of people killed by disaster type
Source: CRED, UNISDR, "The Human Cost of Weather-Related Disasters 1995-2015."

Looking at the factors affecting human mortalities due to natural disasters over the past twenty years, the largest is storms, followed by extreme temperatures. Among 164,000 deaths from extreme temperatures, 148,000 (90%) were due to heat waves. Deaths from flooding are similar in magnitude.

Table III-1. Events and victims of natural disasters worldwide (1995-2015)

Type of disaster	Number of occurrences		People affected		Deaths	
	Cases	Percent	Million persons	Ratio	Thousand persons	Ratio
Flood	3,062	43%	2,300	56%	157	26%
Storm	2,018	28%	660	16%	242	40%
Earthquake	562	8%	-	-	-	-
Extreme temperature	405	6%	94	2%	164	27%
Drought	334	5%	1,100	26%	22	4%
Landslide	387	5%	8	0.2%	20	3%
Forest fire	251	4%				
Volcanic activity	111	2%	-	-	-	-
Total	7,130					
Total weather-related disaster	6,457		4,160		605	

Source: CRED, UNISDR, "The Human Cost of Weather-Related Disasters 1995-2015."

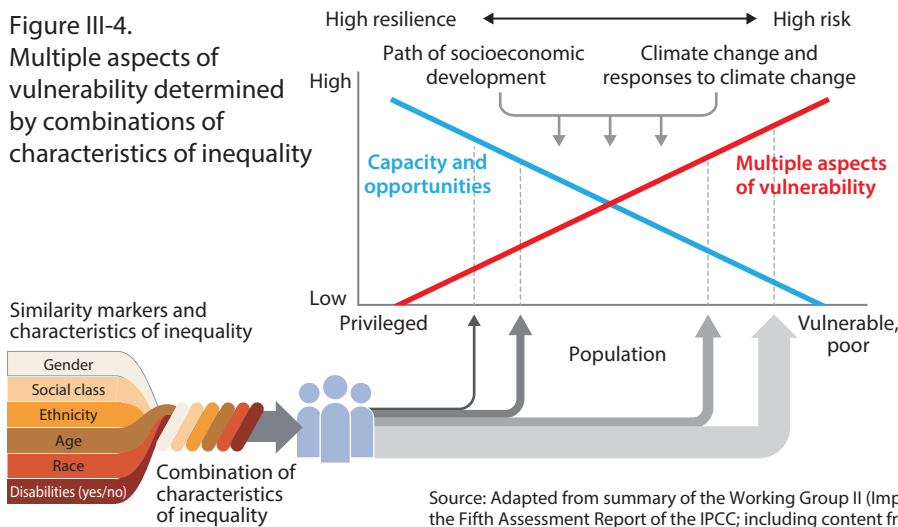
III What are the impacts of climate change on the life insurance industry?

Where will the impacts be the greatest?

Fundamentally, human health and mortalities are associated with many other factors besides climate. And since projections of climate change also involve uncertainty, it is not a simple task to evaluate and project the precise impacts of climate change. In addition, the vulnerability to climate change impacts such as intensification of weather-related disasters can vary significantly with factors such as a person's age, economic status, country and region. Research is ongoing in countries around the world to better understand the kinds of impacts that will arise, where, and how to identify and evaluate them.

Figure III-4.

Multiple aspects of vulnerability determined by combinations of characteristics of inequality



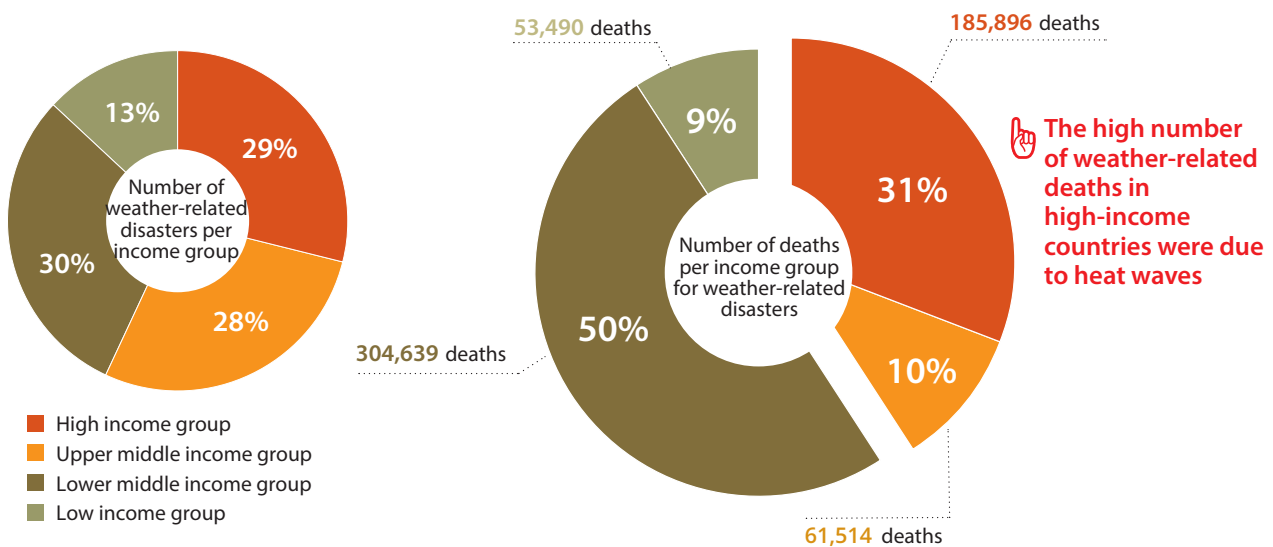
The vulnerable and poor* have high risk from climate change. Conversely, the privileged have low risk and high resilience.

*For example, for health impacts from climate change, this refers to the elderly and socially isolated.

Source: Adapted from summary of the Working Group II (Impacts, Adaptation, Vulnerability) contribution to the Fifth Assessment Report of the IPCC; including content from Ministry of the Environment.

What about impacts in developed countries?

Natural disasters can occur anywhere in the world (Figure III-5, left), but the numbers and ratios of people affected by disasters will be different in developed countries, which have better-developed infrastructure, medical care and insurance, etc. Figure III-5, right shows that the high number of weather-disaster deaths in developed countries was mainly due to heat waves.



The high number of weather-related deaths in high-income countries were due to heat waves

Figure III-5. Number of weather-related disasters and deaths per income group

*Smaller numbers for the low income group are due to lack of available data.

Source: Adapted from CRED, UNISDR, "The Human Cost of Weather Related Disasters 1995-2015."

The use of air conditioning is a basic means of mitigating the impacts of extreme heat. In developed countries, people can typically obtain air conditioners more easily than in developing countries. Also, warmer winter temperatures are expected to have the positive effect of reducing the number of deaths from cold waves.

Recent research, however, projects that, in Europe and the United States, rising mortalities from extreme heat and heat waves will have a negative impact that more than offsets the decline in deaths from cold waves (Figure III-6, Figure III-7).

The examples from the United States compare values with the year 1990 in 209 cities. The summer (April to September) increase in deaths is projected to be greater than the decrease in deaths in winter (October to March).

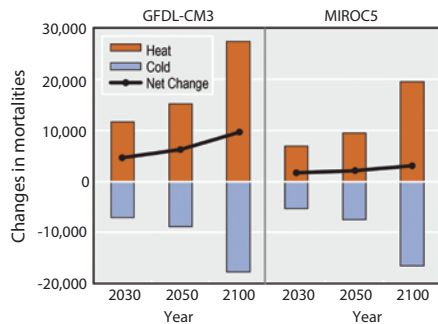


Figure source: adapted from Schwartz et al., Projections of temperature-attributable premature deaths in 209 U.S. cities using a cluster-based Poisson approach 2015

Figure III-7. Projected mortalities by season in United States cities Changes in mortalities

Source: Crimmins, A. et al., Executive Summary. The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment, USGCRP, 2016.

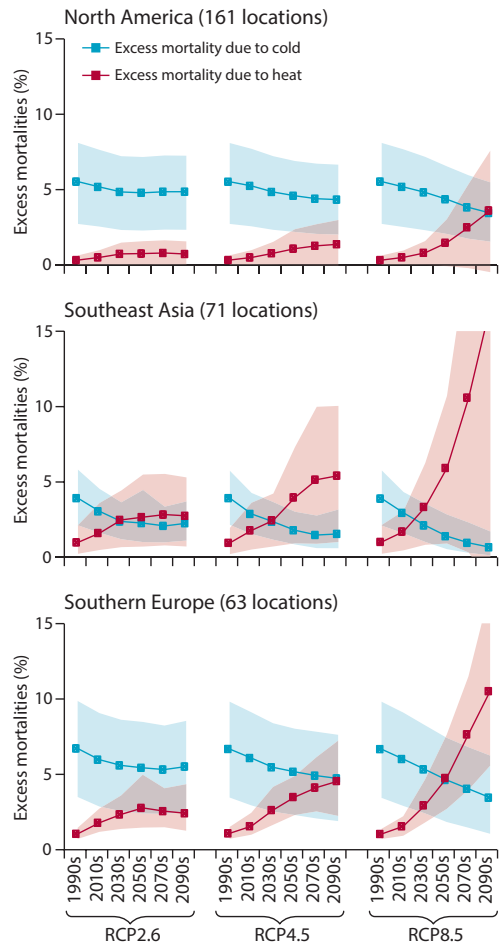
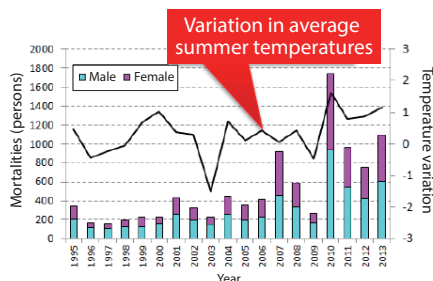


Figure III-6. Warming scenarios and mortalities to 2100

Source: Adapted from Gasparrini, A. et al., Projections of temperature-related excess mortality under climate change scenarios, Lancet Planet Health 2017; 1: e360–67.

What will happen in Japan?

In Japan as well, the intensity of extreme heat is already being felt each year. Heat stroke deaths are on the rise, and other impacts are becoming evident, such as expanded range of disease vectors.



Source: Ministry of Health, Labour and Welfare, Annual mortalities from heat stroke: "Vital Statistics." Temperature variations: Prepared from Japan Meteorological Agency: <http://www.data.jma.go.jp/gmd/risk/obsdl/index.php>

Figure III-8. Trends in annual mortalities from heat stroke

Source: Ministry of the Environment, "Stop the Global Warming 2017."

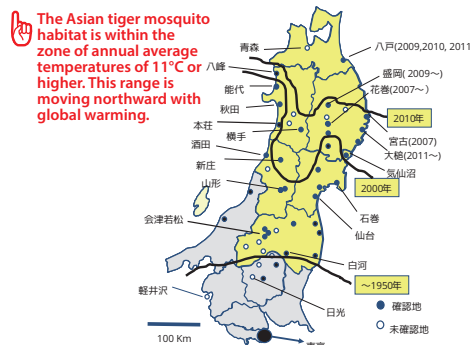


Figure III-9. Expanding range of the Asian tiger mosquito (*Aedes (Stegomyia) albopictus*)

Source: Global Warming Impact Integrated Projection Project Team, Global Warming Impact Assessment/Adaptation Policy Integrated Research 2014. Report "S-8 Global Warming: Impacts on Japan"



Source: Ministry of the Environment, "Climate Change Adaptation Information Platform" portal site.

Figure III-10. Line of 20°C sea surface temperature in August and areas of disease outbreaks from *vibrio vulnificus* bacteria

Source: Ministry of the Environment, "Stop the Global Warming 2017."

III What are the impacts of climate change on the life insurance industry?

It has been predicted that in the absence of aggressive GHG emission reduction measures, the number of hospitalized heat stroke patients will increase nationwide (Figure III-11).

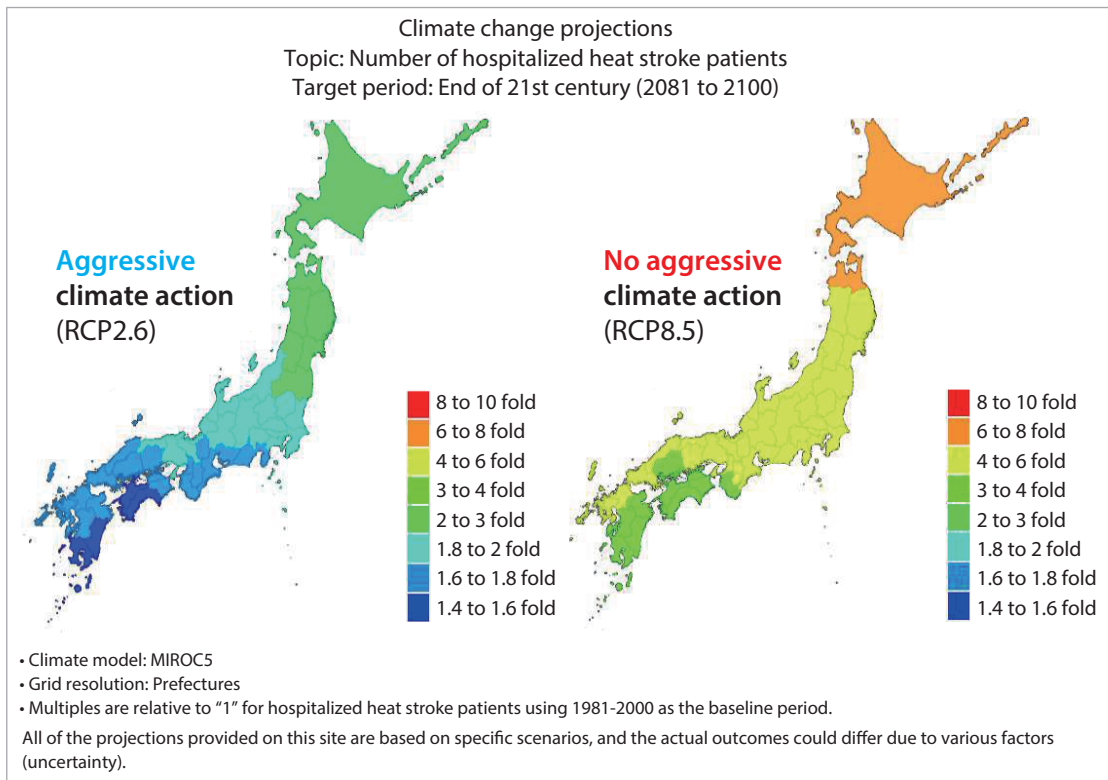
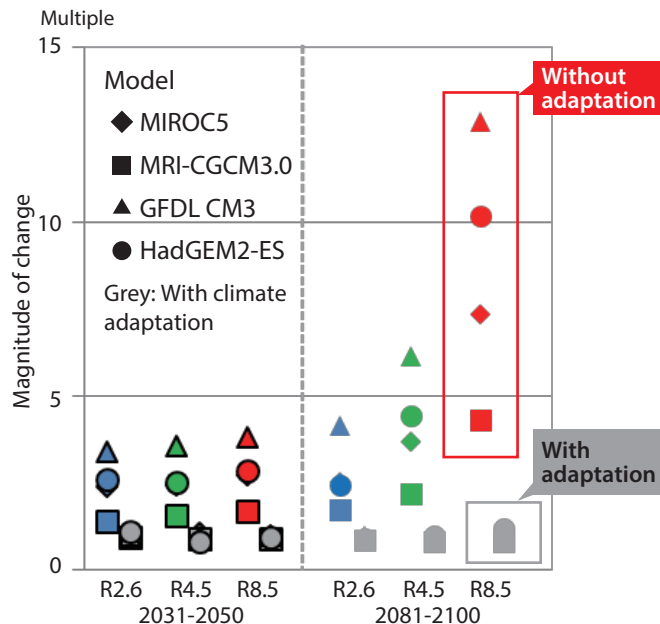


Figure III-11. Examples of projected impacts/SCENARIOS

Source: Ministry of the Environment, "Climate Change Adaptation Information Platform" portal site.

The increase in hospitalized patients will also lead to an increase in mortalities. In the absence of aggressive climate actions, deaths from heat stress could increase four-fold to thirteen-fold nationwide by the end of the century. If appropriate actions are taken, it is projected that this increase could be limited to less than two-fold.



Source: Global Warming Impact Integrated Projection Project Team, Global Warming Impact Assessment/Adaptation Policy Integrated Research 2014. Report "S-8 Global Warming: Impacts on Japan"

Figure III-12. Increase in excess mortalities from heat stress (totals for Japan)

Source: Ministry of the Environment, "Stop the Global Warming 2017."

2 Impacts on institutional investors

What are transition risks for life insurers?

Besides physical risks, major impacts of climate change facing life insurers as institutional investors include changes associated with the transition to a low-carbon or decarbonized society. These are referred to as “transition risks.” Here we look at the transition risks life insurance companies face in their roles as institutional investors.

GHG emissions from the actual business activities of life insurance companies are very limited. Most of those emissions are probably related to electricity used for things like office lighting and air conditioning, plus the use of gasoline for employee commuting and mobility. But in their roles as institutional investors, it is important for life insurers to know about GHG emissions from the companies in which they invest or provide financing. In other words, the investment portfolio.

There are five main types of transition risk.¹

Public policy and regulation

New policies and regulations related to climate change (e.g., emissions trading) will affect the business of companies in a portfolio.

Technology

As we have seen with rapidly decreasing costs of solar panels and batteries, technological advances reduce costs and the rapid spread of those technologies will change existing markets, affecting asset values.

Investor preferences

Changes in market sentiment to avoid carbon risks and divestment (described below) will affect asset values.

Severe weather-related disasters

Disasters caused by extreme weather will not only affect market forecasts and market sentiment, but also lead to rapid regulatory and public awareness changes, which will also affect asset values.

Advances in climate science

Research progress on the phenomenon of global warming will reduce uncertainty. As a result, the basis for the 2°C emission reduction target will be reexamined, for example, and projections of asset risk will become more accurate.

Life insurers typically hold assets for the long term, so as institutional investors, life insurers will see their assets directly affected by climate change over the long term.

¹ PRA 2015, The impact of climate change on the UK insurance sector - A climate change adaptation report by the Prudential Regulation Authority

III What are the impacts of climate change on the life insurance industry?

In the short term, transition risk will be one of the largest factors affecting asset value, but over the medium to long term, the impacts of physical risks from climate change affecting asset values and economic performance will be greater than transition risk. In the longer term, the physical risks from climate change are expected to become significantly greater and affect investment performance more than transition risks. It is important for insurers to carefully understand and monitor these trends affecting their investments and financing.

Many life insurers may have invested in or financed companies that consume a large amount of fossil fuels in the course of doing business and companies in industries that depend on fossil fuels. Sectors including iron and steel, electricity, chemicals, petroleum and coal, automobiles, and general trading companies were listed in a July 2019 survey of members of the Life Insurance Association of Japan as industries that should receive attention in engagement on the Task Force on Climate-related Financial Disclosures (TCFD) described in Chapter V.

These companies, as we saw in Chapter II, provide crucial infrastructure for day-to-day life and underpin the activities of society today. They consume fossil fuels for their business activities and as a result emit large amounts of GHGs. As one would expect, many are making an effort to reduce their own emissions, but the higher their emissions the more attention they attract for concrete measures they are taking to deal with emissions.

How do others see the financial sector?

Increasingly, companies in the financial sector are disclosing how they are dealing with their fossil fuel-related assets. Internationally and in Japan, a number of companies in the insurance industry have clearly articulated their stance.

Reflecting these developments, there are now also projects that compare, evaluate and rank company responses to climate change based on reports published by major insurance companies. Some NGOs are also active, saying that those efforts are not yet sufficient and that much more progress is needed.

What is a stranded asset?

To achieve the 2°C target of the Paris Agreement (see Chapter IV), about 70% of proven fossil fuel reserves cannot be burned (Figure III-13). The term “stranded asset” refers to this portion of a company’s listed assets that represent carbon that cannot be released. Around the world, some institutional investors have declared a policy of making no new investments in companies that hold such assets, and divesting from any such companies if they hold any of them.

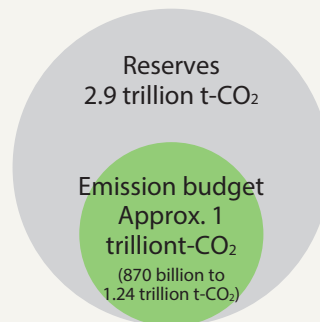


Figure III-13. Fossil fuel (carbon) reserves and emission budget to meet 2°C target (units: CO₂ equivalent)


Source: IPCC, 2018: Global Warming of 1.5°C, and Adapted from McGlade, C. and P. Ekins, 2015: The geographical distribution of fossil fuels unused when limiting global warming to 2°C. *Nature*, 517 (7533), 187-190.

Definition of short, medium and long term

The definition of “short-term,” “medium-term,” and “long-term” is different for corporate activities versus climate actions. A company’s short-term activities are normally considered to be within one year, and a medium-term plan would be three years. For climate actions, however, “medium term” is considered to be about 10 to 30 years, and “long-term” projections are typically for the years 2050 and 2100.

In response to climate change, companies are required to take actions with a long-term perspective that differs from their conventional business definition of long term.

With significant influence as long-term institutional investors, life insurers are the focus of much attention and need to understand such trends in society. The box below provides examples of climate risks associated with insurance operations and activities. “Reputational risk” is one of these. Life insurers need to understand such public attention, criticism, and external evaluation, and to respond appropriately. In responding to external factors such as these, it might be important for Life Insurance Association of Japan members to work collaboratively and move forward with careful actions.

 **Examples of climate risks across various insurance operations and activities**

The “Issues Paper on Climate Change Risks to the Insurance Sector,” prepared by the International Association of Insurance Supervisors (IAIS) and Sustainable Insurance Forum (SIF) together with the United Nations Environment Programme (UNEP), describes the following climate risks for insurance operations and activities.

Physical and transitional risks can pose a variety of strategic, operational and reputational risks to insurers across underwriting and investment businesses. Some of the climate factors are long-term in nature, but many have already proven to be important to businesses. These are listed below.

Underwriting risk

Climate change is already affecting the frequency and concentration of high-impact natural catastrophes around the world, leading to increases in weather-related insurance claims.

Investment risk

If climate-related risks significantly disrupt capital markets, insurers’ solvency to cover anticipated claims could be significantly affected.

Strategic risk

Risks arising from climate events or (internal or external) scenarios may present challenges to insurers’ achievement of strategic goals. Examples include losses due to inappropriate strategies related to climate goals, risks associated with poor management of future plans, or failure to respond to transition factors affecting the industry landscape.

Market risk

Insurers’ capacity to underwrite may be constrained by increased physical risk to assets as risk-based pricing rises beyond demand elasticity and customer willingness to pay. Market contractions could further exacerbate barriers for consumers to access insurance.

Operational risk

Physical climate-related factors could affect insurers’ own assets (property, equipment, IT systems, human resources, etc.) and lead to increased operating costs, inhibited claims management capacity, or potential stoppages of operations.

Reputational risk

In recent years, underwriting or investment in sectors perceived as contributing to climate change has emerged as a civil society issue. Examples include prominent social movements calling for divestment from fossil fuels and the cessation of underwriting of coal-fired power generation infrastructure.

The impacts of climate change on insurers depend on their core underwriting business areas and investment allocation strategies. However, in the long run, climate change will have implications for all insurers through either their underwriting or investment activities.

IV What is the global community thinking and doing?



- The importance of climate change was recognized by the global community about 30 years ago.
- The Paris Agreement is a significant achievement, with all participating countries committing to emission reduction targets.
- Readers may wish to bookmark these pages as a handy reference on what drove investors to start taking action, and what direction the global community is taking, etc.

1 What is happening with international negotiations?

————— From the Kyoto Protocol to the Paris Agreement

Kyoto Protocol

Climate change was discussed at the “Earth Summit” organized in 1992 by the United Nations in Rio de Janeiro, Brazil, resulting in adoption of the UN Framework Convention on Climate Change (UNFCCC). International negotiations on the topic of climate change were conducted through the Conference of the Parties to the Framework Convention on Climate Change (COP). Scientific knowledge underpinning the international negotiations has been provided regularly by the Intergovernmental Panel on Climate Change (IPCC) established in 1988.

In 1997, the Kyoto Protocol was adopted at the Kyoto Climate Change Conference (COP3) in Japan. It established the goal of reducing GHG emissions from developed countries by 5% relative to 1990 over the five year period from 2008 to 2012. However, in 2001 the United States, the world’s largest emitter at the time, announced it would not ratify the Protocol. Under the Kyoto Protocol, agreement was reached on the rules for the “Kyoto Mechanisms,” which included **carbon emissions trading between developed countries**, and **the Clean Development Mechanism**. Under the CDM, developed countries could provide funding and technology to developing countries for renewable energy and energy efficiency projects in order to reduce emissions in developing countries, and have those reductions counted as reductions by developed countries. As a result, the pace of carbon emissions trading and CDM activities accelerated.

However, the global financial shock that occurred in 2008 had a major impact on international climate negotiations. Economic activity slowed as a result of the economic downturn, and GHG emissions from energy use also dropped. As a result, trading activity dropped as buyers lost interest in carbon

emissions trading under the CDM and similar trading mechanisms, which had mostly involved governments and large companies in developed countries. Prices fell from over fifty dollars to about one dollar per ton of CO₂. Despite these circumstances, the first commitment period of the Kyoto Protocol ended with all parties achieving their goals.

Paris Agreement

Discussions on an international framework to replace the Kyoto Protocol from 2020 onward started at COP meetings around 2011, leading to the Paris Agreement being adopted at COP21 in Paris in 2015. The Paris Agreement has the following goals:

- “
1. Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
 2. Aiming to reach global peaking of greenhouse gas emissions as soon as possible ... and to undertake rapid reductions thereafter ... to achieve a balance between anthropogenic emissions by sources and removals by sinks (including forests) of greenhouse gases in the second half of this century.
- ”

* The Industrial Revolution was a restructuring of industry and society in the latter half of the eighteenth century. Historical temperatures are not well documented, but the IPCC uses the average temperature from 1850 to 1900 to provide reliable temperature data when referring to the extent of global average temperature rise.

Item 1 above is generally referred to as “the 2°C target.”

The Paris Agreement is a framework that calls on all participating countries, including both developed and developing countries, to make efforts to reduce emissions. It is a landmark international agreement of historic importance. Under the Kyoto Protocol, only developed countries set reduction targets, and the fact that it accounted for only about 30% of global emissions was a major issue. However, even though the United States announced its withdrawal in 2017, the Paris Agreement still applies to more than 80% of global emissions.

Unlike the Kyoto Protocol, which only regulated total emissions in developed countries, under the Paris Agreement each country can determine its own method of setting reduction targets. The targets vary country by country. Some countries, Japan included, focus on total emissions. For example, Japan’s target is to reduce total CO₂ emissions by 26.0% in 2030 compared to 2013. China’s target is to reduce CO₂ emissions per unit of GDP by 60% to 65% in 2030 compared to 2005. Korea’s target is to reduce emissions by 37% in 2030 compared to a business-as-usual scenario. A major theme of ongoing international negotiations relates to who will do what further amount of emission reductions in order to reach the 2°C target between 2030 and 2050.

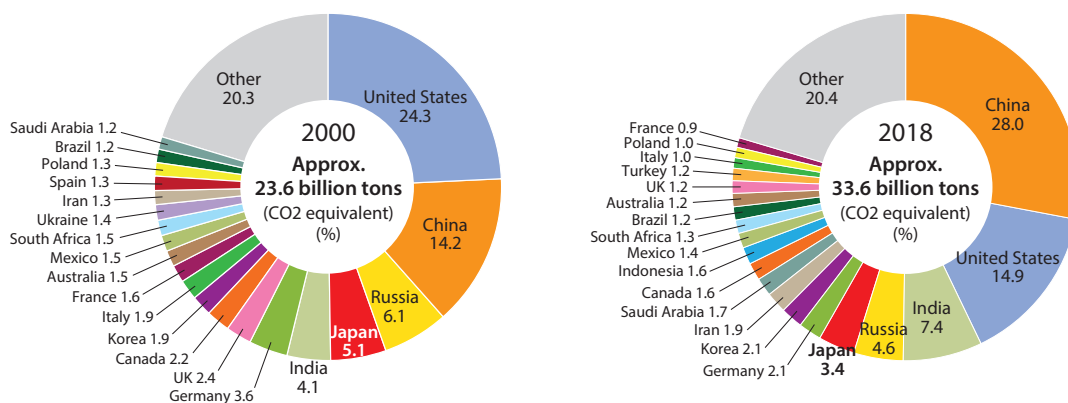


Figure IV-1. Global CO₂ emissions and ratios, by country

Source: Prepared from Global Note (www.globalnote.jp)

2 What is Japan doing?

Japan's emissions declined significantly in 2009 and 2010 due to the **global financial crisis**. After the **Tohoku earthquake and tsunami disaster** of 2011, emissions increased due to the shutdown of nuclear power plants in Japan and a significant increase in the use of thermal power plants. Despite the big increase, however, **Japan achieved its target for the first commitment period of the Kyoto Protocol**.

As for the Paris Agreement, Japan's target is to reduce GHG emissions by 26.0% in 2030 from the level in 2013. In June 2019, Cabinet adopted Japan's "Long-term Strategy under the Paris Agreement" and is proceeding with actions. The strategy mentions cross-sectoral measures to realize a "virtuous cycle of environment and growth," and these include the "promotion of innovation", the "**promotion of green finance**", "business-led promotion of international application (of green technologies), and international cooperation."

The "promotion of green finance" includes sections on "**mobilizing finance through disclosure including the TCFD and dialogue**," and "promoting initiatives to expand ESG finance." In other words, companies and financial institutions are expected to be key players in Japan's efforts under the Paris Agreement, unlike the Kyoto Protocol where the government played a leading role. Notably, the TCFD Consortium (see page 45) - Japan's original organization created in June 2019 - serves as a forum for dialogue between financial institutions and companies, and is expected to lead global disclosure efforts by developing and updating guidance for financial institutions and companies.

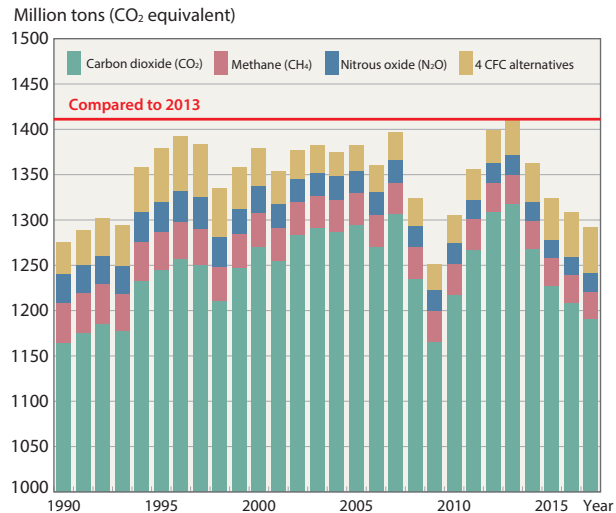


Figure IV-2. GHG emission trends in Japan

Source: Prepared from data by the National Institute for Environmental Studies

3 What are investors doing?

The **PRI (Principles for Responsible Investment)** are an important example of international activities that are motivating investors to take action on climate change. The PRI are voluntary investment principles created in 2006 under the leadership of the United Nations Environment Program's Finance Initiative (UNEP-FI), in response to an appeal by Kofi Annan who was then the UN Secretary-General. These principles call for environmental, social and governance (ESG) considerations to be incorporated into investment decision-making processes.

It has become common practice for investors making **ESG investments** to endorse the PRI. The number of signatories has continued to rise since 2006, and more than 2,200 organizations have signed as of the end of 2018, including more than 70 from Japan. Once an organization has signed the PRI, the PRI Secretariat assesses its efforts on a scale of A+ to E once a year.

Examples of the types of assessment criteria include “strategy and governance,” “listed equity,” and “bonds.” It is expected that investors such as life insurers, asset managers and pension funds will make greater efforts to address climate change through efforts to raise their PRI scores.

Some organizations among the investors who have signed the PRI are taking the initiative to attract partners and engage in joint efforts. One example in the area of climate change is **Climate Action 100+**. This is a global initiative of 100 companies and institutional investors who have a significant impact on solving global environmental problems such as climate change. They are promoting constructive dialogue on information disclosure and efforts to reduce GHG emissions. Ten of the 100 companies are from Japan.

4 What are companies doing?

Under the Kyoto Protocol, the main activities of companies were related to the CDM and other carbon emission trading schemes. Notable in Japan were companies that acquired carbon emission credits based on Keidanren Voluntary Action Plans, and the trading companies and securities companies that purchased those credits. In recent years, there has been an increasing number of companies declaring and implementing their own measures to tackle climate change, in response to the increasing investor involvement in ESG investment, thanks to the penetration of the PRI. **Renewable Energy 100% (RE 100)** is an initiative in which member companies declare a target of sourcing 100% renewable energy to cover the energy they need for business operations. As of September 2019, there were 193 member companies, of which 22 were from Japan.

The number of **green bonds** issued by companies and local governments to raise funds for green projects is also on the rise internationally. According to results published by the Climate Bonds Initiative (CBI), an international NGO in the UK, green bonds issued worldwide increased from 3.1 billion US dollars in 2012 to 167.6 billion in 2018. In Japan, the value of green bonds issued rose from about 200 billion yen in 2017 to over 500 billion yen in 2018, and the number issued more than tripled.

5 What are NGOs doing?

Independent bodies are increasingly active in evaluating climate change initiatives of investors and companies. **CDP** is one example. Its predecessor is the Carbon Disclosure Project, established in the UK in 2000. With the aim of promoting low-carbon efforts by companies, it has been collecting and analyzing climate change related information of the world’s leading companies from the perspective of management risk, evaluating the results in eight stages, and disclosing the results to institutional investors. Originally, it only targeted climate change, but in recent years it has expanded to water and forest resources. In 2018, more than 7,000 companies, accounting for more than 50% of global market capitalization, disclosed environmental data through the CDP platform. CDP participates in the TCFD as an observer and since 2018 has incorporated TCFD recommendations into the questionnaire it sends to companies.

From the perspective of third-party evaluation of life insurers, several other NGOs also investigate and report or evaluate the climate risk of institutional investors, either independently and in cooperation with others.

6 What will the world do next?

There was another major move on the global scene in 2015 when the Paris Agreement was adopted: the **Sustainable Development Goals (SDGs)** that were adopted at the UN Sustainable Development Summit in September 2015. The SDGs consist of 17 international goals, and among them, Goal 13 has the theme of Climate Action, with the message being “take urgent action to combat climate change and its impacts.” Other goals are also related to climate change and are linked to actions for the Paris Agreement. For example, Goal 7 calls for “Affordable and Clean Energy.” Thus, with the adoption of the Paris Agreement and the SDGs, it is now recognized that the rules by which the world operates have made a dramatic shift in the direction of a low-carbon society. In the next several years, we can expect to see a variety of developments around the world as more and more stakeholders work individually and/or collectively in this direction.

In the financial sector, the actions of central banks and financial supervisory authorities are also attracting attention. For example, the Network for Greening the Financial System (NGFS) was established in December 2017 by financial authorities of countries around the world. It has the aim of supporting, from the financial dimension, the development of environmental and climate risk management in the financial sector and the transition toward sustainable economies. Japan’s Financial Services Agency is a member of the NGFS, and it is considering how financial supervision can address climate change risks. Many will be monitoring its future discussions.

V Understanding the TCFD Recommendations



- The TCFD is a task force created to address climate change-related risks to financial stability.
- The TCFD Recommendations encourage companies to examine the risks and opportunities of climate change in terms of impacts on their own business activities, and to disclose the findings in their financial disclosures.
- The TCFD Recommendations consist of four main pillars (governance, strategies, risk management, and metrics and targets) and provide sector-specific recommendations on disclosures.

1 Why was the TCFD created?

The TCFD was in response to the perception among the finance ministries and central banks of major world countries that *climate change-related issues could potentially be as large a destabilizing factor in financial markets* as the financial crisis of 2007 and 2008. They viewed climate change as the next potential threat to financial stability.

In his “Breaking the Tragedy of the Horizon: Climate Change and Financial Stability” speech in September 2015, Mark Carney, then the chairman of the Financial Stability Board (FSB) of the Bank for International Settlements, aptly explained the relationship between financial markets and the risk of climate change:

“ The horizon for monetary policy extends out to 2-3 years. For financial stability it is a bit longer, but typically only to the outer boundaries of the credit cycle – about a decade. In other words, once climate change becomes a defining issue for financial stability, it may already be too late. ”

Mr. Carney also said that international insurance companies were already experiencing enormous losses, including asset losses, from extreme weather disasters.

In April 2015, the Group of 20 (G20) Finance Ministers and Central Bank Governors formally requested that the Financial Stability Board (FSB) bring together public- and private-sector stakeholders to examine how the financial sector can take account of the impacts of and responses to climate change as a crucial topic for global financial markets. In response, in December that year the FSB established the Task Force on Climate-related Financial Disclosures (TCFD), chaired by former New York mayor Michael Bloomberg. The FSB, consisting of representatives from finance ministries and central banks of member countries, thus began in earnest to tackle the issue of climate change as a potential future threat for financial markets.

To protect financial markets from the impacts of climate change, it is important to identify assets that could be affected. It is also important to support businesses to make a quick transition to the low-carbon economy. The FSB asked the TCFD to develop standards and frameworks that could assess the risks and opportunities of climate change (business risks and new business opportunities) on the companies in which the financial sector is invested.

In the preface to the TCFD Recommendations, Mr. Bloomberg articulated his expectations as follows:

“The Task Force’s report establishes recommendations for disclosing clear, comparable and consistent information about the risks and opportunities presented by climate change. Their widespread adoption will ensure that the effects of climate change become routinely considered in business and investment decisions. Adoption of these recommendations will also help companies better demonstrate responsibility and foresight in their consideration of climate issues. That will lead to smarter, more efficient allocation of capital, and help smooth the transition to a more sustainable, low-carbon economy. ”

2 What is the TCFD?

The TCFD Recommendations were prepared with European financial institutions playing a central role. The TCFD has 32 members, sixteen of whom are from financial institutions (of which nine are European) including banks, insurance companies, asset managers, and asset owners, and eight are from four large accounting and consulting firms (EY, Deloitte, KPMG, and PwC), and finance-related organizations, including two large credit rating agencies (S&P and Moody’s). In effect, three-quarters of the members were there either in the role of calling for corporate disclosure of climate-related financial information, or the role of auditing, assessing or rating that information. Meanwhile, all eight members from non-financial organizations were from European or American companies; and the representatives of industries such as automobiles and steelmaking, sectors in which Japanese companies are major players on the global stage, were generally from European and American companies. The sole member from Japan was Masaaki Nagamura of Tokio Marine Holdings.






The TCFD proceeded with a very rapid pace of meetings and extensive discussions. TCFD members were selected in January 2016, and the TCFD Recommendations were submitted to the FSB in June 2017. The pace of work was quick, with three types of reports completed in the course of just over a year.

What are the key messages of the TCFD Recommendations?

After the Kyoto Protocol was adopted, the United Nations and states played a major role in responses to the issue of climate change. One of the underlying messages of the TCFD Recommendations is a shift of efforts from “state actors and the United Nations” to “investors and companies” playing a major role. There is some expectation that the TCFD Recommendations will be used as a guide to help create a low-carbon society. This would be

accomplished by shifting to a system in which investors and others can, based on financial information, evaluate a company’s intentions and achievements in responding to climate change, and those evaluations can be reflected in a company’s ratings, share prices, and financing conditions.

The future as envisioned by the TCFD Recommendations is as follows:

-  Carbon taxes and emissions trading will be introduced and carbon prices will rise (to US\$50 to \$100/t- CO₂ by 2030).
-  Electricity generation will shift to renewable sources, making electricity from renewable energy more accessible.
-  Existing fossil fuel technologies will become obsolete due to the development and spread of new technologies.
-  Consumers will prefer low-carbon products and services.
-  Green finance will expand in markets.

3 What is the big picture of the TCFD Recommendations?

Three core documents

The FSB's request to the TCFD was to develop climate-related disclosures that “could promote more informed investment, credit [or lending], and insurance underwriting decisions” and, in turn, “would enable stakeholders to understand better the concentrations of carbon-related assets in the financial sector and the financial system’s exposures to climate-related risks.” Therefore, likely users of the TCFD recommendations include investors, lenders, and insurance underwriters as primary users, and also credit rating agencies, equity analysts, stock exchanges, and investment consultants. In other words, the TCFD Recommendations were developed so that persons in the financial sector responsible for corporate valuations could indicate in a systematic and understandable format the information that they want companies to disclose.

A summary of the three documents of the TCFD Recommendations is provided below.

<p>Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures</p> <p>This is the main report of the TCFD Recommendations. It describes “climate-related risks, opportunities and financial impacts,” followed by “recommendations and guidance” in common for financial and non-financial sectors. It also explains the need for scenario analysis and provides recommended approaches.</p>	<p>Annex: Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures</p> <p>This report provides supplementary guidance targeting the financial sector and non-financial sectors that may be exposed to more significant negative impacts from climate change and the transition to a low-carbon society. The financial sector is divided into “banks,” “insurance companies,” “asset owners” and “asset managers,” while the non-financial sector is divided into groups for “energy,” “transportation,” “materials and buildings,” and “agriculture, food, and forest products.” More detailed guidance is provided based on the characteristics of each group.</p>	<p>Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities</p> <p>This report is a technical supplement with an overview of “scenario analysis” and points to be noted for the implementation of the recommendations. It supports disclosure activities aligned with the TCFD Recommendations.</p>
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Note: Links to download the TCFD Recommendations are provided at the end of this paper.

Climate-related risks, opportunities and financial impacts

The TCFD classified and defined climate change-related risks and opportunities so that companies can grasp in a financially quantifiable way the climate-related risks and opportunities that could affect their own business activities, and also be (easily) able to disclose them as financial information. Risks are classified as “transition risks” in the transition to a low-carbon economy, and “physical risks” such as the impacts of weather-related disasters. Transition risks are further classified as (1) policy and legal, (2) technology, (3) market, and (4) reputation. Physical risks are classified as (1) acute and (2) chronic. For example, for policy and legal risks, examples cited include policy changes associated with the shift to carbon pricing and renewable energy, as well as the tightening of laws and regulations.

Examples of acute physical risks include the risks from cyclones, hurricanes, and extreme weather, while examples of chronic physical risks include sea-level rise and changes in weather patterns.

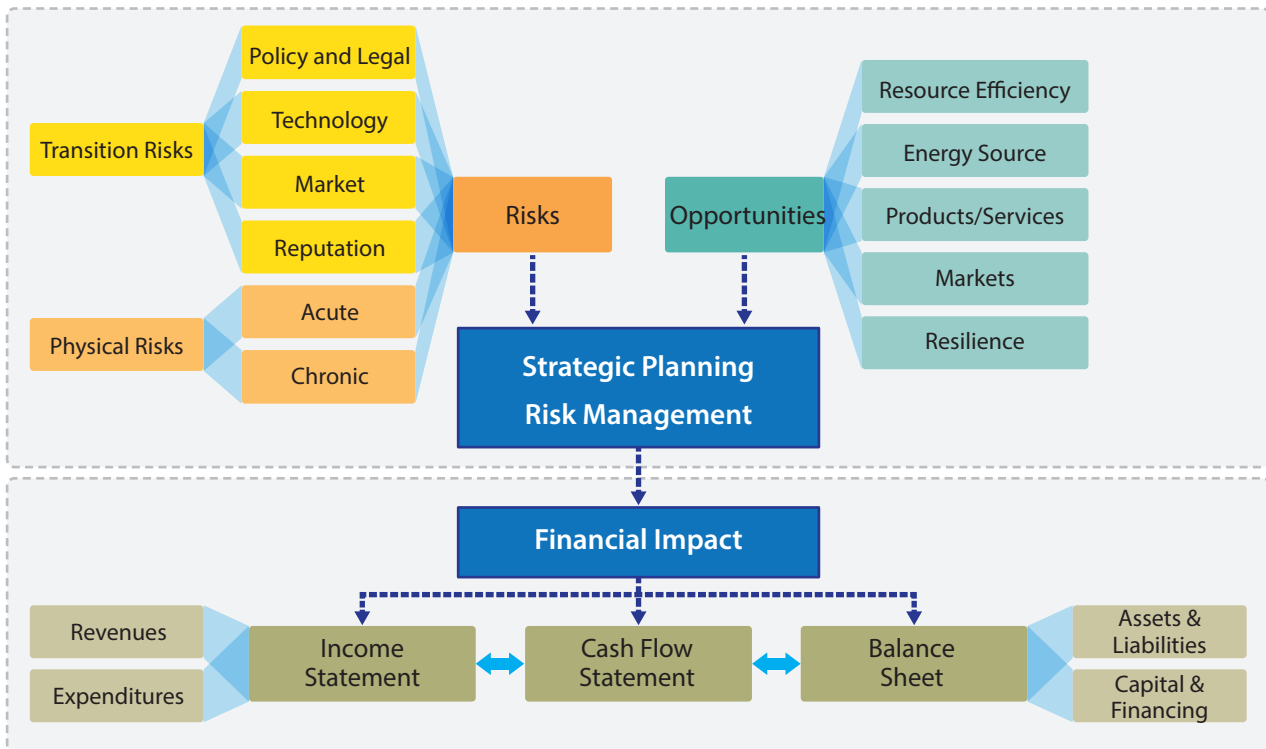


Figure V-1. Climate-related risks, opportunities, and financial impact.

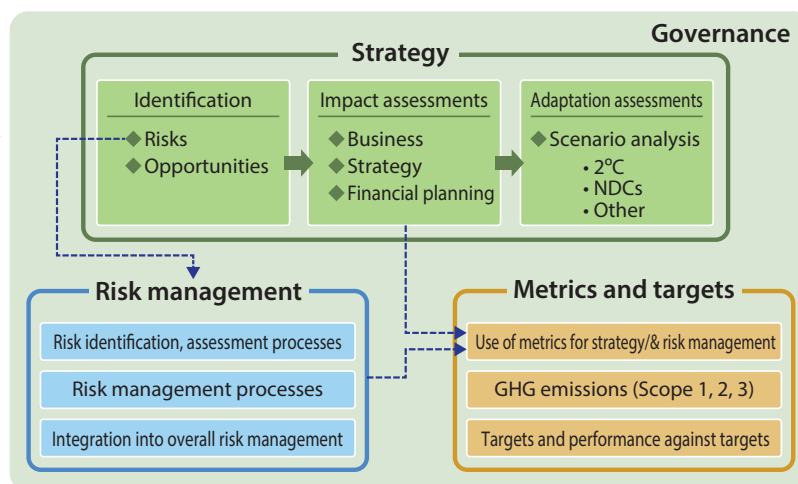
Source: Adapted from Recommendations of the Task Force on Climate-related Financial Disclosures (Final Report).

The TCFD Recommendations, as shown in Figure V-1, recommend that companies indicate the financial impacts of climate change-related risks and opportunities in corporate *income statements*, *cash flow statements*, and *balance sheets*. For example, it is suggested that companies consider specifically how to indicate the impacts in their income statements. If a carbon pricing policy is introduced or strengthened, such as by raising the carbon tax, the *income* and *expenditures* of a company dealing with fossil fuels will be affected in the future. By predicting future carbon pricing policies, a company can set a carbon price for its *internal carbon pricing* and forecast future revenues and expenditures. However, the TCFD Recommendations do not imply that companies must suddenly disclose difficult-to-disclose information such as internal carbon pricing. The basic stance is that companies should *start disclosures with what they are able to disclose, and then move forward step by step*.

4 What are the four pillars of the TCFD Recommendations?

The TCFD Recommendations are organized around four major themes for corporate management: “governance,” “strategy,” “risk management,” and “metrics and targets.” Figure V-2 is useful to help understand the four themes.

Figure V-2.
The four themes of the TCFD Recommendations
Source: Adapted from Recommendations of the Task Force on Climate-related Financial Disclosures (Final Report).



Governance

Governance is a system of corporate management and control that increases the value of a company over the medium and long term. Investors need to be able to evaluate a company’s governance in order to invest with confidence. The TCFD Recommendations state that for investors to judge the appropriateness of a company’s governance, it is important to have an understanding of information about board oversight of the company’s response to climate change, and the role of corporate management in assessing and managing climate change-related risks and opportunities.

Information needs to be disclosed so that investors and other stakeholders can understand whether corporate management of companies affected by transition risks and physical risks, or that of companies that may benefit from business opportunities in their responses to transition risks and adaptation measures, has put in place organizational structures to understand the risks and take advantage of the opportunities, whether or not those organizational structures are functioning and whether or not they are effective. They are interested in having the disclosures done in a format that is useful for investors not only to evaluate management but also so that they can evaluate

The TCFD Recommendations indicate the following disclosure contents relating to governance.

A. Description of board oversight structure

Recommended disclosure

- 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 relating to strategy, action plans, risk management policies, annual budgets, and business plans, etc.
- How the board monitors and oversees progress against goals and targets for addressing climate-related issues

B. Description of management role

Recommended disclosure

- Status of climate-related responsibilities assigned to management-level positions or committees
- Organizational structure (chart) relating to climate-related issues
- Processes by which management is informed about climate-related issues
- Methods and processes for management to monitor climate-related issues

Strategy

The most important theme of the TCFD recommendations is strategy. The strategy development process identifies climate change risks and opportunities that affect business activities, assesses the impact of those risks and opportunities for the business, strategic and financial planning of the company, and shows the direction of transformation of the business, strategy and financial planning to respond to the impacts. When developing strategies, the TCFD recommendations encourage the use of a “scenario analysis” approach to show medium to long-term risks and opportunities objectively and understandably for the company

The TCFD Recommendations encourage companies to present investors the following storyline as a part of *strategy*, in relation to climate-related disclosures..

“

1. In the context of various global circumstances including climate change, our strategies and financial planning are robust for today and the future.
2. Our systems are proactive in addressing future climate-related risks and opportunities, and aggressive in reducing risks and taking advantage of opportunities.
3. Our organization is flexible enough to respond to the highly uncertain impacts of climate change.

”

Investors first need to evaluate the scenario analysis of the companies in which they invest. In Europe, some companies conduct complex scenario analysis using models, but most Japanese companies that currently conduct scenario analysis use what is referred to as the “qualitative approach.” In other words, companies present their qualitative analysis of future trends for their business based on future climate scenarios, including those prepared by the IPCC.

To evaluate a company’s scenario analysis, investors engage in dialogue to obtain explanations from the company’s personnel responsible for the scenario analysis assumptions and criteria, and then judge whether or not they are consistent, reasonable, and logically convincing.

Specifically, it is desirable to review mainly the following points about scenarios disclosed by a company.

- What was the rationale for selection of the climate scenario(s) adopted by the company?
- Are the future visions assumed in the adopted scenario(s) consistent with the company’s business model?
- Is the timescale of the adopted scenario(s) appropriate (too short or too long)?
- Are the risks and opportunities identified through scenario analysis logically convincing?
- Are systems in place to incorporate strategies into business plans to reduce risks and take advantage of opportunities?

Risk management

In the “Global Risks Report 2019” of the Davos World Economic Forum, “extreme weather” topped the list of risks with the highest likelihood of occurring for three consecutive years, followed by “failure of climate-change mitigation and adaptation.” This ranking reveals the extent to which the issue of climate change, including extreme weather, has risen in importance. In that context, based on a company’s own industrial characteristics, the question of whether or not a company is able to address climate change as a management issue will affect its success or failure in avoiding climate change risks and exploiting opportunities.

The TCFD Recommendations encourage companies to have company-wide integrated risk management to manage climate-related risks.

The TCFD Recommendations present the following recommended disclosures relating to risk management.

A. Describe the organization’s processes for identifying and assessing climate-related risks

- The important perspective for process description, from among the various risks that can affect a company, is to explain how the organization judged the relative importance of various risks and how it ultimately identified and decided on those risks.
- In doing so, describe also whether or not an effort has been made to consider new regulations such as tighter GHG emission controls and other related factors (e.g., technology innovation, market changes, changes in consumer preferences).

B. Describe processes by which the organization manages climate-related risks

- Describe processes to manage climate-related risks such as how decisions are made to “mitigate,” “transfer,” “accept” or “control” those risks.
- Describe how climate-related risks were prioritized, and processes to do so.

Scenario analysis (selected excerpts from TCFD Recommendation)

- ...organizations ... should consider (1) using scenario analysis to help inform their strategic and financial planning processes, and (2) disclosing how resilient their strategies are to a range of plausible climate-related scenarios.
- For many organizations, scenario analysis is ... a largely qualitative exercise. However, organizations with more significant exposure to transition risk and/or physical risk should undertake more rigorous qualitative and, if relevant, quantitative scenario analysis...
- For organizations just beginning to use scenario analysis, a qualitative approach that progresses and deepens over time may be appropriate ...
- The Task Force recommends organizations use a 2°C or lower scenario in addition to two or three other scenarios most relevant to their circumstances, such as scenarios related to Nationally Determined Contributions (NDCs), physical climate-related scenarios, or other challenging scenarios.
- Financial-sector organizations should consider using scenario analysis to evaluate the potential impact of climate-related scenarios on individual assets or investments, investments or assets in a particular sector or region, or underwriting activities.

Metrics and targets

The TCFD Recommendations encourage companies to disclose information on climate change-related metrics and targets from a different perspective than what is used in traditional environmental reports and CSR reports, which might have shown the amount by which emissions declined year on year. Below are the disclosures recommended in the TCFD Recommendations.

A. Key metrics used by companies to assess and manage relevant climate-related risks and opportunities

- Consider including key metrics on climate-related risks associated with water resources, energy, land use, and waste management where relevant and applicable.
- Where climate-related issues are material, describe whether climate risk-related performance metrics are incorporated into the company's remuneration policies, and if so, how they are applied.
- Disclose "internal carbon price" as well as climate-related opportunity metrics (e.g., revenue from products and services designed for a lower-carbon economy).
- Disclose the values for these key metrics over sufficient historical periods to allow for trend analysis.

B. Disclosure of company GHG emissions

- Disclose company GHG emissions based on GHG Protocol methodology for Scope 1 and Scope 2 and (if necessary) Scope 3. (The use of GHG Protocol allows aggregation and comparison across companies, countries and regions.)
- For companies in industries with high energy consumption, metrics for GHG emission intensity are important (e.g., disclosure of GHG emission intensity in units of t-CO₂ per ton of product).
- For GHG emissions and related metrics, disclose the values over sufficient historical periods to allow for trend analysis (disclose calculation methods as necessary)

C. Disclose targets used to manage climate-related risks and opportunities, and performance

- Companies should describe their climate-related targets such as those related to GHG emissions, water usage, energy usage, etc., in line with anticipated regulatory requirements or market change and constraints or other goals (which may include financial goals, financial loss tolerances, avoided GHG emissions, or net revenue goals for products and services designed for a lower-carbon economy, etc.).
- In describing targets, consider the following:
 - Whether target is absolute or intensity based
 - Time frames over which the target applies
 - Base year from which progress is measured
 - Key performance indicators (KPI) used to assess progress against targets

5 What do the TCFD Recommendations expect from life insurance companies?

Life insurance companies have two dimensions, as *life insurance operators* and as *institutional investors*. In the supplemental guidance for the TCFD Recommendations, these are referred to as “insurance companies” and “asset owners.” Asset owners have a particularly large impact, and the following perspectives are provided for them in the TCFD Recommendations.

“Whether asset owners invest directly or through asset managers, asset owners bear the potential transition and physical risks to which their investments are exposed. Similarly, asset owners can benefit from the potential returns on the investment opportunities associated with climate change.”

“Asset owners sit at the top of the investment chain and, therefore, have an important role to play in influencing the organizations in which they invest to provide better climate-related financial disclosures.”

For a company’s disclosures based on the TCFD Recommendations, it is desirable to show the linkages between *increasing medium to long-term corporate value* and *realizing a virtuous cycle for the entire Japanese economy*. To do so, insurance companies engaged in disclosures based on the TCFD Recommendations need to understand and evaluate matters through dialogue and publicly available documents.

More detailed explanations are provided in Chapter VII. Readers are encouraged to review that material.

“Intensity” measures and “avoided GHG emissions”

Metrics and targets to be disclosed include intensity and avoided GHG emissions.

The inclusion of both of these is significant.

Total GHG emissions from a company’s products can be calculated as the “emission intensity” (e.g., GHG emissions per ton of product) multiplied by the number of units produced. Thus, it is easy to understand the importance of reducing the intensity as a means of reducing GHG emissions.

The term “avoided GHG emissions” refers to the reduction in GHG emissions during the use of products and

services newly developed by a company to replace existing products and services. A product has GHG emissions throughout its entire value chain (life cycle), not only in production processes in a factory but also from the extraction of raw materials, the usage of the product, and disposal. If a product is used that has lower GHG emissions through the entire life cycle, it will have more avoided GHG emissions. Companies in highly productive industries procuring raw materials may be able to exploit avoided GHG emissions as a business opportunity.

6 What is next for the TCFD Recommendations?

The TCFD has been actively publishing materials since the TCFD Recommendations were released. It has also continued its work on “Key Issues Considered and Areas for Further Work,” as mentioned at the end of the TCFD Recommendations.

The “TCFD Status Report 2019,” published in June 2019, reviews progress made after release of the Recommendations. Please see below for some highlights.

The TCFD plans to release a new Status Report in September 2020. Future plans also include the preparation of “additional process guidance around how to introduce and conduct climate-related scenario analysis” and “business-relevant and accessible scenarios.”

“

○ Disclosure of climate-related financial information has increased since 2016, but is still insufficient for investors... the Task Force sees progress being made to improve the availability and quality of climate-related financial information. However ... more companies need to ... disclose material findings.

More clarity is needed on the potential financial impact of climate-related issues on companies... Without such information, users may not have the information they need to make informed financial decisions.

Of companies using scenarios, the majority do not disclose information on the resilience of their strategies. Three out of five companies responding to the TCFD survey that view climate-related risk as material and use scenario analysis to assess the resilience of their strategies do not disclose information on the resilience of their strategies... Companies are still early in the process of using climate-related scenarios internally, evolving their approaches, and learning how to integrate scenarios into corporate strategy formulation processes.

Mainstreaming climate-related issues requires the involvement of multiple functions. While sustainability and corporate responsibility functions are the primary drivers of TCFD implementation efforts, risk management, finance, and executive management are increasingly involved as well. The Task Force believes involvement of multiple functions is critical to mainstreaming climate-related issues, especially the involvement of the risk management and finance functions.

...The Task Force believes the success of its recommendations depends on continued, widespread adoption by companies in the financial and non-financial sectors...

Through widespread adoption, climate-related risks and opportunities will become a natural part of companies’ risk management and strategic planning processes. As this occurs, companies’ and investors’ understanding of the financial implications associated with climate change will grow, information will become more useful for decision making, and risks and opportunities will be more accurately priced, allowing for the more efficient allocation of capital and contributing to a more orderly transition to a low-carbon economy.

”

7 What is happening with TCFD Recommendations in Japan?

When the TCFD Recommendations were first released in June 2017, initial interest was not particularly high in Japan. Over time, however, corporate interest began to rise.

Support from government bodies

One major feature in Japan compared to other countries is the involvement of government bodies actively supporting the spread of the TCFD efforts. The TCFD Study Group, established by the Ministry of Economy, Trade and Industry to examine green finance and corporate disclosures, prepared a paper in Japanese entitled “Guidance on Climate-related Financial Disclosures” (TCFD Guidance) and published it in December 2018. It was written for the non-financial sector, that is, companies whose disclosures will be evaluated by investors and other stakeholders, and it provides guidance on how to respond to the TCFD Recommendations and highlights noteworthy points using concrete examples.

TCFD Consortium

The TCFD Consortium was established in Japan on May 27, 2019 as a forum to promote collective efforts by companies, organizations, and financial institutions that endorse the TCFD Recommendations, and to discuss initiatives that will lead to effective corporate disclosure and appropriate investment decisions by financial institutions and other organizations using such disclosed information

As of September 2019, the TCFD Consortium had the participation of 181 member companies who had endorsed the TCFD Recommendations. Japan has now surpassed the UK, making it the top country in terms of the number of companies that have endorsed the TCFD Recommendations. Another distinction for Japanese signatories is the significantly larger number of companies providing products and services, compared to financial institutions. The Ministry of Economy, Trade and Industry (METI), the Financial Services Agency, and the Ministry of the Environment are observers.

The TCFD Consortium has a Planning Committee, a Working Group on Information Utilization, and a Working Group on Disclosures. In October 2019, the Consortium co-organized the TCFD Summit together with METI and the World Business Council for Sustainable Development (WBCSD) and released “Green Investment Guidance” for investors. Going forward, the Consortium plans to revise and further develop the above-mentioned TCFD Guidance for companies.

Scenario Analysis Support Project

When responding to the TCFD Recommendations, one of the challenges companies face is finding ways to analyze various scenarios. One concern raised by companies is that climate scenarios are not always straightforward for them to apply in their own business strategies and risk management, because climate scenarios themselves are typically framed in the context of scientific research.

Thus, to promote decarbonization-oriented corporate management that incorporates climate-related risks and opportunities in line with the TCFD Recommendations, Japan’s Ministry of the Environment is implementing a project to support the work of scenario analysis. In March 2019, findings were published as “Suggestions for Developing Management Strategies Utilizing the TCFD: A Practical Guide to Scenario Analysis Incorporating Climate-related Risks and Opportunities.”

VI Examples of TCFD-type disclosures



- We introduce leading examples of companies doing information disclosure in their respective industries.
- For companies that are starting to consider their own information disclosure, please consider these examples as ideals to achieve, and look for pointers on governance and strategies, etc.
- For non-financial sectors, please also look at differences in Scope 1, 2, and 3.

Information disclosure in line with the TCFD recommendations has only just begun in financial and non-financial sectors. This chapter introduces leading examples from the financial sector in Europe and best practices from the non-financial sector in Japan. Regarding companies in non-financial sectors, for the GHG emission trends of companies introduced in Chapter 3, we introduce examples of three types of companies: Scopes 1 and 2, Scope 3, and low-emission.

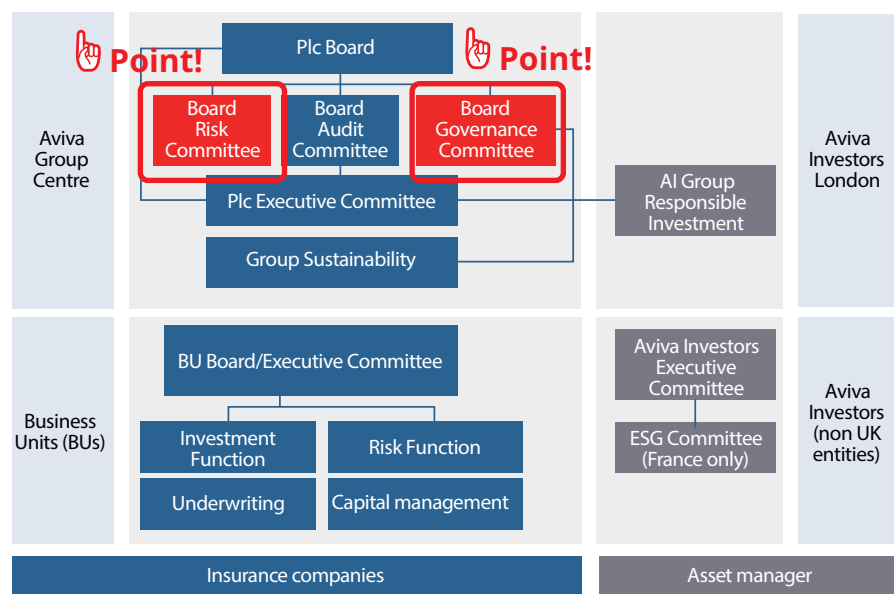
1 Examples of disclosure in the financial sector

AVIVA

Aviva was established in 2000, and in 2006 became the world's first insurer to become a carbon neutral company, by using offsets to achieve zero CO₂ emissions in respect of their own operations. Since then, the company has been proactive in its climate change measures and published its own climate change adaptation strategy in 2015. After the TCFD recommendations were issued, the company was quick to move ahead with information disclosure in accordance with the recommendations.

Governance

On Aviva's Board, the Risk Committee and Governance Committee are responsible for the role of overseeing climate-related risks and opportunities. In 2018, the Risk Committee met five times and the Governance Committee four times, and discussions included topics such as responses to climate-related risks and opportunities.



Aviva's climate governance structure

As part of regular training programmes a presentation was made to board members in 2018 about climate risks and opportunities. Responses are also required at the board level for each country. For example, in France, board training on climate risk is mandatory.

Strategy

Aviva’s strategic response to climate change, published in 2015, lists the following five pillars.

Integration of climate risk into investment considerations	To obtain sustainable and superior investment outcomes long-term, since 2012, [the company] has committed to integrating ESG factors into all assets
Investment in lower carbon infrastructure	In 2015, [the company] declared the goal of investing 500 million pounds annually for five years into low-carbon infrastructure
Support for strong policy action	[The company] advocates for reforms of capital markets and correction of existing market failures, in order to mobilize trillions of pounds required for transition to a low-carbon economy
Active stewardship related to climate risk	[The company] actively engages with companies in order to enable the creation of business strategies to make companies climate-resilient
Divestment where necessary	[The company] uses its influence as a shareholder to transition companies to a low-carbon economy. [It] divests in cases where the efforts of companies with high carbon emissions are not showing adequate progress.

Risk management

Aviva manages Group risk using a spectrum chart (see figure on right) to evaluate the distribution of areas of risk. It is used to comparatively consider the impacts and timescale of various external factors. According to it, climate-related risks impose significant and long-term risks for Aviva’s business model, and they are also proximate risks on the timescale.

Based on this, Aviva acts to reduce and manage current and future climate change impacts, and moves to respond to climate-related transition risks, physical risks, litigation risks, and stranded asset risks.

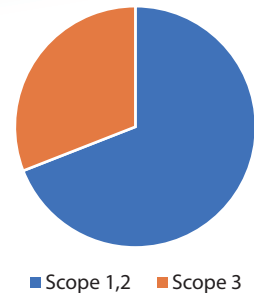


2 Non-financial sector: Scope 1 and 2 type companies

Sumitomo Chemical

The chemical industry has diverse climate-related risks and opportunities due to its diverse products. For example, not only does a reduction in grain production due to extreme weather create physical risks that lead to a reduction in the use of agrochemicals, there are also new opportunities such as the development of improved agrochemicals and fertilizers to adapt to climate change.

Sumitomo Chemical manufactures and sells a wide range of products, including chemical materials, agrochemicals, and pharmaceuticals, and approximately two-thirds of its emissions are Scope 1 or Scope 2. Below we introduce some of Sumitomo Chemical's initiatives in response to the TCFD Recommendations.

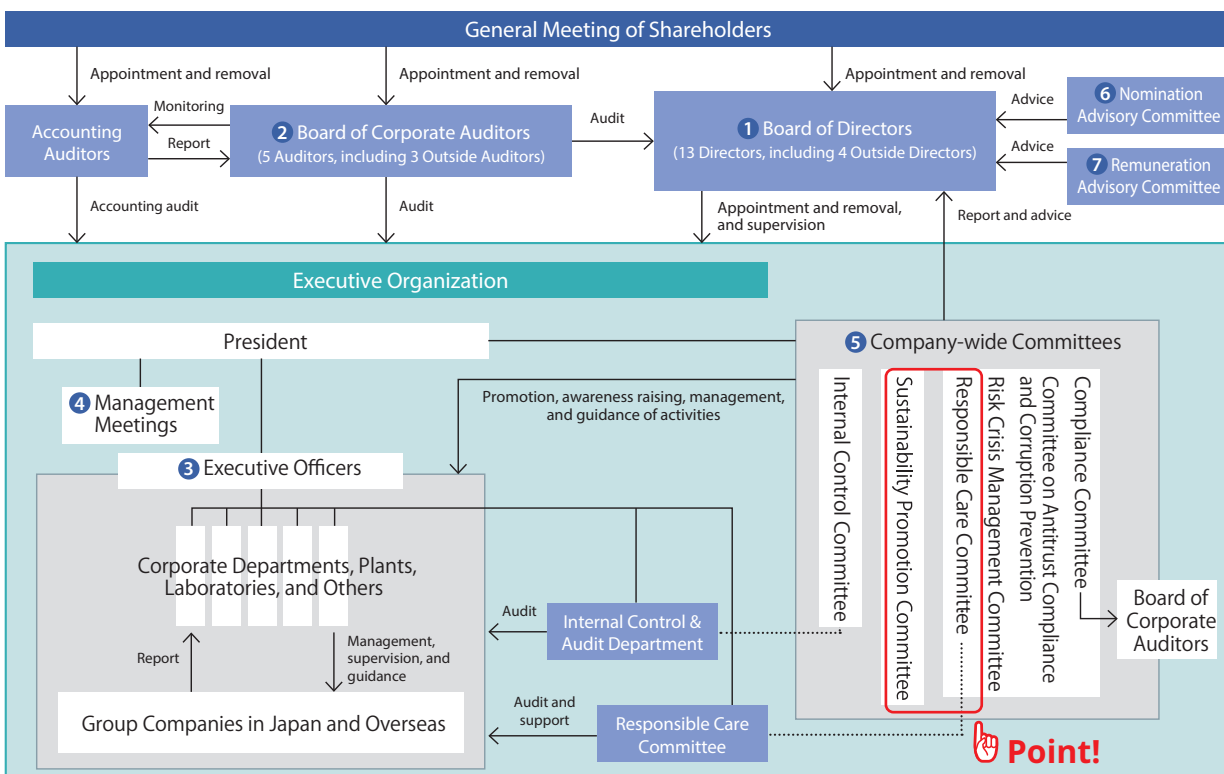


Governance and risk management

Sumitomo Chemical, Annual Report 2019 (excerpt)

The President is responsible for promoting climate-change measures, together with the executive officer of Responsible Care. In March 2018, medium- to long-term plans for greenhouse gas (GHG) reductions were deliberated at our management meeting and we agreed to establish science-based targets (SBTs) in accordance with the Science Based Targets initiative. The Sustainability Promotion Committee and the Responsible Care Committee periodically deliberate and decide on measures to deal with climate change. The Responsible Care Committee also assesses and monitors the risks of climate-related challenges.

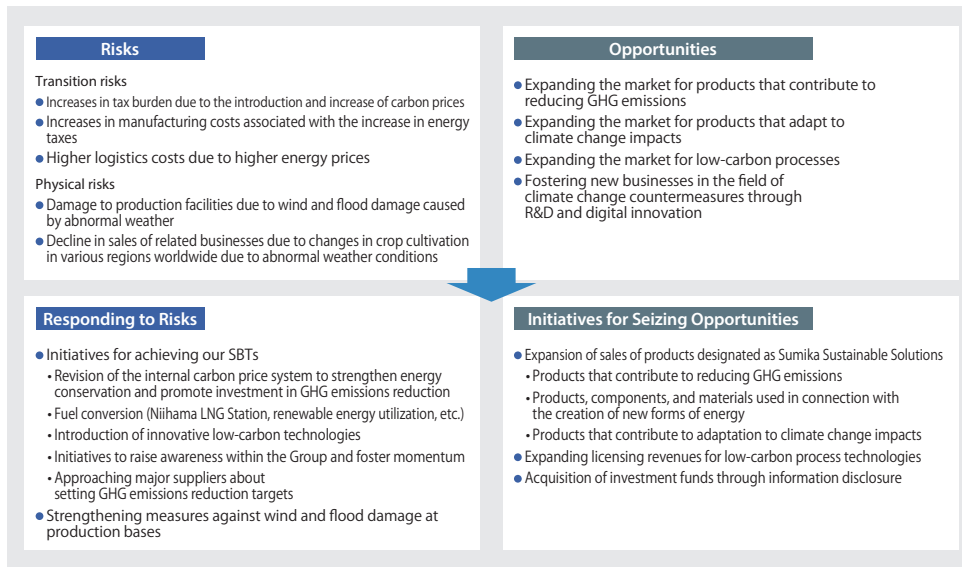
Corporate Governance Organization (As of July 1, 2019)



Responding to risks and seizing opportunities



The Sumitomo Chemical Group has established a **dedicated organization** in the Responsible Care Department to deal with climate change. The organization identifies and analyzes the risks and opportunities posed by climate change issues to the Sumitomo Chemical Group's business over the medium- to long-term, including the size, scope of impacts, and other issues. In addition, we are implementing measures to respond to risks through initiatives for achieving our SBTs, and striving to seize new business opportunities through the development and spread of products and technologies designated as Sumika Sustainable Solutions. Concrete initiatives are reported to management meetings, the Sustainability Promotion Committee, the Responsible Care Committee, the Plant Managers' Meetings, and the Group-wide President Meetings. In order to steadily implement these initiatives, we hold meetings linking factories, research laboratories, business sectors, and Group companies, and have established a framework for prompt information sharing.

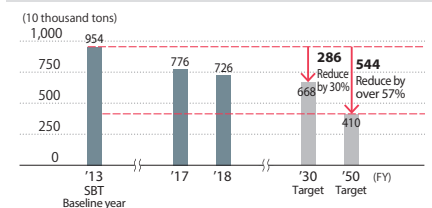


Our Group will focus on reducing its GHG emissions (Scope 1+2) by 57% or more from fiscal 2013 levels by fiscal 2050, while providing solutions for significant GHG reductions in the value chain. We aim to quickly double the sales revenue of Sumika Sustainable Solutions compared with FY2015 (Sumitomo Chemical Group products and technologies that contribute to such issues as global warming countermeasures, reducing environmental burdens, and effective use of resources, are referred to as Sumika Sustainable Solutions, or SSS).

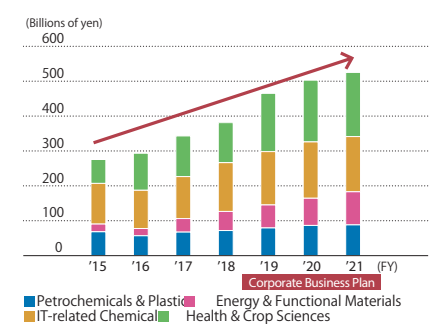
Our Approved GHG Emissions Reduction Targets

Scope 1 + 2		Scope 3
By FY2030	By FY2050	By FY2024
Reduce by 30% (vs. FY2013)	Reduce by over 57% (vs. FY2013)	Have major suppliers set reduction targets

GHG Emission Volume and Reduction Targets



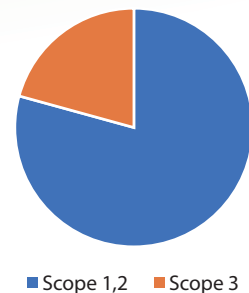
Sales Revenue of Designated Products and Technologies



FY2018 (Billions of yen)	
Sales revenue of Sumitomo Chemical Group	2,318.6
Sales revenue of SSS	381.3

JFE Holdings

The iron and steel industry consumes a significant amount of coal in steel-making processes due to the use of coke, which is made from coal. As a result, the industry must deal with transition risk. Meanwhile, Japanese steelmakers, as world leaders in production efficiency and product quality, are also contributing to CO₂ emission reductions in other industries. For example, the use of strong and light steel sheets reduces automobile weight by about 8%, which saves a corresponding amount of fuel consumption in gasoline-powered vehicles. Similarly, high performance steel sheets help ships and trains use less energy (and reduce CO₂ emissions) (Japan Iron and Steel Federation). In this way, the iron and steel industry is making a contribution through “avoided GHG emissions” in other industries.



Approximately 80% of the emissions from JFE Holdings, Inc. an affiliate of JFE Steel, are Scope 1 or Scope 2 emissions.

Below is an introduction to some of the efforts of JFE Holdings, Inc. in response to the TCFD Recommendations.

JFE Group’s Initiatives for Climate Change Issues

JFE Group Report 2019, Integrated Report (excerpt)

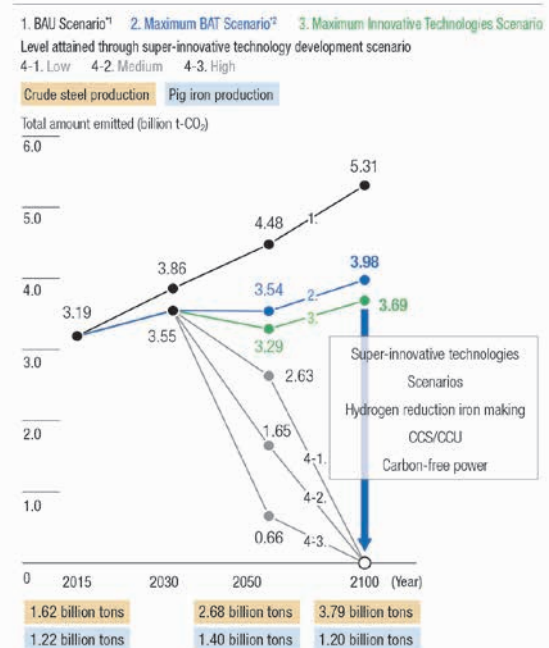
Basic policy

The JFE Group’s business involves steel manufacturing, which emits massive amounts of CO₂. That is why climate change issues are serious management issues from the viewpoint of business continuity. The steel business accounts for 99.9% of the JFE Group’s CO₂ emissions. The JFE Group is able to manufacture steel with the lowest CO₂ emission intensity among all the integrated steel mills in the world through developing diverse technologies that enable energy saving and CO₂ emission reduction, and applying them to our iron and steelmaking processes. We will continue developing processes to reduce environmental impact and **spread our vast accumulated technologies globally for new opportunities, in order to contribute to mitigating climate change.**

Long-term vision and direction

The Japan Iron and Steel Federation, to which JFE Steel, the steel operating company of JFE Group, belongs, has set 2030 as the target year to achieve its Commitment to a Low Carbon Society. In addition, in November 2018, the Federation established and announced the Japan Iron and Steel Federation’s long-term vision for climate change mitigation for 2030 and beyond, which ultimately aims for Zero Carbon Steel production. JFE Steel played a pivotal role in the development of this long-term vision. To help achieve the Paris Agreement’s long term goal of holding the average global temperature rise well below 2C, the company continues to develop and spread required technologies and contribute to playing its part in mitigating climate change.

CO₂ emissions in terms of projected scenarios of long-term climate change mitigation



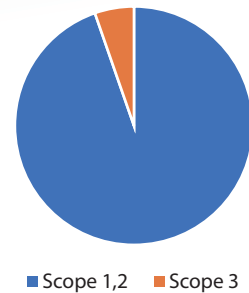
Source: Compiled based on information provided by the Japan Iron and Steel Federation

	Societal changes and responses to changes		Expectations and concerns of stakeholders towards the JFE Group	Evaluation results
<p>2°C scenario</p> <p>Important factor ① Decarbonization in steel production processes</p>	<p>Rising societal demands for decarbonization towards steel production processes</p>	<p>Implementation of innovative technologies that achieve large-scale decarbonization</p> <p>Implementation of carbon pricing</p>	<ul style="list-style-type: none"> • Significant contribution through innovative technologies • Increase in investment in the implementation of innovative technologies • Increase in operation costs due to the introduction of carbon pricing 	<p>Opportunities</p> <ul style="list-style-type: none"> ➤ Development and implementation of innovative technologies on top of existing technologies <p>Risks</p> <ul style="list-style-type: none"> ➤ Investment in the implementation of innovative technologies is possible ➤ Cost competitiveness is maintained when carbon pricing is implemented worldwide
<p>2°C scenario</p> <p>Important factor ② Increase in demand for the effective use of steel scraps</p>	<p>Increased focus on electric furnace method, which emits low levels of carbon</p>	<p>Rising expectations toward electric furnace steel</p> <p>Increase in scrap generation</p>	<ul style="list-style-type: none"> • Replacement of converter steel with electric furnace steel • Increase in JFE Group's production of electric furnace steel 	<p>Opportunities</p> <ul style="list-style-type: none"> ➤ Restrictions on the amount of scrap provided, increase in production of converter steel ➤ Increase in production of electric furnace steel and the need for electric furnace engineering ➤ Expansion of the scrap logistics business
<p>2°C scenario</p> <p>Important factor ③ Change in demand for steel for automobiles and others</p>	<p>Change in automobile needs</p> <p>Rising demands for eco-friendly raw materials</p>	<p>Increase of EV motors</p> <p>Decrease of internal combustion engines</p> <p>Reduction of weight and the increased use of multi-materials</p> <p>Demand for decarbonization and recyclability</p>	<ul style="list-style-type: none"> • Increase in demand for electrical steel sheets for EV motors • Decrease in demand for special steel due to the decrease of internal combustion engines • Replacement of automobile steel due to the increased use of multi-materials • Demand for further decarbonization and recyclability in steel production 	<p>Opportunities</p> <ul style="list-style-type: none"> ➤ Increase in demand for electrical steel sheets due to more electric vehicles ➤ Increase in demand for special steel due to increase in automobile sales ➤ Increase in demand for high-tensile steel sheets for automobiles ➤ Refocus on the recyclability of steel <p>Risks</p> <ul style="list-style-type: none"> ➤ Limited impact of the increased use of multi-materials
<p>2°C scenario</p> <p>Important factor ④ Increase in demand for solutions promoting decarbonization</p>	<p>Shifting to decarbonization</p>	<p>Increase in demand for solutions promoting transition toward decarbonization</p> <p>Overseas development of energy conservation technologies</p>	<ul style="list-style-type: none"> • Renewable-energy power generation plants • Low-carbon business (Eco Solution) in developing countries using Best Available Technology (BAT) developed and commercialized in Japan 	<p>Opportunities</p> <ul style="list-style-type: none"> ➤ Integrated constructions and operations of renewable energy (biomass, geothermal, and solar power) plants ➤ Integrated constructions and operations of waste incinerators and plastic recycling plants ➤ Integrated constructions of CCU and CCS facilities ➤ Overseas development of low carbon businesses
<p>4°C scenario</p> <p>Important factor ⑤ Procurement of raw materials becomes unstable due to increased frequency in climate disasters</p>	<p>Intensifying climate disasters alongside rising temperatures</p>	<p>Procurement of raw materials becomes unstable</p>	<ul style="list-style-type: none"> • Procurement of raw materials becomes unstable 	<p>Risks</p> <ul style="list-style-type: none"> ➤ Undergoing concrete measures ➤ "Alternative procurement methods and source distribution" ➤ "Strengthening equipment capabilities"
<p>4°C scenario</p> <p>Important factor ⑥ Damages to business bases due to climate disasters</p>	<p>Intensifying climate disasters alongside rising temperatures</p>		<ul style="list-style-type: none"> • Increased damages due to typhoons and rainstorms • Increased damages due to water shortages • Flood damages due to rising sea levels 	<p>Risks</p> <ul style="list-style-type: none"> ➤ Flood and water shortage response measures already in motion ➤ Flood impacts due to rising sea levels can be coped with the current measures
<p>4°C scenario</p> <p>Important factor ⑦ National resilience</p>	<p>Intensifying climate disasters alongside rising temperatures</p>	<p>Increase in importance of strengthening infrastructure</p> <p>Increased demand for disaster prevention products</p>	<ul style="list-style-type: none"> • Contribution with steel and related products that help strengthen infrastructure 	<p>Opportunities</p> <ul style="list-style-type: none"> ➤ Strengthening infrastructure with steel and related products

NYK

The marine shipping industry is reliant on fossil fuels as it uses bunker oil and other fuels to power oceangoing vessels. The cargo volume carried by international marine transport is expected to rise in the future, so the industry will likely have to deal with transition risks such as a reduced dependency on fossil fuels. More specifically, some potential responses include a fuel shift from bunker oil to natural gas and making shipping operations more efficient by reducing ship weight and hull resistance. However, the fact that ships can have service lives spanning several decades makes it necessary to implement systematic and well-planned measures.

NYK has various operations in the international marine transport industry, including general cargo and passenger ships, and has begun taking action in response to the TCFD Recommendations.



Climate risk NYK Report 2019 (excerpt)

NYK Group uses the World Energy Outlook of the International Energy Agency (IEA) as reference points for future energy-related trends. The IEA publishes a New Policies Scenario (NPS) as its main scenario and a Sustainable Development Scenario (SDS), which assumes that the Sustainable Development Goals (SDGs) of the United Nations will be achieved. The IEA projects that global energy demand in 2040 under the NPS will increase by 27% compared to 2017 and decrease by 2% under the SDS. The NPS assumes current efforts will continue, and new measures and technological innovations will be implemented. However, NPS projections for global energy consumption and CO₂ emissions have been reduced each year based on growing expectations for a global transition to renewable energy and accelerating progress in technological developments. Therefore, projections for energy trends must be based on a careful analysis of both the NPS and SDS and factor in the influence from increasing implementation of climate change measures.

NYK Group also uses the IEA's World Energy Outlook as a reference point for an annual analysis of the potential impact on demand for our freight transport services. Because we operate our large seagoing cargo vessels for 15 to 20 years, framing an accurate long-term projection for the freight transport trend is critical for investment and other business planning. While we base our projections primarily on the IEA's main scenario, we also must take a long-term view on our business operations, which requires considering the potential impact on Group business from changes in overarching trends or freight volume and in the event that stepped-up climate change measures were to cause a shift in freight demand.

Potential Risks and Opportunities (example)

		Potential risks and opportunities	Impact on the Group
Transition risk	Policies, laws, regulations	<ul style="list-style-type: none"> • Stricter environmental regulations (EEDI, GHG reductions) • Fuel usage regulations (heavy oil restrictions, fuel conversion, obligatory use of renewable energy) • Adoption of emissions trading systems (MBM) 	<ul style="list-style-type: none"> • Increased capital expenditure, current ships become stranded assets • Reduced service capabilities • Increased costs to purchase credits
	Technology	<ul style="list-style-type: none"> • Response to new technologies (such as new investment) 	<ul style="list-style-type: none"> • Higher R&D expenses to develop new technologies • New technology development leads to new business opportunities
	Market	<ul style="list-style-type: none"> • Changes in the logistics market (local production and consumption, recycling) • Installation of renewable energy and autonomous vehicle technology 	<ul style="list-style-type: none"> • Changes in freight conditions, reduced freight volume • Increased capital expenditure
	Reputation	<ul style="list-style-type: none"> • Avoidance of firms using fossil fuels • Bidding criteria introduced for environmental performance 	<ul style="list-style-type: none"> • Earlier conversion to new fuels • First-mover market capture, increased differentiation
Physical risk	Acute	<ul style="list-style-type: none"> • Increased incidents of abnormal weather 	<ul style="list-style-type: none"> • Schedule delays, increased cargo damage (impaired quality) • Increased risk of machinery problems and ship handling accidents • Increased ship operating costs
	Chronic	<ul style="list-style-type: none"> • Climate change induced shifts in populations, regional activity • Ship investment to meet freight demand trends • Impact on port facilities from rising sea level 	<ul style="list-style-type: none"> • Changes in transportation demand, reduced freight volume • Revised investment plans, increased investment costs
Opportunity	Market	<ul style="list-style-type: none"> • Development of new businesses • Development of new technologies 	<ul style="list-style-type: none"> • Increased business related to renewable energy (such as wind power) • Increased shipping opportunity for alternative energy sources (such as biomass and hydrogen) • Development of new businesses using existing technologies • Reduced fuel consumption due to use of new technologies

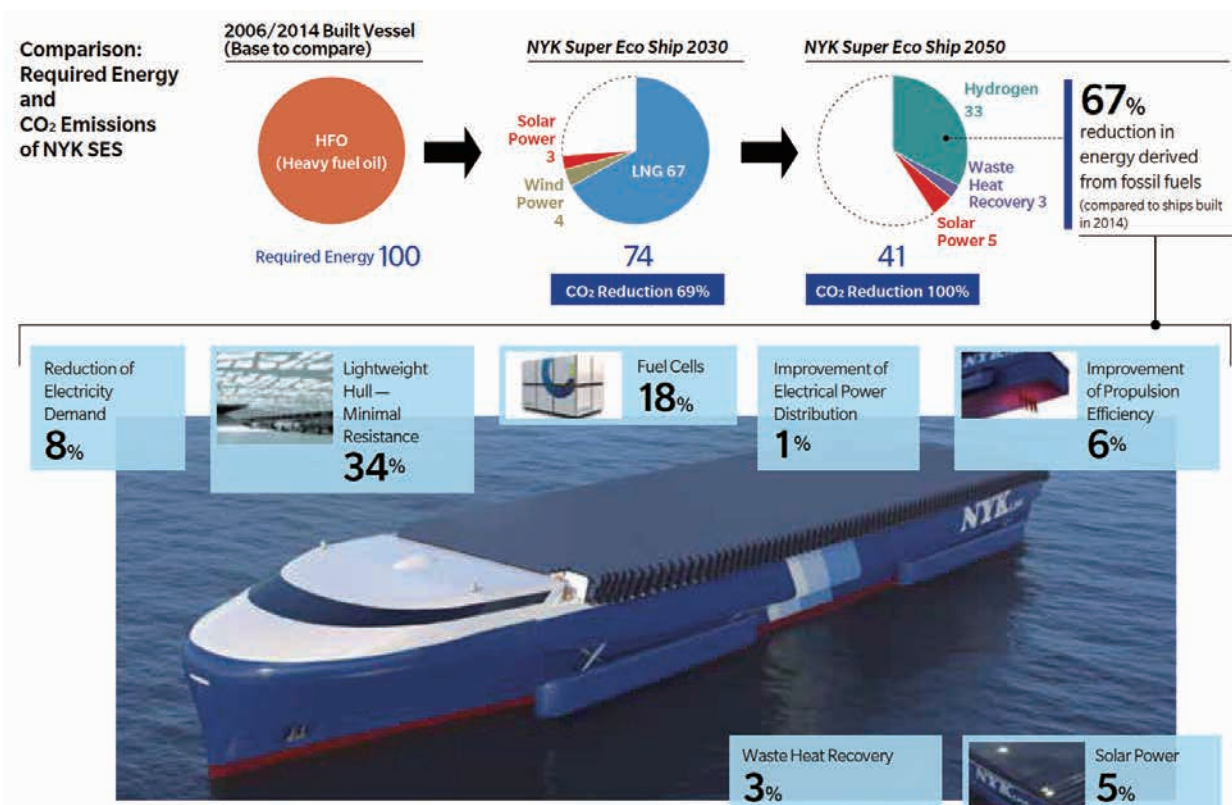
In November 2018, NYK developed a new concept ship called NYK SES 2050, a carbon-free vessel of the future aimed at achieving NYK's medium- to long-term environmental targets. It is a concept ship for 2050 modeled after a pure car and truck carrier. *Minimal resistance is achieved with a low weight hull and optimized shape*, while the use of electricity capitalizing on fuel cells and the adoption of high efficiency systems achieve a 67% reduction in energy derived from fossil fuels (compared to ships built in 2014). Several of the technologies depicted in the concept ship NYK SUPERECO SHIP 2030 (NYK SES 2030) announced by the NYK Group in 2009 have already been introduced and practically applied on vessels. We have also made changes to our road map on the elemental technologies of ships to reflect the stricter environmental regulations and rapid technological advancements of recent years in new research domains. Going forward, we will promote collaboration with a broad range of global partners in the marine industry aimed at research and development, verification, and the introduction of elemental technologies proposed for NYK SES 2050.

Group Medium to Long-Term Environmental Targets (CO₂ Reduction Targets)

Our medium-term management plan defines medium- to long-term environmental targets. We plan to reduce CO₂ emissions from our vessels and produce a ripple effect down the supply chain.

	(FY)				
	2016	2017	2018	2030 (target)	2050 (target)
Vessels and ocean transportation	-0.5%	-1.6%	-2.4%	-30%	-50%

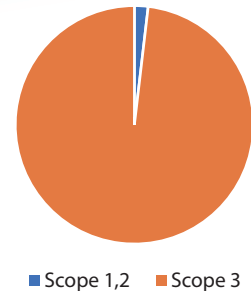
* CO₂ emissions per ton-kilometer of transport (base year is fiscal 2015)



3 Non-financial sectors; Scope 3 type companies

Toyota Motor Corporation

For the automotive manufacturing industry, CO₂ emissions from gasoline and diesel consumption when vehicles are operating is significantly greater than emissions from the manufacture of vehicles in factories. Global demand for automobiles is expected to continue rising for the foreseeable future. This makes it necessary to consider transition risks, including the decarbonization of automotive fuels. Key measures will include improving fuel efficiency, using biofuels, and promoting hybrid vehicles. The recent development and popularity of electric vehicles has shown some promise for the near future. However, even if electric vehicles were to become popular globally, that would not completely ensure a reduction in CO₂ emissions, because many regions around the world rely on coal and other fossil fuels to generate electricity. In developing countries in particular, the widespread use of inefficient coal-fired power plants means that vehicles might be powered by electricity produced with high CO₂ emissions.



As a global automobile manufacturer, Toyota has begun to act on the TCFD Recommendations.

2030 Milestones Set in Order to Achieve the Toyota Environmental Challenge 2050 Toyota Environmental Report 2019 (excerpt)

In September 2018, Toyota announced the 2030 Milestones, indicating the status of six challenges – in 2030, which is one of the medium- to long-term initiatives to achieve the Toyota Environmental Challenge 2050. By setting quantitative and qualitative milestones for each of the challenges, we will be able to promote reductions of the environmental impacts and accelerate activities that have a net positive social impact. By establishing them in combination with the Toyota Environmental Action Plan which sets specific action plans and targets for every five-year period, we will clarify value-creation stories for achieving the Toyota Environmental Challenge 2050, further promote activities, and contribute to the realization of a sustainable society.

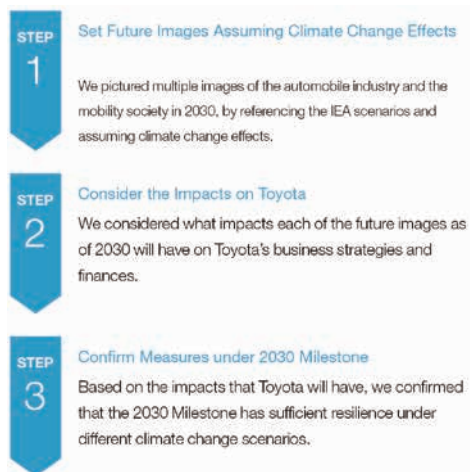
Toyota Environmental Challenge 2050		2030 Milestone
Challenge 1 New Vehicle Zero CO₂ Emissions Challenge		
Reduce global average CO ₂ emissions during operation from new vehicles by 90 percent from Toyota's 2010 global level	Accelerate widespread use of next-generation vehicles to save energy and respond to diverse range of fuels <ul style="list-style-type: none"> Accelerate global expansion of electrified vehicles Joint development of electrified vehicles and establish networks to encourage their widespread adoption 	<ul style="list-style-type: none"> Make annual global sales of more than 5.5 million electrified vehicles, including more than 1 million zero-emission vehicles (BEVs and FCEVs) The estimate of global average CO₂ emissions reduction in g-CO₂/km from new vehicles will be 35 percent or more, which may vary depending on market conditions, compared to 2010 levels
Challenge 2 Life Cycle Zero CO₂ Emissions Challenge		
Completely eliminate all CO ₂ emissions from the entire vehicle life cycle	Reduce CO ₂ emissions along the entire vehicle life cycle, from materials production, parts and vehicle manufacturing to driving and disposal stage <ul style="list-style-type: none"> Develop and expand use of low-CO₂ emission materials Promote eco-friendly action throughout the entire value chain 	<ul style="list-style-type: none"> Reduce CO₂ emissions by 25 percent or more over the entire vehicle life cycle compared to 2013 levels by promoting activities for the milestones of Challenges 1 and 3, and with support from stakeholders such as suppliers, energy providers, infrastructure developers, governments and customers
Challenge 3 Plant Zero CO₂ Emissions Challenge		
Achieve zero CO ₂ emissions at all plants by 2050	Promote both the development and introduction of low-CO ₂ technologies and daily kaizen and the utilization of renewable energy and use of hydrogen, at all production plants <ul style="list-style-type: none"> Reduce CO₂ emissions per unit at newly established plants by simplifying and streamlining production processes and taking innovative energy-saving measures Use renewable energy at all plants 	<ul style="list-style-type: none"> Reduce CO₂ emissions from all plants by 35 percent compared to 2013 levels
Challenge 4 Challenge of Minimizing and Optimizing Water Usage		
Minimize water usage and implement water discharge management based on individual local conditions	Promote activities from the two perspectives of water volume and water quality <ul style="list-style-type: none"> Reduce water usage in existing production processes as well as introducing technologies reducing industrial water usage through rainwater use and improving water recycling rates Manage water discharge quality by complying with strict standards, improving the local environment by returning clean water for nature 	<ul style="list-style-type: none"> Implement measures, on a priority basis, in the regions where the water environment is considered to have a large impact <ul style="list-style-type: none"> -Water quantity- Complete measures at the four Challenge-focused plants in North America, Asia and Southern Africa -Water quality- Complete impact assessments and measures at all of the 22 plants where used water is discharged directly to river in North America, Asia and Europe Disclose information appropriately and communicating actively with local communities and suppliers
Challenge 5 Challenge of Establishing a Recycling-based Society and Systems		
Promote global deployment of End-of-life vehicle treatment and recycling technologies and systems developed in Japan	Establish a recycling-based society with four key features: use eco-friendly materials; use auto parts longer; develop recycling technologies; and manufacture vehicles from End-of-life vehicles <ul style="list-style-type: none"> Two global projects started in 2016: <ul style="list-style-type: none"> Toyota Global 100 Dismantlers* Project Toyota Global Car-to-Car Recycle Project 	<ul style="list-style-type: none"> Complete establishment of battery collection and recycling systems globally Complete set up of 30 model facilities for appropriate treatment and recycling of End-of-life vehicles
Challenge 6 Challenge of Establishing a Future Society in Harmony with Nature		
Connect nature conservation activities beyond the Toyota Group and its business partners among communities, with the world, to the future	Enhance Toyota's long-standing nature conservation activities promoting harmony with nature, environmental grants, and environmental educations <ul style="list-style-type: none"> Develop three "connecting" projects started in 2016, sharing our know-how and environmental experiences: <ul style="list-style-type: none"> Connecting communities: Toyota Green Wave Project Connecting with the world: Toyota Today for Tomorrow Project Connecting to the future: Toyota ESD Project 	<ul style="list-style-type: none"> Realize "Plant in Harmony with Nature" – 12 in Japan and 7 overseas – as well as implement activities promoting harmony with nature in all regions where Toyota is based in collaboration with local communities and companies Contribute to biodiversity conservation activities in collaboration with NGOs and others Expand initiatives both in-house and outside to foster environmentally conscious persons responsible for the future

* Dismantlers: Operates dismantling business for vehicles

Thinking About the Climate Change Effects in 2030 Using Scenario Analysis

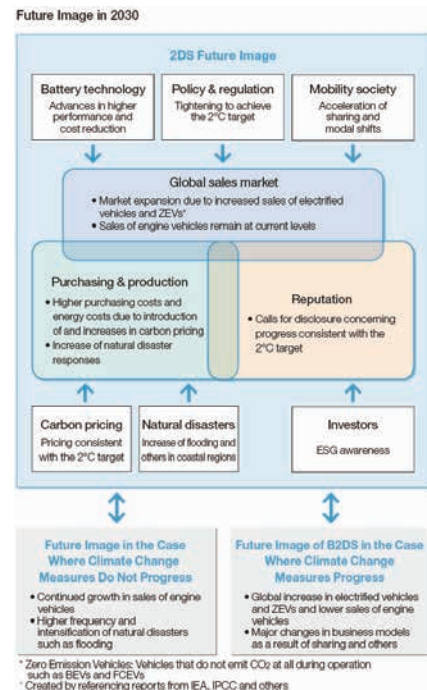
Toyota Environmental Report 2019 (excerpt)

To confirm that the 2030 Milestone is a valid and resilient strategy for addressing the effects that climate change will have on Toyota, we conducted scenario analysis by picturing multiple future images in 2030. The climate scenarios mentioned above were developed by referencing scenarios equivalent to "2 °C (2DS)" and "Beyond 2°C (B2DS)" in the International Energy Agency (IEA) reports and others.



STEP 3 Confirm Measures Under 2030 Milestone

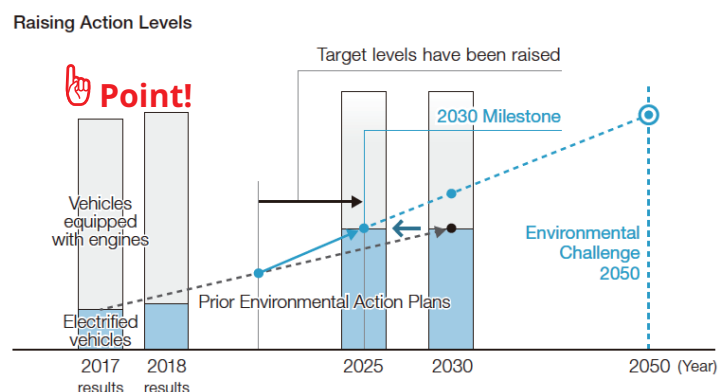
	Milestone	
	Challenge 1	Challenge 2
Electrified vehicle sales:	5.5 million units	Reduce CO ₂ emissions by 25% over the entire vehicle life cycle compared to 2013
ZEV sales:	1 million units	Reduce CO ₂ emission from plants by 35%



The percentages of electrified vehicles and ZEVs in global sales of new vehicles vary considerably depending on the scenario, and in anticipation of these circumstances, it will be important to flexibly consider powertrain lineups and development of mobility businesses.

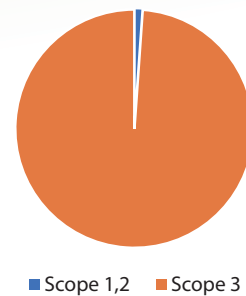
Under the 2030 Milestone, the percentage of ZEVs will exceed the 2DS level, but will not reach the level necessary to achieve B2DS. However, through the development of HEVs, Toyota has been establishing a mass production base by cultivating the component technologies essential to electrified vehicles. These technologies can also be utilized in ZEVs, and Toyota is capable of making flexible and strategic changes to powertrain lineups according to demand changes. **Therefore, Toyota will be able to respond to changes in social demand through advances in its electrified vehicle technologies.**

Specific measures relating to electrified vehicle sales targets include the announcement that the projection for achieving the electrified vehicle sales target in the 2030 Milestone has been moved up by approximately five years. Also, Toyota invested in Uber which is developing a large sharing business in North America, and is steadily advancing in response to the development of new mobility businesses, including developing ridesharing for automated driving.



Daiwa House Industry

House construction is an industry with significant CO₂ emissions during the use, deconstruction, and disposal of buildings, as well as the manufacture and transport of construction materials procured. Thus, most of the emissions are Scope 3. Below is an introduction to initiatives by Daiwa House Industry in response to the TCFD Recommendations.

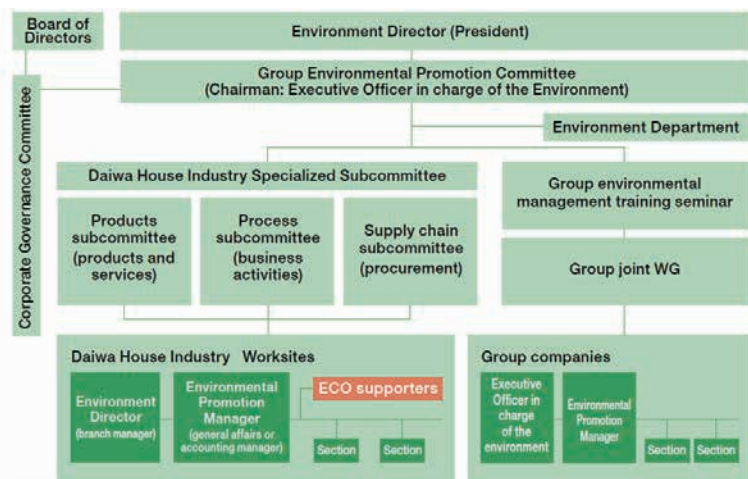


Governance Daiwa House Group Sustainability Report 2019 (excerpt)

Our Group positions “slowing and adapting to climate change” as one of the important management issues and has appointed a Senior Managing Executive Officer as Executive Officer in charge of the Environment, who is responsible for implementing a climate change strategy, with the Group Environmental Promotion Committee chaired by an Executive Officer in charge of the Environment. The committee, which is convened biannually, discusses and makes decisions on matters about our Group’s environmental initiatives including climate change-related ones and risks and opportunities, managing the Group’s environmental initiatives.

Strategy Daiwa House Group Sustainability Report 2019 (excerpt)

Climate change-related risks and opportunities can result from two factors: “transition” derived from tightening of regulations, technological advancement, and changes in market environment accompanied by a shift to a decarbonized society; and “physical changes” such as acute extreme weather and chronic temperature rise as a result of global warming. Some effects of climate change may not last long, but others can have medium- or long-term consequences. Classifying of factors of various external environmental changes accompanied by climate change into “transitions” and “physical changes,” we assess possible financial impacts facing us on a scale of large, medium, and small with affected periods assumed, trying to identify important risks and opportunities. In addition, based on such risks and opportunities, in order to devise business strategies that flexibly respond to external environmental changes in the future, we assess the degree of impact on our business by using multiple scenarios.



Conference body	Principal members	Principal roles in handling climate change	Conference frequencies
Board of Directors	Director, External Director	Supervision of climate change strategy	Annually
Corporate Governance Committee	Representative Director, External Director, Auditor, External Auditor	Discussing and reporting important items about climate change strategy to the board of directors	Biannually
Group Environmental Promotion Committee	Executive Officer in charge of the Environment, Division Manager of the Head Office, Group Environmental Promotion Manager	Drafting and examining our climate change strategy and adopting the final text, managing the progress of the Group management indicators	Biannually
Daiwa House Industry Specialized Subcommittee	Relevant Division Manager, Promotion Manager	Implementing our climate change strategy, managing the progress of individual management indicators	Quarterly
Group environmental management training seminar	Group Executive Officer in charge of the Environment	Promoting climate change strategy across the Group	Annually

Principal risks and opportunities related to climate change

Short term (0 to 3years), medium term (3 to 10 years), long term (10 to 30 years)

Types			Content	Affected periods	Degree of financial impacts
Risks	Transitions	Policies, laws and regulations	◆ Tightening of Building Energy Efficiency Act With the scope of application of compliance with the Building Energy Efficiency Act expanded or energy efficiency standards elevated, the number of businesses or properties to be regulated can balloon, which can increase workloads and costs of houses and buildings we offer.	Short-term	Medium
			◆ Carbon tax hike and expansion of emissions trading With the carbon tax significantly raised or emissions trading expanded, a significant increase in operational costs or additional business tasks out of regulations will be needed, which can result in reduced work efficiency.	Medium-term	Small
	Physical changes	Chronic	◆ Maximum temperature in summer rising With the maximum temperature in summer rising, workers in construction sites where outside work is common can be at higher risk for heatstroke, which can lead to delay in construction periods or reduced productivity in construction sites.	Short-term	Small
Opportunities	Transitions	Products / services	◆ Demand for houses and buildings with fewer greenhouse gas emissions growing We have a domestic policy target of "making newly-constructed houses and buildings zero energy-oriented by 2030." With support for achieving the goal continued and expanded, demand for ZEH and ZEB, products with high unit price per building, can grow.	Present time	Large
		Products / services	◆ Creation of carbon credits through the supply of low-carbon houses and buildings With emissions trading introduced nationwide, demand for carbon credits will grow, which can promote the creation and acquisition of the credits through the supply of low-carbon houses and buildings and generate additional profits through their sale.	Medium-term	Medium
	Physical changes	Products / services	◆ Expansion of the environmental greening business beneficial to heat-island phenomenon control With urban heat-island phenomenon becoming severer accompanied by maximum temperature in summer rising, there can be a growing need for the temperature adjusting function by greening, which can expand the greening business.	Medium-term	Small

Summary of the result of scenario analysis

External scenario	Reason for choice	Result of analysis	Application to policies and strategies
Nationally Determined Contribution (NDC)	Most viable as the future of domestic business, which accounts for much of our business. The scenario is of high precision.	A possible increase in operational costs due to tightening of regulations can be covered by an increase in sales of ZEH and ZEB as well as revenues out of the creation of credit.	Under the policy of "maximizing sales increase and minimizing profit decrease with early development of ZEH and ZEB, and cost reduction pushed forward," we performed monitoring of the growth of sales rate of ZEH and ZEB as important management indicators, both indicators reflected in our business strategies.
Representative Concentration Pathway (RCP8.5)	The scenario that foresees the greatest physical impact was chosen to simulate the most extreme situation.	Possible additional costs such as construction delayed damages due to increased extremely hot days can be covered by an increase in sales of products that can mitigate the heat island phenomenon.	Under the policy of "thoroughgoing measures against heatstroke in construction sites" and "demonstration of group synergy in the environmental greening business," we performed monitoring of the number of heatstroke cases and the company facilities with greenery development projects as important management indicators, both indicators reflected in our business strategies.

Risk management

Daiwa House Group Sustainability Report 2019 (excerpt)

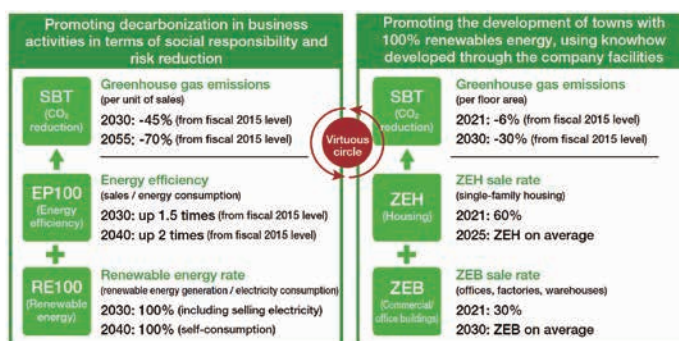
We recognize that the climate change risk is one of the risks that have significant impacts in the medium and long run and integrate it in the Groupwide risk management process. We carefully identify and assess risks and opportunities nearly every three years, their identification and assessment used to identify priority issues in a Medium-Term Management Plan, which is formulated every three years, and an Action Plan for the Environment or reflected in major policies and target levels in these plans. In response to the Environment Department's identification of "external environmental changes" associated with a shift to a decarbonized society and "physical changes" from global warming, we assess important risks and opportunities from the likelihood of these changes and possible financial impacts if they occur.



Metrics and targets

Daiwa House Group Sustainability Report 2019 (excerpt)

Aiming to minimize risks and maximize opportunities associated with climate change, we have set short-, medium- and long-term targets as below.



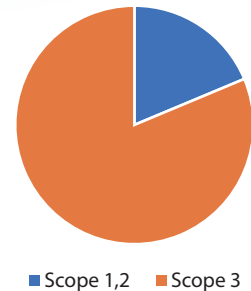
ZEH: Net Zero Energy House
 ZEB: Net Zero Energy Building
 SBT (Science Based Target): An international initiative to encourage companies to set science based greenhouse gas reduction targets aligned with the "2oC target" of the Paris Agreement.

4 Non-financial sectors: Low-emission companies

Kirin Group

The food manufacturing industry generally has low transition risk, as many companies in the industry have low CO₂ emissions. However the procurement of raw materials in the form of agricultural products such as grain and fruit from overseas for use may expose them to significant impacts of physical risks that arise in producer countries. They may also be exposed to physical risks to port facilities, roads and other components of logistics routes from the producer countries to the food products manufacturing plants.

Below is an introduction to the initiatives of the Kirin Group in response to the TCFD Recommendations, with a special focus on physical risks.



Response to the New Frameworks for Disclosure of Climate Related Information

Kirin Group Environmental Report 2018 (excerpts)

○ Governance

The Kirin Group is reliant on natural capital in the pursuit of its business. That natural capital is being affected greatly by climate change resulting from global warming. Perceiving such circumstances as major risks and opportunities, in 2012, the Kirin Holdings' Board of Directors approved the Kirin Group Long-Term Environmental Vision. At the same time, it declared the lofty goal of halving the CO₂ emissions of its business by 2050 from a 1990 base year, across its entire value chain. From 2017 onward, as part of the CSV Commitment, the Group CSV Committee has set a number of targets, including CO₂ emission reduction targets for 2030, and is monitoring progress and establishing new policies. The Group CSV Committee was established for the Kirin Group to actively promote CSV. It brings together the presidents of the Group's main companies and the executives responsible for finance, IR, SCM, marketing, and other divisions to formulate CSV policies and monitor the progress. Along with the CSV Commitment, the major policies decided in the Committee are discussed and approved by the Group Executive Committee or the Board of Directors.

○ Strategy

The likely risks of climate change associated with global warming include disruption of operations due to water shortages, impact on crops in production regions due to rising temperatures and natural disasters, and increased investment on energy conservation. Meanwhile, initiatives to tackle climate change, such as joint delivery, are leading to collaboration in non-competitive areas in the same and other industries. Such initiatives could provide opportunities to solve other problems for the societies and companies besides climate change. Through the appropriate identification of and response to these kinds of risks and opportunities, the Kirin Group is pursuing initiatives that will solve issues related to climate change. Climate change risks and opportunities are subject to the risk management system, and the material items and corresponding policies are reported to the Group CSV Committee, which approves the policies for dealing with them. These items are integrated in the business plans of the individual operating companies and addressed accordingly.

○ Risk management  **Point!**

The effects of climate change have already manifested, and we recognize that the physical risks and transitional risks have become greater. In particular, the impact of natural disasters on agricultural production regions can no longer be ignored and water issues are also very serious. The Kirin Group evaluated the risks surrounding biological resources in around 2013. In 2017, we repeated a 2014 evaluation of water risks in the catchments of our business locations and upstream in the value chain. Decisions on policies and the contents of initiatives are based on the tangible outcomes of investigations.

Key risks are monitored by the Group CSV Committee and policies are formulated and revised where necessary. Other risks are identified and handled within the risk management system and the environmental management systems of the individual operating companies and business locations.

○ Metrics and targets

The Kirin Group monitors Scope 1, 2, and 3 emissions across the entire Group and uses the outcome of that monitoring in the formulation of its next strategies. Currently, initiatives are generally progressing as planned.

Scenario analysis

Kirin Group Environmental Report 2019 (excerpts)

Impact of climate change on major agricultural product yields/land suitable for cultivation

Legend: Negative/positive impact of less than 10% ▲/+
From 10% to less than 50% ▲▲/++
50% or more ▲▲▲/+++

Agricultural products	Kirin Group Scenario3: 4°C, unwanted world, 2050			
	United States	Asia	Europe/Africa	Oceania
Barley		West Asia Yield▲/+ South Korea Yield +	Finland Spring wheat yield▲ Mediterranean coast (West) yield ▲, (East) yield+ France Winter barley and spring barley: Both yields▲	Western Australia Yield▲▲
Hops			Czech Republic Yield▲	
Black tea		Sri Lanka Yields down in lowlands Little impact of temperature rise in highlands India (Assam region) For each 1°C temperature rise above average temperature of 28° C, yields down 3.8% India (Darjeeling region) Yield▲▲~▲▲▲ (Sources from tea industry, not academic papers)	Kenya Rise in altitude of suitable cultivation land Major contraction of suitable cultivating land in Nandhi region and western Kenya Kenyan mountain regions will remain suitable for cultivation Malawi Chitipa district: Suitable land ▲▲▲ Nkhata Bay district: Suitable land ▲▲▲ Mulanje district: Suitable land +++ Thyolo district: Suitable land ++	
Wine grapes	United States (California) Suitable land: ▲▲▲ Northwestern United States Suitable land: +++ Chile Suitable land: ▲▲	Japan (Hokkaido) Expansion of suitable land Enable cultivation of Pinot Noir Japan (Central Honshu) Suitable land expanded on the one hand, but high-temperature damage also caused	Northern Europe Suitable land: +++ Mediterranean coast Suitable land: ▲▲▲ Spain Production volumes▲to▲▲ Western Cape, South Africa Suitable land: ▲▲▲	New Zealand Suitable land: +++ Southern coastal regions of Australia Suitable land: ▲▲▲ Outside southern coastal regions of Australia Suitable land: ▲▲
Coffee beans	Brazil Suitable land for Arabica: ▲▲▲ Suitable land for Robusta: ▲▲▲	Southeast Asia Suitable land for Arabica: ▲▲▲ Suitable land for Robusta: ▲▲▲	East Africa Suitable land for Arabica: ▲▲ Suitable land for Robusta: ▲▲	
Corn	Southwestern United States Yield ▲▲ United States (Iowa in mid-West) Yield ▲~▲▲			

Mitsubishi Corporation

General trading companies have low CO₂ emissions from their own operations, but their business activities could face climate change-related risks and opportunities due to involvement in businesses surrounding a wide range of services and products, including fossil fuels such as coal and petroleum. Mitsubishi Corporation was the first Japanese general trading company to disclose according to the TCFD Recommendations. Below is an introduction to their initiatives.

TCFD responses

ESG Data Book 2018 (excerpt)

○ Governance

Climate change is one of the most important issues acknowledged by MC's top management. MC's basic policy on climate change and important matters therein are deliberated and decided upon by its Executive Committee, the company's officer-level decision-making body. As stipulated in the regulations governing MC's board of directors, the Executive Committee reports its findings regularly (at least once a year) to the board, appropriate supervision of which is facilitated by the structure of MC's governance framework. Before the Executive Committee has addressed basic policy and important matters pertaining to climate change, actions are taken by MC's Sustainability Advisory Committee and Sustainability and CSR Committee. The former fields opinions and advice from outside experts, and the latter (which reports directly to the Executive Committee) holds extensive hearings with all the Business Group CEOs.

The Business Groups also act independently to address climate change. Group Chief Sustainability Officers and Group Sustainability Managers are appointed with each Group's department responsible for management strategy in order to oversee sustainability-related initiatives (including climate change) and reflect climate-related opinions and information into their respective businesses and strategies. At MC, the company's basic policy on climate change and important matters therein are comprehensively addressed when making decisions on business strategies and investments.

○ Strategy

MC considers the opportunities and risks associated with climate change to be key variables in establishing its business strategies, and recognizes the possibility that the impact of climate change on its operations will grow over the medium to long term. Accordingly, MC is identifying where the risks and opportunities are likely to reveal themselves up to and even beyond the year 2030. Regular internal analyses and assessments also factor in changing external trends.

Main Opportunities and Risks Associated with Climate Change

Transition Risks and Opportunities

Regulations	<ul style="list-style-type: none"> • Low-carbon and carbon-free products / proliferation of service-related subsidies • Growing operational and systems-related costs due to carbon pricing mechanisms (carbon taxes, etc.) and increasing regulations
Technologies	<ul style="list-style-type: none"> • More new business opportunities due to the development and proliferation of renewable energy sources, electric vehicles and other new technologies or alternative products • Obsolescence of products and services that rely on older technologies
Markets	<ul style="list-style-type: none"> • Shifting demand from fossil-fuel products and services to low-carbon products and services

Physical Risks

Increase in Unusual Weather Patterns	<ul style="list-style-type: none"> • Risks of water shortages, floods and other resulting phenomena having an adverse impact on business operations
Climate Change	<ul style="list-style-type: none"> • Risk of rising temperatures, etc. having an adverse impact on agricultural and marine products

* The impacts of the above risks and opportunities will depend on both the relevant regions and products.
 * With respect to physical risks, it is important to consider environmental changes (or possibilities thereof) on a region-by-region or product-by-product basis. Accordingly, MC's responses to phenomena such as floods and water shortages are tailored to the on-the-ground characteristics and needs of each of its businesses.

Point!

- MC considers the various opportunities and risks associated with climate change to be an important perspective in determining business strategies.
- With the goal of contributing to the transition to a low-carbon society, MC is promoting the following businesses

Renewable energy businesses	Businesses that support the proliferation of renewable energy, including energy transmission and storage-related businesses
The copper business, which supports the proliferation of electric vehicles (EVs), etc.	Low-emission natural gas businesses

Scenario Analysis

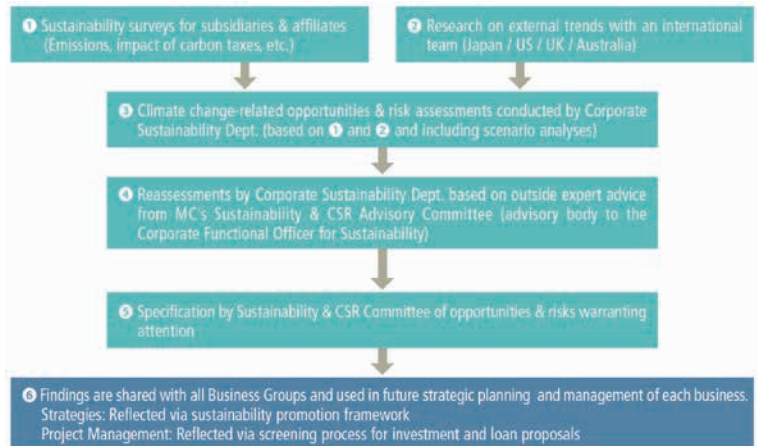
Among all of its businesses, including those mentioned above, MC has conducted an analysis of multiple scenarios in relation to its fossil fuel-related businesses. Even under a 2°C scenario*², we believe our business is highly resilient from a medium- to long-term perspective, having confirmed our competitive capabilities and initiatives towards new business opportunities.

*² The International Energy Agency (IEA) Sustainable Development Scenario

Integrated Report 2018 (excerpt)

○ Risk management

MC regularly assesses which climate-related opportunities and risks warrant the most attention through both internal and external surveys, and makes official determinations at the Sustainability & CSR Committee, which consists of Group CEOs from each of MC's Business Groups. The specified opportunities and risks are managed under MC's sustainability promotion framework from two perspectives: Strategic Planning and Project-by-Project Business Management.



○ Metrics and targets

MC has set the following climate-related targets to capitalize on opportunities and mitigate risks on a consolidated basis.

Target 1: Greenhouse Gas Emissions Reduction	Target 2: Renewable Energy
Reduce emissions* ¹ per total assets* ² by 25% by 2030	By 2030 aim to achieve at least 20% renewable energy in MC's power generation business (based on generation amount).
<p>*¹ Compared to fiscal year ended March 2017 levels. Greenhouse gas emissions on a consolidated basis (MC on a non-consolidated basis plus subsidiaries)</p> <p>*² The total assets used for this target represent the numerical values within the emissions reporting calculation range, which differ from the total assets reported in MC's financial reports.</p>	

References for further study: Examples of the TCFD approach to information disclosure

More examples of disclosure that is consistent with the TCFD Recommendations can be expected to appear in the future. Besides the examples provided on pages 46 to 61 of this handbook, a number of companies around the world have been proactive in adopting the TCFD approach.

Anyone interested in learning more is encouraged to review reports by the following companies, which have been particularly proactive in climate-related information disclosure.

Financial sector (life insurance companies)

- | | |
|--------------|--|
| ● AXA Group | ● Climate-related investment & insurance report - in line with France's Article 173 and Taskforce on Financial Climate-related Disclosure (TCFD) recommendations |
| ● Allianz | ● Shaping our sustainable future - Allianz group sustainability report 2018 |
| ● Storebrand | ● Green is good - Annual report 2017 |
| ● Swiss Re | ● Resilience in action - 2017 Financial report |

Non-financial sector

- | | |
|---------------------|--|
| ● BHP Billiton | ● BHP Annual report 2019 |
| ● EnBW | ● Integrated annual report 2018 |
| ● ENI | ● Eni for 2018 - Sustainability report |
| ● Royal Dutch Shell | ● Annual report and form 20-F for the year ended December 31, 2018 |
| ● Unilever | ● Unilever annual report and accounts 2018 - Making sustainable living commonplace |

VII Essential points for life insurers to consider based on the TCFD



- Life insurance companies need to consider the TCFD Recommendations from two perspectives—as life insurers and as institutional investors.
- As life insurers, they need to do disclosures that take into account the impacts of climate change, but much remains to be researched in this respect.
- As a result, disclosures from the perspective of institutional investors are the current focus of attention.

1 What is the status of life insurance companies?

There are two aspects to the operations of life insurance companies: as life insurers and as institutional investors. What is required of each in terms of responding to the TCFD?

Considerations from the perspective of a life insurer

Basic context

In the life insurance industry it is crucial to understand the impacts of climate change on human life and health. Chapter III showed how various impacts of climate change are now being recognized and predicted, but research on this topic is still at an early stage for the life insurance industry compared to the general insurance industry. The wide variety of factors that affect human health is one factor making this research a challenge.

It is worth noting that the impacts of climate change on the life insurance industry have not been particularly significant to date. However, it would not be appropriate to wait until after impacts are more obvious to everyone, so now is the time to gather information, study the impacts of climate change on health and mortality rates, and properly consider how to apply the findings in the life insurance industry.

Key points of the TCFD Recommendations

The TCFD Recommendations include supplemental guidance for specific sectors. In addition to the guidance provided for all sectors, this supplemental guidance is intended to promote better disclosure based on the characteristics of specific sectors. The supplemental guidance for insurance companies applies to the liability (underwriting) side of insurance activities.

Supplemental guidance for insurance companies

- | | |
|---|---|
| <ul style="list-style-type: none">● Strategy | <ul style="list-style-type: none">• Describe potential impacts of climate-related risks and opportunities• Provide supporting quantitative information (where available) on core businesses, products, and services |
| <ul style="list-style-type: none">● Risk management | <ul style="list-style-type: none">• Describe the processes for identifying and assessing climate-related risks on re-/insurance portfolios by geography, business division, or product segments.• Describe key tools or instruments, such as risk models, used to manage climate-related risks in relation to product development and pricing.• Describe the range of climate-related events considered and how the risks generated by the rising propensity and severity of such events are managed. |
| <ul style="list-style-type: none">● Metrics and targets | <ul style="list-style-type: none">• Provide aggregated risk exposure to weather-related catastrophes of their property business (i.e., annual aggregated expected losses from weather-related catastrophes) by relevant jurisdiction (country, region, etc.). |

Examining the above points, however, one can see that many are closely associated with the general insurance and re-insurance businesses. The life insurance business is obviously related to these, but there are still many aspects (e.g., scenario analysis and risk models) where information and tools that provide a basis for consideration are still limited.

Therefore, for the near term, when members of the Life Insurance Association of Japan begin to respond to the TCFD Recommendations, it would be appropriate to begin with the supplemental guidance addressed to all sectors. The disclosure items common to all sectors are the same as for the perspective of institutional investors. It would also be practical to start with the governance items that would also be important for “Creating ‘the right internal systems’ to respond to the TCFD in the section further below.

Considerations from the perspective of an institutional investor

Basic context From the perspective of institutional investors, companies in which they invest need to consider the impacts of climate change. The business of each investee company may be negatively affected by the physical or transition risks of climate change, or they may also find opportunities.

For these reasons, life insurance companies need to consider their own disclosures as described above, and also, call upon their investees to disclose climate-related information. It is also important to properly understand the information disclosed by these companies.

Key points of the TCFD Recommendations The actions of institutional investors calling on companies in which they invest to disclose climate-related information may have an impact on responses to climate change by other companies.

This was already partially covered on page 43, but the TCFD Recommendations cover these points with an emphasis on the following content.

“ Asset owners sit at the top of the investment chain and, therefore, have an important role to play in influencing the organizations in which they invest to provide better climate-related financial disclosures.

... Further, climate-related financial disclosures by asset owners may encourage better disclosures across the investment chain—from asset owners to asset managers to underlying companies—thus enabling all organizations and individuals to make better-informed investment decisions.

”

In other words, as institutional investors, members of the Life Insurance Association of Japan are expected to disclose their own information as well as to encourage investee companies and asset managers to strive for better information disclosure.

* For the investment aspects of their businesses, life insurance companies are asked to refer to the supplemental guidance written for asset owners.

As shown in Chapter V of this Handbook, the TCFD Recommendations encourage disclosures to be done so that investors and others can understand the risks and opportunities they face from climate change. Understandably, it is difficult for a company to do disclosure perfectly on the first attempt, and they are not expected to simply increase the number of disclosure reports they publish.

As an issue that requires further consideration, the TCFD Recommendations also indicate that desirable locations for the information to be disclosed are mainstream (public) annual financial filings.

However, for asset owners, based on the idea that “the Task Force recognizes reporting by asset managers and asset owners to their clients and beneficiaries, respectively, generally occurs outside mainstream financial filings,” the Recommendations state the following.

“ The financial reporting requirements and practices of asset owners vary widely and differ from what is required of organizations with public debt or equity. Some asset owners have no public reporting, while others provide extensive public reporting. For purposes of adopting the Task Force’s recommendations, asset owners should use their existing channels of financial reporting to their beneficiaries and others where relevant and feasible.

TCFD Recommendations, Reporting by Asset Owners (excerpt)

”

Life Insurance Association of Japan members prepare annual disclosure documents based on legislation. The Association has also voluntarily formulated its own Disclosure Standards. Some companies also publish their own CSR and sustainability reports. Thus, if the TCFD recommended information is disclosed within these conventional types of disclosure documents, they can serve as convenient and user-friendly media for everyone.

Which location should be used for disclosures?

The TCFD Recommendations encourage organizations to incorporate climate-related disclosures into mainstream financial reports. However, the TCFD also acknowledges that the circumstances are different in each country.

“ In considering possible reporting venues, the Task Force reviewed existing regimes for climate related disclosures across G20 countries. While many G20 countries have rules or regulatory guidance that require climate-related disclosure for organizations, most are not explicitly focused on climate-related financial information. In addition, the locations of these disclosures vary significantly and range from surveys sent to regulators to sustainability reports to annual financial filings.

The Task Force also reviewed financial filing requirements applicable to public companies across G20 countries and found that in most G20 countries, issuers have a legal obligation to disclose material information in their financial reports—which includes material, climate-related information.

... The Task Force recognizes organizations’ concerns about disclosing information in annual financial filings that is not clearly tied to an assessment of materiality. However, the Task Force believes disclosures related to the Governance and Risk Management recommendations should be provided in annual financial filings. Because climate-related risk is a non-diversifiable risk that affects nearly all sectors, many investors believe it requires special attention.

“Location of Disclosures and Materiality,” TCFD Recommendations (excerpt)

”

Institutional investors also have roles to play in making good use of climate-related information disclosed by companies in which they have invested and/or provided lending, to evaluate and decide on investments and lending and to enhance corporate value through engagement. However, this requires knowledge and know-how to correctly understand climate-related information.

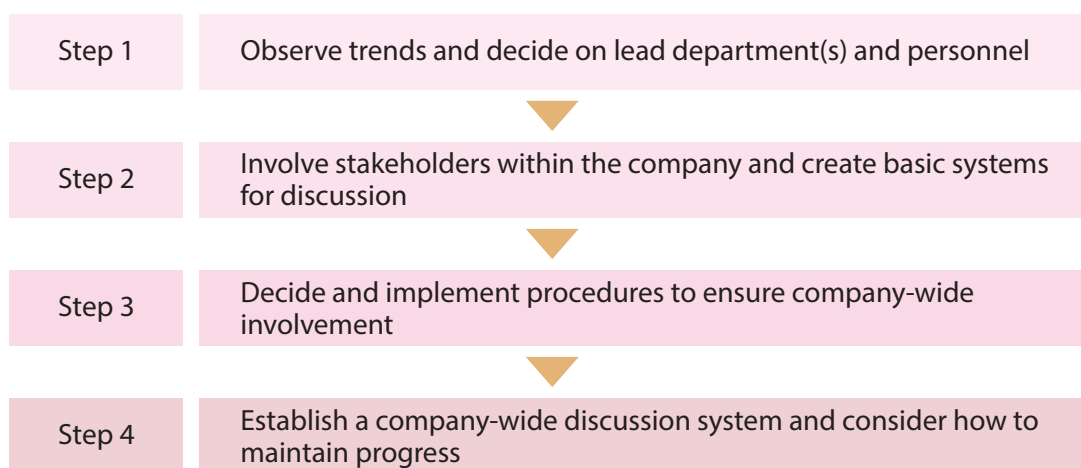
This chapter provides pointers for life insurance companies to consider from their perspective and position as institutional investors, by describing how they can engage in information disclosure, and how the disclosed information can be used.

2 Creating the right internal 'systems

The TCFD Recommendations detail the information that asset owners should disclose as well as important points to note. Below is an introduction to the most important points, as well as a summary of steps to follow starting from how a company can create its own systems to facilitate disclosures.

A company that is not clear about why responses to the TCFD Recommendation are needed and important may have a tendency to lose momentum or abandon its efforts. A clear understanding within the company about the need for these efforts will make it possible to create a system that achieves objectives and ensures continuity of efforts. For this, it is essential to have an understanding of the underlying nature of the issue of climate change.

The following steps can be used to create a system that will sustain efforts to respond to TCFD Recommendations.



Starting on the next page is an outline of what to do at each stage.

Step 1

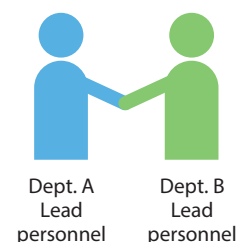
Observe trends and decide on lead department(s) and personnel

Companies gather a variety of information in the course of day-to-day business operations, and in that context, it is important to have someone in the company monitoring trends and developments outside the company as they relate to climate change. There are many sources of information, and with so many types of information it may be daunting to know where to begin.

It helps to begin with actions such as reading information published online by public bodies, attending seminars and other meetings, and so on, on an ongoing basis to find some clue. In the process, it is important to look at information from the perspectives outlined in this Handbook in terms of seeking to understand the kinds of impacts that might affect one's own business.

For this kind of information gathering, the regular approach is to assign responsibility to someone. Because climate change has been traditionally seen as an environmental issue, the information gathering is often handled as part of the duties of the CSR, sustainability, or corporate planning departments.

However, to respond to the TCFD Recommendations the aim is climate-related financial disclosure. Some important aspects will also be related to ESG investment. Therefore, it is desirable to have the department in charge of corporate planning be responsible, in coordination with the asset management department. The lead personnel are in a central role and need to first consider **how to create this collaborative structure**.



Step 2

Involve stakeholders within the company and create basic systems for discussion

Step 2 involves finding more information sources, selecting and gathering the appropriate information, and sharing the information within the company. This work can be tedious and time consuming.

The question of how the lead personnel should communicate this information to the senior

management level is an important topic at this stage. A basic system for consideration needs to be created so that the lead personnel identified in Step 1 are enabled to consider climate-related topics, which also serves to convey the appropriate information to senior management at the appropriate time.

For this, the lead personnel need to digest the climate change-related information they have gathered, identify what is relevant for the company's business, and convey it broadly to other departments in the company. To attract the attention of busy people, **the key is to find ways to point out correlations with their own areas of interest and responsibility**. To do so, it is necessary to create an in-house team to promote TCFD's recommended disclosures, or **a structure to consider basic (initial) responses within the company**, based on the collaborative structure mentioned in Step 1, by attracting the involvement of other relevant departments within the company.

The starting point for information dissemination within the company is likely to be information related to climate change impacts on human health and mortality. Other recent topics include growing media coverage about Europe moving toward a decarbonized society, including divestment campaigns. Other items that could provide important opportunities to attract attention within the company include mainstream media reports, special television programs, declarations and endorsements made by international bodies, and so on.

For example, how should a company view the guidance and policies (e.g., the UN Principles for Responsible Investment) issued by organizations and bodies that are important for the life insurance industry, and how should a company consider its responses to such policies? Such consideration is an important starting point in terms of awareness of issues, particularly among senior management.

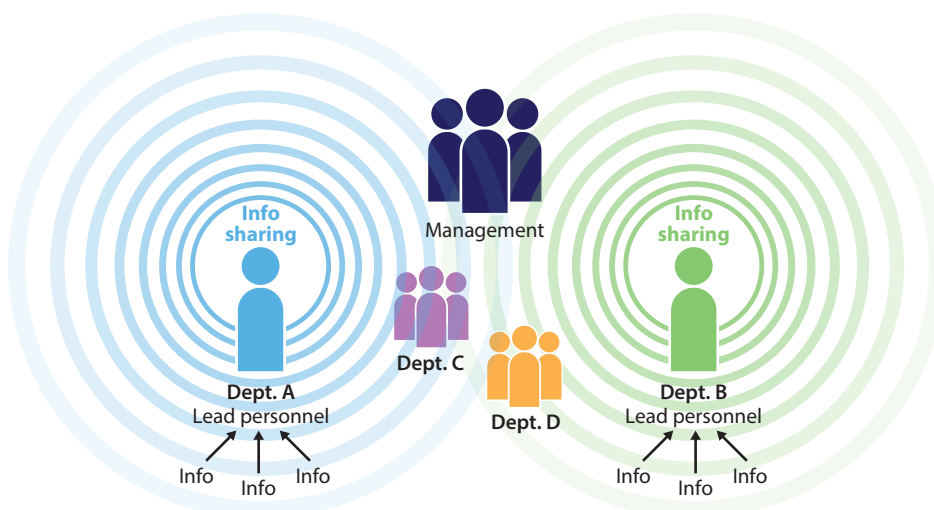
Now it is time to consider which departments should have personnel participating in an in-house team.

Because responses to the TCFD Recommendations are regarded as a corporate management issue and could have impacts on many corporate departments, it is important to create an inclusive and cross-departmental team that cuts across multiple departments within in a company. It is important to consider a team composition and structure that is appropriate for each company’s specific circumstances, but the following aspects, for example, may be useful to consider when establishing a team.

Governance	Corporate planning department, department responsible for sustainability
Strategy	Corporate planning department, asset management department (i.e., in charge of ESG investments)
Risk management	Department responsible for risk management
Metrics and targets	Department responsible for reporting CO ₂ emissions
General information disclosure	Public relations department, investor relations department

As initiatives progress, the following departments might also be considered for future participation in the team.

Insurance products	Product development department (when impacts on insurance payouts become clearer)
Financial statements	Financial statement preparation department (when coverage in financial statements becomes clearer)



Step 3

Decide and implement company-wide procedures to ensure company-wide involvement

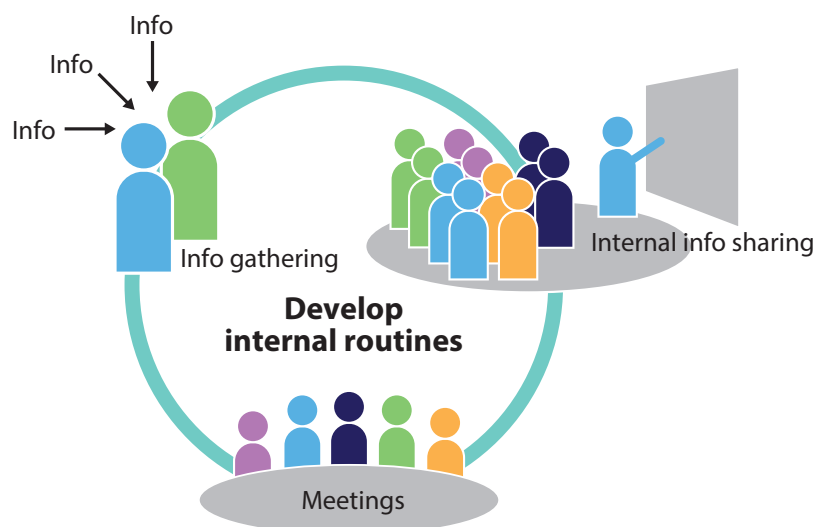
Once the number of interested persons begins to increase in Step 2, the next step is to expand the scope to the entire company. The best way to move ahead at this point—whether to start with senior management or general employees—will likely depend on the company’s distinctive corporate approach and style.

The preference should be to start with senior management, whose role is emphasized in the TCFD Recommendations. To do so, it is important **to discuss among the company’s internal stakeholders what approaches would be most effective for management**. For example, the best opportunity might be a seminar on climate change for all executives jointly held with the board, etc., providing an explanation of current topics and why these themes are important, presented by well-known expert(s). If possible, a series of seminars over the course of half a year would promote deeper understanding.

In many cases the approach of trying to reach senior management may not be easy to achieve. In such cases, the departments that collaborated during Step 1 should discuss matters and choose approaches and means that reach across corporate departments. The themes themselves may be similar to what would have been presented to senior management, but the what is important in this case would be that the content is oriented more toward the practical level.

It is important to go beyond internal responses, and provide concrete information to employees who are responsible for interactions with stakeholders outside the company that arise in the course of business, such as customers and clients, supervisory bodies, asset managers, and/or NGOs, etc. If these employees are **able to see how the issue of climate change can also affect how they do their own day-to-day work**, this awareness can serve as a platform to sustain awareness and action at the practical level.

The key to ensure effectiveness is to **incorporate these kinds of procedures into internal routines and systems** for both senior management and operational staff. Rather than ending with just one seminar, companies are encouraged to create better cycles by circulating new information to constantly promote awareness of the climate implications for day-to-day business, and also to obtain feedback from the senior management and operational staff who are receiving that information.



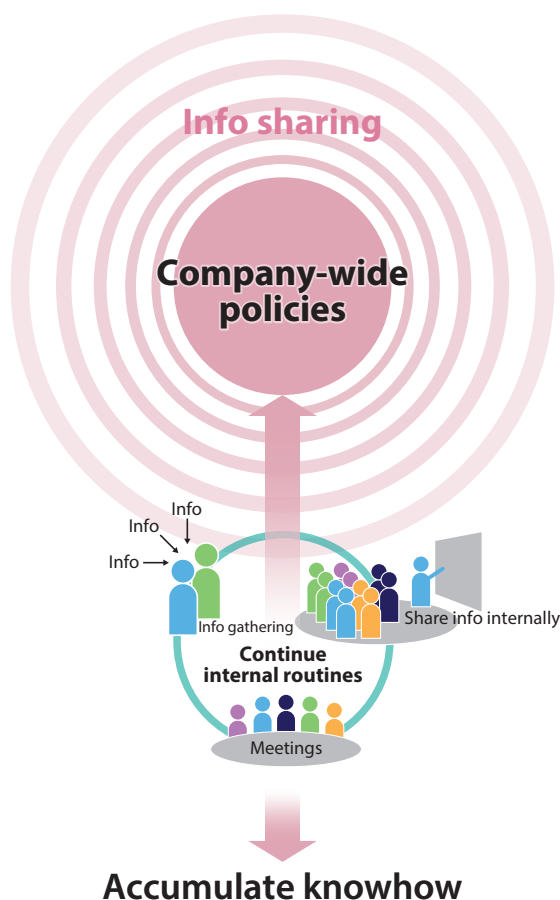
Step 4

Establish a company-wide discussion system and consider how to maintain progress

Having reached this point, the final step is to create a framework to consider these issues at the company-wide level.

Because of the broad impacts of climate change, responses to the TCFD Recommendations could also involve nearly all departments of a company, including management, operations, and risks, etc. Public concern about the issue of climate change has been rising in part due to the increasing levels of damage from extreme weather in recent years. In that context, in order to always discuss what needs to be done based on the latest information, **it is essential to establish frameworks for company-wide discussion and company-wide policies for responses**, beyond the level of the lead personnel identified in Step 1.

For the disclosures being called for by the TCFD Recommendations, companies also need to pay careful attention to create information sharing systems. As efforts are maintained year after year under the systems that have been established, a body of knowhow will be accumulated to advance a company's responses to the TCFD Recommendations in ways that match the company's own distinct circumstances.



3 A company's climate-related disclosures

What kinds of disclosures are expected of life insurance companies?

Below is a description of key points for disclosures that life insurance companies are encouraged to do as institutional investors involved in asset management. This is based on the overview and four pillars of the TCFD Recommendations as introduced in Chapter V. For life insurance companies in particular, the main points here are the same as for institutional investors, because it is considered to be appropriate for them to start with disclosure of items that are in common among all sectors, such as governance, as described above.

Governance

For governance, the same disclosure content is encouraged across all sectors. This includes the supervisory functions of the board, and the role of senior management in assessing and managing climate-related risks and opportunities. In most companies, environment-related initiatives are probably reported in some form to and/or overseen by senior management. Since climate change responses have for a long time been handled as a subset of environmental issues, many companies probably have integrated climate into those processes.

Rather than formalities of procedures, the TCFD Recommendations call on companies to show the actual situation and effectiveness, in terms of whether or not climate-related initiatives are firmly positioned under senior management control and oversight. As shown in Chapter V, governance is one of the important pillars of the foundations of the TCFD Recommendations overall. In that context, the effectiveness of the role played by top management is a key point from the perspective of evaluating the information disclosed.

Note that the parts referring to ESG factors in Japan's Corporate Governance Code (amended in 2018) correspond to the TCFD Recommendations.

“ It has been noted that while the quantitative part of financial statements of Japanese companies conform to a standard format and therefore excel with respect to comparability, non-financial information, such as financial standing, business strategies, risks and ESG (environmental, social and governance) matters, is often boiler-plate and lacking in detail, therefore less valuable. The board should actively commit to ensure that disclosed information, including non-financial information, is as valuable and useful as possible. Japan's Corporate Governance Code (excerpt) ”

Specific examples

Examples of possible initiatives:

- Developing policies
 - Documentation of adopted policies for initiatives on environment and climate change
 - Documentation of adopted policies for initiatives on ESG investment and lending
- Reporting to the board (and top management)
 - Reporting to board of directors regarding responses to climate change issues
 - Can also consider reporting to the board via committees, where a company has an expert committee on sustainability

Strategy

Strategy is a particularly important theme in the TCFD Recommendations, and the use of scenario analysis is also encouraged, but companies often find some themes or topics to be rather bewildering to deal with. Thus, to begin with, below are excerpts from the TCFD Recommendations, from supplemental guidance for asset owners, to highlight some key points for a company to note in terms of disclosure.

Strategy: Recommended disclosure (b)

Describe the impact of climate-related risks and opportunities on the organization’s business, strategy, and financial planning.

● Supplemental guidance for asset owners

Asset owners should describe how climate-related risks and opportunities are factored into relevant investment strategies. This could be described from the perspective of the total fund or investment strategy or individual investment strategies for various asset classes.

Strategy: Recommended disclosure (c)

Describe the resilience of the organization’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

● Supplemental guidance for asset owners

Asset owners that perform scenario analysis should consider providing a discussion of how climate-related scenarios are used, such as to inform investments in specific assets.

When formulating an investment strategy, companies are first encouraged to clarify how they have considered climate-related risks and opportunities with their relevance to individual investment strategies. Also, the fact of whether or not scenarios were used in investment decision-making is listed as an item for disclosure, but this is worded as “consider describing,” so the guidance is not saying that this description is absolutely necessary. This is because of the fact that many companies are not yet using climate-related scenarios in formulating strategies, this involves technical difficulties, and scenario analysis results can also include confidential information directly linked to their business strategies.

Specific examples

Examples of possible initiatives:

- Recognizing climate change risks and opportunities as follows, undertake appropriate risk management, and be more proactive providing green finance to companies that help the transition to a low-carbon society

Opportunities

- Increased opportunities for investment and lending for companies, technologies or projects that contribute to the transition to low carbon

Risks

- In the insurance business, the risk of increased insurance payouts due to extreme weather, and risks from rising disease morbidity and mortality due to the rise in average temperatures.
- In asset management, the risk of impaired value of investment assets due to the transition to a low carbon society.

Risk management

Regarding risk management as well, the TCFD Recommendations provide supplemental guidance for asset owners.

Risk Management: Recommended disclosure (a)

Describe the organization's processes for identifying and assessing climate-related risks.

- Supplemental guidance for asset owners

Asset owners should describe, where appropriate, engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks to improve data availability and asset owners' ability to assess climate-related risks.

Risk Management: Recommended disclosure (b)

Describe the organization processes for managing climate-related risks

- Supplemental guidance for asset owners

Asset owners should describe how they consider the positioning of their total portfolio with respect to the transition to a lower-carbon energy supply, production, and use. This could include explaining how asset owners actively manage their portfolios' positioning in relation to this transition.

Specific examples

Examples of possible initiatives:

- Insurance business
 - Investigation and research into the impacts of changes in the frequency and scale of natural disasters on insurance payments and the medium-to-long-term impacts on morbidity and mortality due to rising average temperatures.
- Asset management
 - Formulation of investment and lending standards/criteria
 - Engagement activities with investees (implement climate change-related dialogue)
 - Analysis of climate change-related impacts on investment and lending assets

“Engagement” and **“portfolios”** are key words that deserve more attention here.

Regarding engagement, as a means of increasing a company's risk assessment capacity, companies should describe what they are doing through engagement to encourage disclosure and actions by companies in which they are investing. Regarding portfolios, companies should describe how in particular their own portfolios are exposed to transition risks, and how they are managing those risks.

Both are important points for institutional investors to show how they are reaching out to the companies they invest in. These points are important particularly for institutional investors to consider, in combination with the items of how to evaluate the disclosures from the companies in which they invest, as described further below.

Metrics and targets

The TCFD Recommendations provide the following items in supplemental guidance for asset owners relating to metrics and targets.

Metrics and targets: 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.

● Supplemental guidance for asset owners

Asset owners should describe metrics used to assess climate-related risks and opportunities in each fund or investment strategy. Where relevant, asset owners should also describe how these metrics have changed over time.

Where appropriate, asset owners should provide metrics considered in investment decisions and monitoring.

Metrics and targets: Recommended disclosure (b)

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

● Supplemental guidance for asset owners

Asset owners should provide the weighted average carbon intensity, where data are available or can be reasonably estimated, for each fund or investment strategy.

In addition, asset owners should provide other metrics they believe are useful for decision making along with a description of the methodology used.

Specific examples

Examples of possible initiatives:

- Disclosure of CO₂ emissions associated with business activities (this refers to disclosure of emissions associated with overall business as a life insurance company)

The TCFD Recommendations say that asset owners should state specifically what data and metrics they used for their decision making, including the formulation of strategies. Regarding (b) above, the Recommendations provide a table with reference information relating to common carbon footprinting and exposure metrics, including weighted average carbon intensity.

However, the TCFD acknowledges that currently there are various constraints involved. For example, due to the challenges and limitations of current carbon footprinting metrics, as well as difficulties with data availability and methodologies, that the TCFD mentions that asset owners may not be able to adequately report weighted average carbon intensity for all of their investments.

As explained in Chapter VI, there are still not many examples of information disclosure in line with the TCFD Recommendations. From the reports compiled by the TCFD regarding the state of initiatives around the world, one can see that companies are making various attempts to move ahead as they deal with various challenges.

TCFD disclosures are also expanding gradually in the financial industry. The contents that should be written in disclosure documents are in principle determined in accordance with each company's initiatives, but readers are encouraged to refer to the examples of other companies shown in Chapter VI (pages 42 to 26).

The following Japanese life insurance companies are conducting disclosures in line with the TCFD's recommended disclosures (as of September 30, 2019).

Examples of disclosures (alphabetical order)

- Dai-ichi Life Holdings: Annual Report 2019
- Nippon Life Insurance Company: Nissay Annual Report 2019 (Integrated Report)

4 Evaluation of climate-related information disclosed by investee companies

What is the preferred/desirable way to evaluate company responses to TCFD?

The TCFD Recommendations provide a framework for the financial sector to appropriately evaluate the impacts of climate change, which is one of the biggest risks facing companies. Using information disclosed by investee companies in line with the TCFD Recommendations, life insurance companies—which are institutional investors—can decrease their own portfolio risk, appropriately evaluate the companies in which they have invested and provided lending, and through engagement, enhance their medium and long-term corporate value.

“Appropriately evaluate” does not simply mean verifying the correctness and accuracy of information disclosed. It means evaluating—in the context of what the company does as its core business, and in terms of its CSR activities—the extent to which the company is properly understanding its climate-related risks and hedging against them, and also, whether it is taking advantage of opportunities and creating successes.

By examining disclosures that are compliant with the TCFD Recommendations it becomes easier to compare multiple companies in the same industry. Companies that are doing a good job of responding to climate change will probably be viewed as more desirable investments and borrowers. Companies that are not doing so well in that regard can be encouraged to try harder, through engagement and dialog. If as a result the ratings and corporate value of those companies increase, the ultimate result will be an increase in the returns of institutional investors.

For things to work this way, one requirement is that **the party doing the evaluating must properly understand the impacts of climate change on the companies and industries where the investments are placed**. Of course, an enormous amount of information can be gleaned from reports and disclosures from companies, but the disclosing companies might not necessarily be able to disclose every bit of information.

The personnel responsible for evaluating disclosures are encouraged to deepen their understanding of individual companies and industries, while drawing on the characteristics of climate change impacts in each industry (Chapter 2) and the examples of leading companies conducting proactive disclosure (Chapter VI).

Useful information online

Scientific information on climate change

- Intergovernmental Panel on Climate Change (IPCC)
 - IPCC (English)
<https://www.ipcc.ch/>
 - IPCC-related information from Ministry of the Environment (Japan)
<http://www.env.go.jp/earth/ondanka/ipccinfo/>
 - National Institute for Environmental Studies, Center for Global Environmental Studies (information on climate change, in Japanese)
http://www.cger.nies.go.jp/ja/library/qa/qa_index-j.html
 - Climate Change Adaptation Information Platform
<http://www.adaptation-platform.nies.go.jp/index.html>

International climate change negotiations, Japanese policy, etc.

- United Nations Framework Convention on Climate Change (UNFCCC)
 - Ministry of the Foreign Affairs: Outline of UNFCCC (in Japanese)
https://www.mofa.go.jp/mofaj/gaiko/kankyo/jyoyaku/clm_cnv.html
 - UNFCCC (English)
<https://unfccc.int/>
- Paris Agreement
 - Ministry of Foreign Affairs: International history leading to the historic Paris Agreement (Japanese)
<https://www.mofa.go.jp/mofaj/press/pr/wakaru/topics/vol150/index.html>
 - Ministry of the Environment: Basic documents on the Paris Agreement (Japanese)
<http://www.env.go.jp/earth/ondanka/cop/shiryo.html>
- Financial Services Agency
 - Financial Authorities and SDGs (Japanese)
https://www.fsa.go.jp/policy/sdgs/FSAStrategyforSDGs_2018.html
- Ministry of Economy, Trade and Industry
 - Trends in Climate Change-related Disclosures (Japanese)
https://www.meti.go.jp/policy/energy_environment/global_warming/disclosure.html
- Ministry of the Environment
 - Scenario analysis support project for climate risks and opportunities in line with TCFD (Japanese)
<https://www.env.go.jp/press/107168.html>

Major frameworks and activities responding to climate change

- TCFD
 - Task Force on Climate-related Financial Disclosures (English)
<https://www.fsb-tcf.org/>
 - TCFD Recommendations downloads (English)
<https://www.fsb-tcf.org/publications/final-recommendations-report/>
* Japanese version of the Recommendations is available from the above site.
 - TCFD Consortium
<https://tcfcd-consortium.jp/>
 - TCFD Summit
<https://tcfcd-summit.org/>
- PRI
 - Principles for Responsible Investment (English)
<https://www.unpri.org/>
- CDP
 - CDP (English)
<https://www.cdp.net/ja/>

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Life Insurance Association of Japan

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