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MS&AD

INSURANCE GROUP

FY2021 First Thematic Meeting

MS&AD Initiatives for Climate Change

September 13, 2021 (Mon)

**Sustainability Section, Corporate Planning Dept.
Group-ERM Section and Group Actuarial Section,
Corporate Risk Management Dept.**

1. Climate-Related Management Systems and Initiatives toward Net Zero

2. Scenario Analysis and Risk Management

Main Points—According to the TCFD Report—

Governance	:	Climate-Related Management Systems
Strategy	:	Initiatives Regarding Risks & Opportunities and Scenario Analyses
Risk Management	:	Risk Management Methods
Metrics and Targets	:	Metrics and Targets for Initiatives

Today's Presenters



Yasumasa Kanie

Manager,
Sustainability Section,
Corporate Planning Dept.
MS&AD Holdings

In charge of sustainability initiatives including climate change. A member of insurance TCFD pilot project of UNEP FI “United Nations Environment Programme Finance Initiative”.



Ryotaro Katayama

Head of
Group-ERM Section,
Corporate Risk Management Dept.
MS&AD Holdings

In charge of planning for the direction of the risk management and selection of important risks of MS&AD Group

In addition, takes a role of ERM enhancement in cooperation with corporate planning dept. of the company.



Hidekatsu Okubo

Head of
Group Actuarial Section,
Corporate Risk Management Dept.
MS&AD Holdings

In charge of actuarial calculation of risk amount and development of risk models for the actuarial calculation

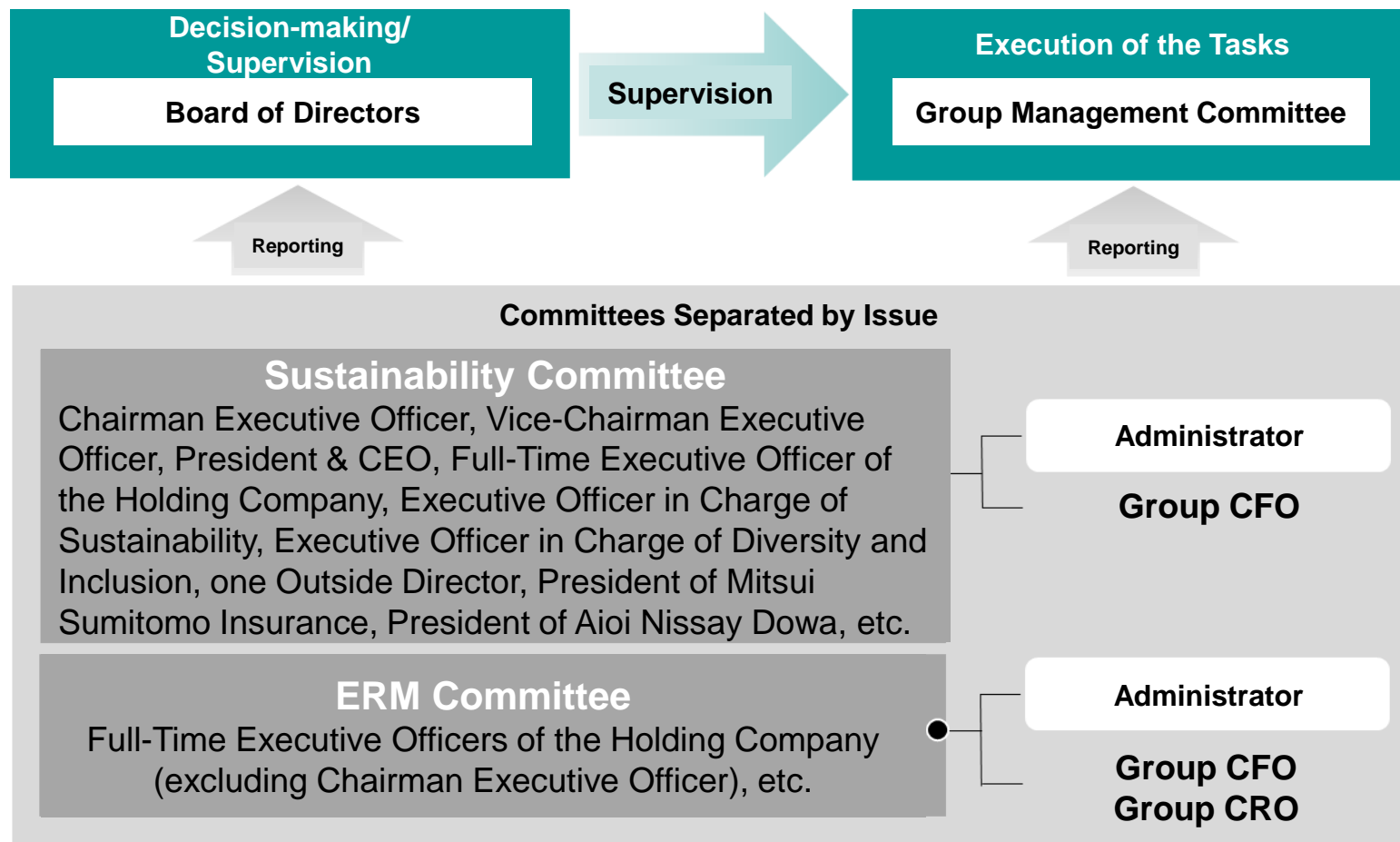
Promotes initiatives for enhancing knowledge regarding climate change and sophistication of risk model mainly for physical risks.

1. Climate-Related Management Systems and Initiatives toward Net Zero

Yasumasa Kanie
Manager,
Sustainability Section,
Corporate Planning Dept.
MS&AD Holdings

Governance: Climate-Related Management Systems

Governance Structure of Board of Directors, Group Management Committee, and Committees Separated by Issue



Physical Risks, Transition Risks, and Their Impact on the Group

Classification		Example	Risk Examples in our Business Activities
Physical risks	Acute	Typhoons, floods, storm surges, heavy rains and wildfires	Deterioration in income and expenditure due to the intensification of natural disasters, etc., and an increase in capital costs due to an increase in profit volatility
	Chronic	Rising sea levels and temperatures Changes in weather such as low rainfall and drought Decrease in supply of water and other resources Changes in the habitat of infectious disease vectors Increase in heat stroke	
Transition risks	Policy and Legal	Rise in carbon prices Strengthening environmental regulations and standards Change in energy composition Rising number of climate-related litigation cases	Decline in investment returns caused by deterioration in the performance of investee companies due to an increase in carbon costs
	Technology	Progress in decarbonization technology Changes in industrial structure due to a decrease in demand for low-carbon efficient products	Reduced earnings due to inability to capture changing markets due to decarbonization
	Market	Changes in supply and demand for goods and services	
	Reputation	Criticism of delayed response to climate change	Decreased reputation due to inadequate information disclosure and/or delayed response to climate change

Climate-Related Opportunities and Their Impact on the Group

Classification	Examples	Opportunity Example in our Business Activities
Resource Efficiency	Modal shift Efficient production and distribution Building efficiency improvement. Relocation to high-efficiency buildings Reduction of water usage and consumption Spread of recycling	<ul style="list-style-type: none"> • Increase in compensation needs due to electrification of mobility, AI of building equipment, etc.
Energy source	Conversion to renewable energy and low-emission energy Utilization of policies and incentives to support climate change measures Use of new technology Utilization of the carbon market	
Products and Services	Development and expansion of low-carbon products and services Adapting to the impacts of evolving climate change Development of new products and services through R & D and innovation Diversification of business activities changes in consumer preferences	<ul style="list-style-type: none"> • Increasing new insurance coverage needs due to changes of clients' business • Increasing consulting needs for decarbonization and disaster prevention/mitigation • Expanding Markets for Climate Change (Disclosure of information, Response to regulations, Provision of mitigation and adaptation measures, etc.)
Markets	Expansion of new and emerging markets Occurrence of assets requiring new financial services	
Resilience	Improving Capacity to Adapt to Climate Change	<ul style="list-style-type: none"> • Increasing needs for disaster prevention and mitigation

Group Initiatives that Take into Consideration Risks and Opportunities

(Adaptation Initiatives)

Provision of services to eliminate and reduce damages and losses associated with the climate

Case Studies: **Supporting climate change risk assessment analysis**
Start of Digital Surveys for Flood Disasters

(Mitigation Initiatives)

We announced our goal to reach "net zero carbon emissions by 2050," and work with our stakeholders to contribute to transition to a decarbonized society

- **Group CO2 reduction initiatives**

Emissions reduction targets by emission sources, and renewable energy usage ratio targets for 2030 and 2050

- **CO2 reduction initiatives throughout the value chain**

"Carbon neutral support special clause " covering extra expenses for reduction of CO2 emissions.

- **CO2 reduction utilizing natural capital**

Tropical rain forest restoration projects in Indonesia
Tree planting activities in Bihoro-cho, Hokkaido

- **Practicing "business activities that take sustainability into consideration"**

Restriction of insurance underwriting and investment in new coal-fired power
ESG themed investments premised on profitability

Case Study

Supporting climate change risk assessment analysis

Support services realized in collaboration with Jupiter Intelligence, an expert in climate modeling

Number of Analysis conducted by Jupiter ; 6,110 locations

(July/2020 - June/2021)

- Corporations can know loss impacts on factories and offices from natural catastrophes in advance.
- Strengthening capability to cope with huge accumulated risks by natural catastrophes
- Financial institutions can know risks on investment portfolios.
- Enabling high level business decision making (locations/ selecting suppliers/ revision of portfolios/ disaster prevention etc.) which leads to whole social resilience.

- A Japanese major financial institution adopts this highly reputable service.

Flood disaster digital survey

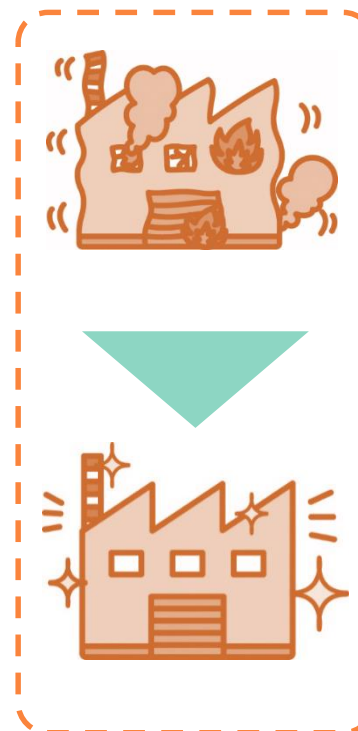
Early damage assessments and appropriate adjustment of claims are made possible even after large-scale flood disasters by the utilization of AI drones and chatbots.



<球磨川流域の撮影の様子>

Carbon neutral support special agreement

During recovery from damages, compensation for additional costs, such as equipment that will lead to reduced CO2 emissions, will be provided



(Examples of decarbonization measures)

- Adding functionality to reuse heat energy emitted by production equipment.
- Installing solar power generating equipment on rooftops.

Metrics and Targets

Metrics pertaining to risks and opportunities

- Product development and revisions, etc. are set as monitoring indicators, and are reflected in performance-based director compensation
- Metrics for natural catastrophe risk levels for insurance underwriting = Risk levels of risks that occur once every 200 years

Environmental burden reduction targets

<CO2 emission reduction target (Scope 1 + Scope 2)>

Base Year	Target Year	Reduction rate
FY2019	FY2030	▲50%
	FY2050	Net Zero

<CO2 emission reduction target (Scope 3)>

Base Year	Target Year	Reduction rate	Target Categories
FY2019	FY2030	▲50%	1, 3, 5, 7, 13
	FY2050	Net Zero	All Categories

<Renewable Energy Usage Ratio>

Target Year	Renewable Energy Usage Ratio
FY2030	60%
FY2050	100%

2. Scenario Analysis and Risk Management

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MS&AD Holdings

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Scenario Analysis: Physical Risks

(Insurance underwriting scenario analysis (physical risk analysis))

Background

- ✓ Forward-looking scenario analysis that look into the effects of climate change on insurance underwriting is a new challenge for the insurance industry, and the United Nations Environment Programme Finance Initiative (UNEP FI) has established a project to consider analytical methods.
- ✓ Over 20 insurance companies that signed to the Principles for Sustainable Insurance (PSI), including our group, participated in the project, and worked on developing scenario analysis methods (analytical evaluation tools) in some groups of climate change impacts.

<Results of our Group's Analysis Using Analytical Evaluation Tools Developed in the UNEP FI Project>

Target Domestic non-life insurance losses due to typhoons (fire, marine, personal accident, auto and etc.)

• Changes to typhoons themselves

Changes to typhoons	Scenarios	Point in time	Insured losses
Changes to "intensity"	4°C scenario	2050	Approximately + 5% to approximately + 50%
Changes to "frequency"	Same as above	Same as above	Approximately ▲30% to approximately + 28%

(Note) The UNEP FI Project developed analytical evaluation tools focusing on the 4°C scenario (RCP8.5) in 2050, placed emphasis on changes to the "intensity" and "frequency" of typhoons themselves caused by climate change, referring to the research by Knutson et al. (2020).

• Changes to storm surges caused by typhoons

Changes caused by typhoons	Scenarios	Point in time	Insured losses
Changes to "storm surges"	2°C scenario 4°C scenario	2030 2050	Only around a few percent

(Note) The UNEP FI Project developed analytical evaluation tools pertaining to changes to storm surges caused by typhoons, with reference to a tool (Aqueduct Flood) developed by the World Resources Institute (WRI) to evaluate storm surge damage and other factors, focusing on the 2°C (RCP4.5) and 4°C (RCP8.5) scenarios in 2030 and 2050.

Scenario Analysis: Physical Risks

(Insurance underwriting scenario analysis (physical risk analysis))

Supplementary information: UNEP FI Insurance Pilot Project

- ✓ Project that UNEP FI (United Nations Environmental Programme Financial Initiative), a partnership between the UNEP, an auxiliary organ of the United Nations, and various banks, insurance companies, and securities companies, etc. throughout the world, led with the aim to develop consistent and transparent methods pertaining to the "Analysis using Future Climate-related Scenarios (Scenario Analysis)" sought by the TCFD.
- ✓ 22 insurance companies from around the world, including our group, participated in the Project, and published a report summarizing the results of their investigations in January 2021.
- ✓ The Report contains scenario analysis methods for the following physical risks and transitional risks.
 - Physical risks: "Typhoons, hurricanes," "river flooding," "coastal flooding"
 - Transitional risks: "Energy shifts," "stronger building regulations"
- ✓ Our company participated as a founding member of the Project, and participated in investigations into "typhoon" scenario analyses.
- ✓ The "typhoon" scenario analysis tool was developed with reference to disclosed information pertaining to research results on the impact of climate change on intensity and occurrence frequency (Knutson et al., 2020), and tools to evaluate storm surge damage, other factors as developed by the World Resources Institute (WRI), and other matters.

Scenario Analysis : Physical Risks

(Scenario Analysis of Insurance Underwriting (physical risk analysis))

Supplementary information: Further Risk Management on Climate Change

- ✓ Our Group manages natural catastrophe risk by taking into consideration various factors (scale, frequency, wind speeds, etc.). We will continue investigating methods to evaluate the effects of climate change, such as typhoons and floods, while referring to analysis methods based on the UNEP FI Project.

Enhancing Knowledge

- ✓ Based on scientific knowledge such as reports by the Intergovernmental Panel on Climate Change (IPCC) and other academic research, we are continuing our investigations into the effects of climate change on physical risks.
- ✓ Through partnerships with external research institutions ,such as universities, we are working to acquire and enhance our scientific knowledge and knowhow.

Advanced Analyses

- ✓ Efforts are being made to refine the scenario analysis that reflects the effects of climate change by utilizing knowledge from inside and outside the Group, such as the estimation of insurance losses assuming the reoccurrence of past natural disasters under future climate.
- ✓ Changes in the frequency and scale of typhoons and floods caused by climate change are quantitatively analyzed, and a natural catastrophe risk model reflecting the effects of climate change is being studied.

Scenario Analysis : Transition Risks

(Investment Scenario Analysis (Transition Risk Analysis))

Background

- ✓ "Carbon pricing," which assesses the costs associated with greenhouse gas emission volumes, is being introduced around the world as a policy for reducing greenhouse gas emissions, and this policy could indicate the risk of increased carbon cost burdens to companies.
- ✓ Using Trucost's analytical tools, which analyze environmental data and climate change risks, starting with carbon emission volumes, we are calculating to what degree investee companies presently have the ability to pay the future carbon costs they would need to bear (carbon earnings at risk (EBIT at risk)).

<Results of Our Group's Analysis Using Analytical Evaluation Tools>

Target

Stocks (covers approximately 99% of domestic listed stocks managed by the company on a market value basis) and bonds (also covers approximately 56% of domestic and foreign bonds managed by the company (including portions with outsourced management) for our Group in our investment portfolio as of the end of March 2020

● MS&AD Group carbon earnings at risk (EBIT at risk)

Stocks		Low scenario	Middle scenario	High scenario
	2030	4.66%	9.23%	20.29%
	2040	7.54%	14.66%	30.54%
	2050	8.81%	34.68%	34.68%
Corporate Bonds		Low scenario	Middle scenario	High scenario
	2030	9.33%	16.89%	34.96%
	2040	14.28%	25.28%	51.03%
	2050	16.28%	57.44%	57.44%

(Note) TCFD recommends investment impact analysis based on various different scenarios, including scenarios that involve warming of 2°C or less. Based on this recommendation, we conduct our analysis based on 3 different scenarios.

- (1) Low Scenario: Each nation voluntarily implements their own targets, but global temperature increase reaches around 3°C,
- (2) Middle Scenario: Long-term administrative policies are enacted to keep global temperature increase to 2°C, but short-term administrative policy implementation is expected to be delayed
- (3) High Scenario: Administrative measures are implemented that are sufficient to be in line with international targets (Paris Agreement) of keeping temperature increase to less than 2°C by 2100

Scenario Analysis : Transition Risks

(Investment Scenario Analysis (Transition Risk Analysis))

Supplementary Information: Carbon earnings at risk (EBIT at risk)

- ✓ Carbon earnings at risk (EBIT at risk) is the unpriced cost of carbon (UCC) divided by earnings before interest and taxes (EBIT) for each scenario, and demonstrates the financial impact of each scenario on investment portfolios.

$$\text{Carbon Earnings at Risk (EBIT at Risk)} = \sum \text{Investment weight } w_i \times \frac{\text{Unpriced cost of carbon } UCC_i}{\text{Corporate profits } EBIT_i}$$

- ✓ Average values for corporate profits over the past 3 years are used in order to mitigate fluctuations in financial performance. As for greenhouse gas emission volumes, the targets are scope 1, which encompass gases directly emitted by investee companies, and scope 2, which encompasses indirect emissions resulting from the use of electricity and gas.
- ✓ In the high-level and mid-level scenarios, which involve the implementation of particularly major administrative measures, carbon cost burdens will be particularly high, meaning that carbon earnings at risk (EBIT at risk) values will be more significant, and transitional risks will also grow more significant.

Indicator: Greenhouse Gas (GHG) Emission for Investee Companies

- Greenhouse gas (GHG) emission for investee companies**

- ✓ The carbon footprints (CO2 equivalent of greenhouse gases emitted from business activities) of investee companies are as indicated in the following chart.

Target	Stocks (covers approximately 99% of domestic listed stocks managed by the company on a market value basis) and bonds (also covers approximately 56% of domestic and foreign bonds managed by the company (including portions with outsourced management) for our Group in our investment portfolio as of the end of March 2020
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(Units: t-CO2e)

As of the end of March 2020	Stocks	Japanese corporate bonds
Scope 1 + Scope 2	2,717,033	3,518,615

(Note) When there is no information disclosed by investees or usable disclosed information available, a tool developed by Trucost is used to calculate greenhouse gas emission volumes via a unique approach based on modeling, and values are calculated for scope 1 and scope 2.

- Weighted average carbon intensity (WACI) of investees**

- ✓ Weighted average carbon intensity (WACI) is used as an indicator for measuring the carbon intensity of portfolio holdings.

Target	Same as above
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(Units: t-CO2e/1 million USD)

As of the end of March 2020	Stocks	Japanese corporate Bonds
Scope 1 + Scope 2	121.45	205.06

(Note) Scope 1 and scope 2 are calculated using the Trucost tool.

Supplementary information: Weighted average carbon intensity (WACI)

- ✓ The weighted average carbon intensity (WACI) is the carbon intensity obtained when taking the weighted average of the "CO2 emissions to sales ratio" as obtained in accordance with the ownership ratio over each company in the portfolio holdings.

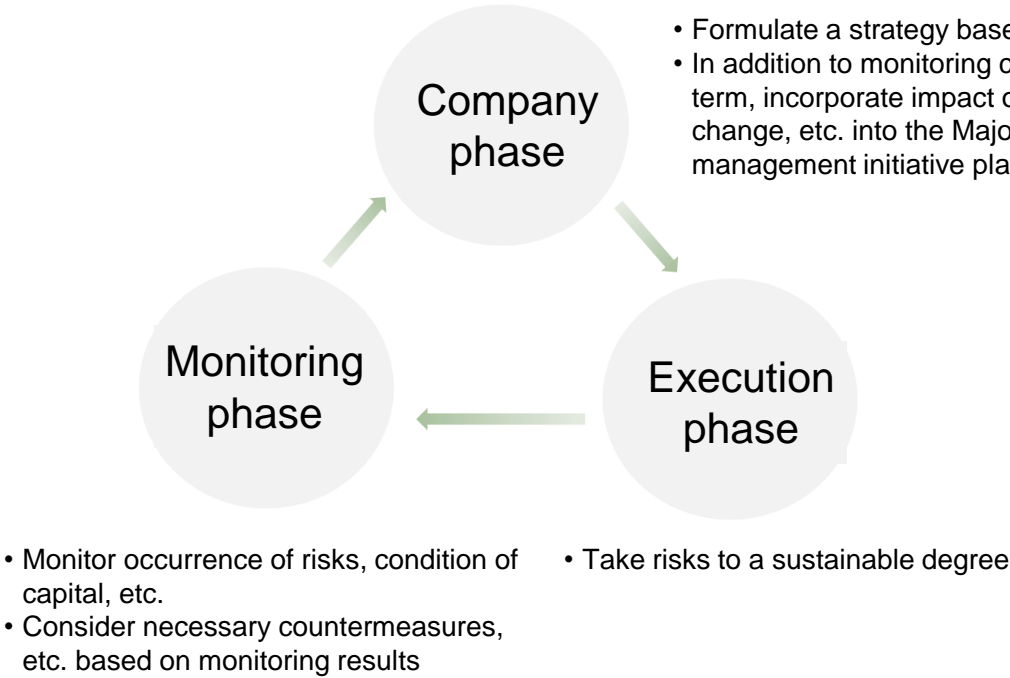
$$\text{Weighted average carbon intensity (WACI)} = \sum \text{Investment weight } w_i \times \frac{\text{Company CO2 emissions}}{\text{Company sales}}$$

Risk Management

- **ERM cycle**

- ✓ Based on the MS & AD Insurance Group Risk Appetite Policy, our group has determined to clarify the amount of risk that can be held under normal conditions and to take risks based on its capital policy in order to realize its management vision. We develop a medium-term management plan for the Group that is in line with our Risk Appetite Policy. Also, we aim to ensure soundness and improve capital efficiency and RoR based on the ERM cycle.

Underwriting risk	We are working to advance growth strategies and assertively take on risks, while also striving to set appropriate insurance conditions, appropriately control natural catastrophe risks, and expand our returns.
Asset management risk	We strive to implement comprehensive asset and liability management that takes into account the characteristics of liabilities, and the reduction of strategic equity holdings, and to expand our returns while securing the soundness and liquidity of assets.



**Supplementary information:
Natural catastrophe risks**

In accordance with the Group Risk Appetite Policy and the Group Guidelines, we work to appropriately control natural catastrophe risks as a Group, and strive to limit domestic wind and flood risk amount and US wind and flood risk amount.

Group Important Risks and Key Scenarios Associated with Climate Change

• Managing climate change risk

- ✓ Our group has formulated a Management Action Plan to identify risks that should be managed by management as "Group Important Risks." Climate change is managed as a Group Important Risk. Specifically, since climate change is a risk event that affects many of the Group's important risks, such as the occurrence of a large-scale natural disaster, the Group associates climate change with other Group important risks as shown in the table below, establishes and manages "Major Assumptions Scenarios" due to climate change, and conducts regular monitoring over the medium to long term.

Group Important Risks Related to Climate Change	
	Key scenarios associated with climate change
Occurrence of large-scale natural disasters	Changes in Probability of Occurrence, Size, etc., Affected by Climate Change
Significant fluctuations in the financial market	Decline in the value of our group's assets due to the materialization of transition risks associated with corporate responses to climate change (Strengthen environment-related policies and regulations, advance decarbonization technologies, increase in lawsuits, etc.)
Significant increase in credit risk	
Occurrence of acts that lead to significant damage to the corporate value of the Group or loss of social credibility	Deterioration in reputation due to delays in responding to climate change and discrepancies between public announcements and activities
Frequent system failures, serious system failures, delays in development plans for large-scale systems, delays in achievement, budget overruns, and unrealized expected effects	Stagnation of operations due to damage to system-related facilities caused by large-scale natural disasters
Outbreaks of new influenza and other infectious diseases	Spread of affected areas due to global warming and climate change
Changes in the insurance market	Significant changes in the market size of specific industries due to technological innovation in response to climate change

Management and Control of Natural Catastrophe Risks

● Management of natural catastrophe risks

- ✓ With respect to domestic wind and flood risk levels and US wind and flood risk levels, we are managing natural catastrophe risks by setting the maximum risk levels (risk limits) for the Group and for each company, using the levels of risks that occur once every 200 years as a basis.
- ✓ In addition to natural catastrophe risk measurement and large-scale natural disaster stress tests, we are working on incorporating the effects of climate change into stress tests, and advancing considerations of methods to quantify the effects of climate change.

Examples of Stress Tests

We are conducting tests that anticipate even greater stresses, such as "continuous occurrences of typhoons" and "floods of multiple rivers," and calculations anticipating the effects of long-term climate change on "domestic typhoons," "domestic flood disasters," and "North American hurricanes."

Management of Natural Catastrophe Risks Overseas

We calculate risk levels by region and by peril, and conduct management of accumulated risk on a global level. For example, at MS Amlin, they have reduced net risk levels of natural catastrophes by approximately 30% in 2 years. With respect to US wind and flood disaster risks, which are the largest forms of risk among natural catastrophe risks overseas, risk limits have been set for the Group and for each company.

● Controlling levels of retained natural catastrophe risk

- ✓ We statistically evaluate the level of risk we take on both by geography and by disaster type. Based on this evaluation, we strive to conduct appropriate insurance underwriting, acquire reinsurance and issue catastrophe bonds, and accumulate catastrophe loss reserves. Through these measures, we are working to improve financial soundness throughout the Group, and reduce the risk of fluctuations in profit and loss during a given period.

Initiatives Pertaining to Reducing Risk of Fluctuations in Profit and Loss

With respect to domestic natural disasters, in addition to reinsurance by Mitsui Sumitomo Insurance and Aioi Nissay Dowa Insurance Co. respectively, we have secured joint reinsurance for both companies that targets their total, annual cumulative damage amounts. This has functioned effectively with respect to domestic natural disaster occurrences in 2019 and 2020, and in 2021 we have secured reinsurance possessing a similar function, and are reducing risks of fluctuations in profit and loss.

Thank you for your attention.