



# For All Generations

## 2022 ESG REPORT

Government Pension Investment Fund

GPIF Homepage



GPIF YouTube channel



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# For All Generations

GPIF is committed to fulfilling our fiduciary duty to secure adequate retirement funds for both current and future beneficiaries.

GPIF promotes ESG based on the concept of securing long term “economic benefits” for the pension beneficiaries by reducing negative environmental and social externalities in the capital market.

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# GPIF in Numbers

## Policy Asset Mix

Equities 50% (±11%)		Bonds 50% (±11%)	
Domestic equities 24.49% 25% (±8%)	Foreign equities 24.32% 25% (±7%)	Domestic bonds 26.79% 25% (±7%)	Foreign bonds 24.39% 25% (±6%)

## Proportions of Passive and Active Investment



## Universal Owner

Asset size **¥200.1** trillion

## ESG Investment

ESG integration **¥200.1** trillion

## Number of GPIF-owned securities

Equities **5,678** stocks

Assets under management tracking ESG indexes Approx. **¥12.5** trillion

Bonds **18,254** bonds

Investments in green bonds, etc. Approx. **¥1.9** trillion

Investment time horizon **100** years

## Number of Employees<sup>1</sup>

Employees **160**

## Specialist Personnel<sup>2</sup>

Securities analysts	<b>59</b>	CPAs	<b>3</b>
Lawyers	<b>3</b>	Real estate appraisers	<b>3</b>
Tax accountants	<b>1</b>	MBA graduates, etc.	<b>20</b>
		Ph.D. graduates, etc.	<b>3</b>

## Long-term Investment Performance

Cumulative returns **¥108.4** trillion  
(FY2001 - FY2022)

Rate of return **35.9%**  
(FY2001 - FY2022)

## External Ratings

Assessment by PRI<sup>3</sup> **★★★★**  
(as of March 31, 2023)

Responsible Asset Allocator Initiative (RAAI) ranking<sup>4</sup> **Leaders**  
The 30 Most Responsible Asset Allocators

<sup>1</sup> Employees: As of April 1, 2023 (excluding temporary staff)

<sup>2</sup> Specialist personnel: As of April 1, 2023 (some personnel are counted in more than one category)

<sup>3</sup> Assessment by PRI: Number of stars from Investment & Stewardship Policy assessment

<sup>4</sup> Every two years, the American think tank New America analyzes sovereign wealth funds and pension funds on their responsible investing practices based on the Responsible Asset Allocator Initiative (RAAI) index, developed in partnership with the Fletcher School at Tufts University.

# ESG Investment at GPIF

While investors have traditionally used cash flows, profit margins and other quantitative financial data to evaluate companies, “ESG investment” also takes non-financial ESG factors into consideration. ESG investment is expected to improve long-term risk-adjusted returns by incorporating environmental, social, and corporate governance perspectives into investment decisions.

## Why Does GPIF Focus on ESG?

GPIF can be described as a “universal owner”; that is, an investor with a substantial level of assets under management that invests in securities spanning the entire world capital market. GPIF can also be characterized as a “cross-generational investor”, managing assets from a perspective spanning multiple generations. Sustainable corporate value creation by each investee company and the sustainable, stable growth of the entire capital market is critical for GPIF – a universal owner and cross-generational investor – to achieve stable income over the long run.

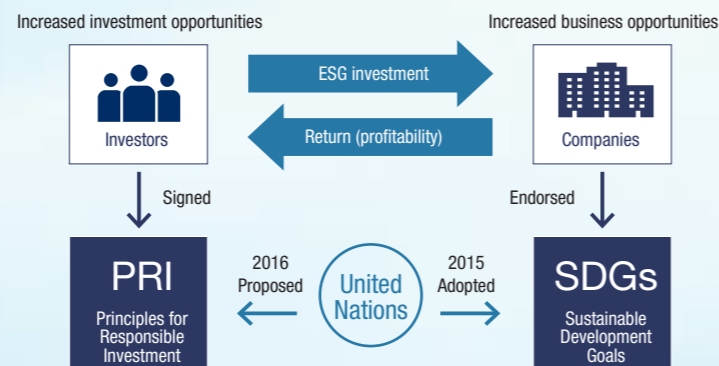
For example, if the share prices of some portfolio companies increase as a result of conducting business activities without paying attention to their adverse impacts on the environment and society for the sake of short-term revenue growth, society and the economy as a whole, including other companies, are negatively affected by such activities. Consequently, the overall portfolio of the universal owner will be significantly impaired. In other words, reducing negative externalities to maintain a sustainable capital market and society is vital for maintaining profitability of the portfolio. This “universal ownership” approach of actively working to curb these kinds of negative externalities lies at the core of GPIF’s ESG investment.

We have published a video explaining this content in simple terms on GPIF’s YouTube page (only available in Japanese).

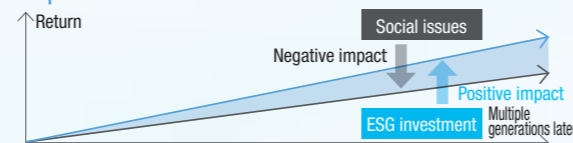


## The Relationship Between ESG and the SDGs

The SDGs (Sustainable Development Goals) are international goals set forth by the United Nations in the “2030 Agenda for Sustainable Development” adopted at the UN Summit in September 2015. The SDGs evolved from the Millennium Development Goals formulated by the UN in 2001 and are targeted for achievement by 2030. They comprise 17 goals aimed at realizing a diverse, inclusive, and sustainable society. Although the ESG issues considered in ESG investment and those of the goals and targets of the SDGs may have different objectives, they also have much in common, and addressing the former also contributes to achieving the latter. We believe that an active commitment to the SDGs and ESG by companies would help to improve their corporate value (ESG investment), while at the same time, the realization of a sustainable economy and society (achieving the SDGs) would lead to better return for all assets managed by GPIF over the long term.



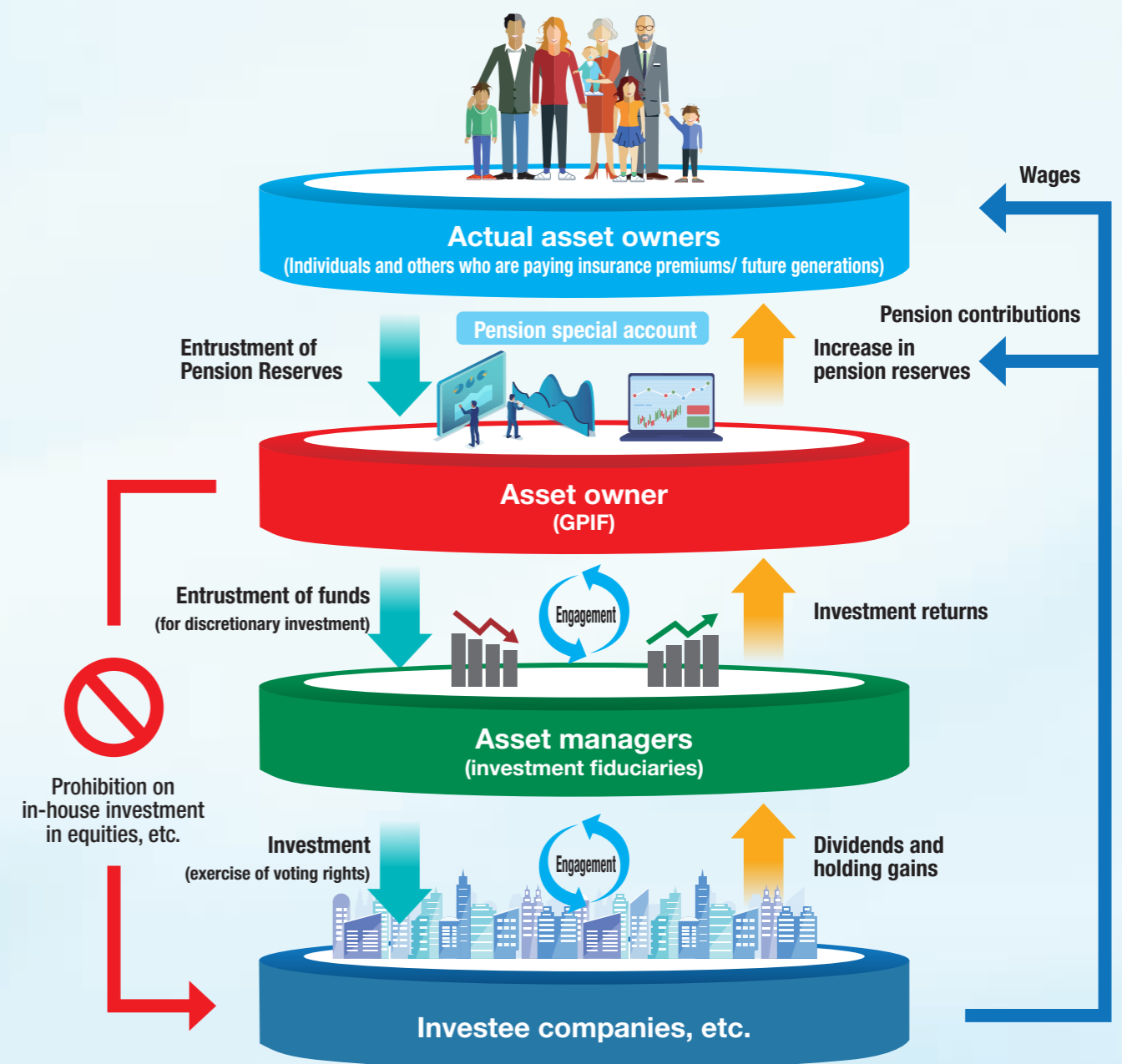
Minimize negative environmental and social externalities and enhance the long-term return of the portfolio across all asset classes



## GPIF’s Positioning in the Investment Chain

A portion of the pension contributions made by individuals and others (the actual asset owners) is entrusted to GPIF by the Minister of Health, Labour and Welfare as pension reserves. As the asset owner of these pension reserves, GPIF selects asset managers to manage these assets and encourages them to pursue constructive dialogue (engagement) with investee

companies, including consideration of ESG. This approach is aimed at creating a virtuous cycle where boosting corporate value over the long term leads to growth across the entire economy and the long-term enhancement of investment returns.



## GPIF is committed to fulfilling our fiduciary duty to secure pension reserves for future beneficiaries by investing from a long-term perspective.

Government Pension Investment Fund

President **MIYAZONO Masataka**



**Even as the trend towards ESG promotion gains pace in Europe, there seems to be an increasing movement against ESG in the United States. What is your perspective on this situation?**

The ESG environment is certainly quite different in Europe and the United States. European countries, especially in the EU, are implementing increasingly stringent rules for ESG disclosure, targeting both companies and investors. They seem to have adopted a strategy of taking a lead in the development of international rules with the aim of building sustainable societies while also boosting the competitive strength of industries in the region. By contrast, there are many recent reports from some political parties and states in the United States that give the impression of an increasingly radical movement against ESG in the context of the country's politics. Even under the previous

Trump administration, however, there were many cases where the federal and state governments did not see eye-to-eye, and not all of the country is unified in its attitude. In that sense, perhaps things have not changed very much. Meanwhile, Japan is in a different situation to both Europe and the United States. Until recently, Japan was trailing behind Europe in its efforts to codify statutory disclosure requirements for sustainability information, but it is now catching up.

Beginning with annual securities reports and similar disclosures for the fiscal year that ended on March 31, 2023, Japanese companies are required to disclose their views and initiatives related to sustainability. Japan's efforts may not be as eye-catching as those in Europe and the United States, but they have sparked little backlash or vacillation and seem to be progressing steadily, step by step. Improving the quality and quantity of ESG information facilitates an improvement in the quality of ESG



**There is an increasing attention in recent years on impact investment aimed at solving social issues. What are your views on impact investment?**

investment. I believe that GPIF's ESG investment will have benefit from this improvement in disclosure.

Our mission at GPIF is to contribute to the stability of the national pension system by managing and investing the pension reserves entrusted to us by the pension beneficiaries, who are the people of Japan, and paying our investment returns into the national treasury. That is our unique mission. We are prohibited by law from managing pension reserves for any other purpose. This is referred to as the "prohibition of consideration of issues except for those that benefit the pension beneficiaries."

The report from the Financial Services Agency working group defines impact investment as investment

designed to achieve a social or environmental effect as well as investment returns. One might assume that investment that pursues both impact (social or environmental effect) and investment returns is the ideal form of investment for GPIF. However, GPIF's sole mission is to generate investment returns. We cannot invest for the purpose of creating an impact. I think that's an important restriction from the perspective of maintaining investment discipline, as well.

However, we believe the act of investing does affect investee companies' corporate value through business activities of our investee companies generating a social and environmental impact which creates revenue and costs eventually leading to impact on corporate value. I believe ESG investment, in particular, is an approach based on this idea. It is for this reason that we have consistently emphasized the measurement of impact in our previous ESG Reports. In this ESG Report, we have gone even further, attempting to measure impact of eligible projects

financed by ESG bonds in GPIF portfolio and other investments. We also plan to measure impact as part of our Measurement of Effects of Stewardship Activities and ESG Investment Project, beginning this fiscal year. GPIF does not invest in impact, and yet we suppose ourselves as among the most impact-focused of all investors.

**Q** Recently, there is growing interest in ESG disclosure related to human capital and disclosure based on the Taskforce on Nature-related Financial Disclosures (TNFD) framework.

I feel that we need to address an increasingly diverse and extensive range of ESG factors with each passing

year. This change is too profound to be characterized simply as a trend; rather, we assume it reflects the increasing number of serious environmental and social issues that must be taken into account. However, these issues affect assets under management to a varying degree depending on the theme. Moreover, since GPIF mainly relies on external asset managers, there are only some issues that we can address effectively.

We would like to remain constantly alert to the various issues that are gaining attention among the public and work to gather information on them.

**Q** In Japan, the Tokyo Stock Exchange has gained public attention by requiring companies with a price-to-book ratio (PBR) below 1.0 to disclose and implement improvement measures. How do you view this initiative?

Approximately half of the listed companies in Japan have PBRs lower than 1.0, indicating that their shares are valued at less than liquidation value. Although everyone is aware of this issue, I presume it has always been a difficult one to address and attempt to improve the situation, since it might be interpreted as a criticism of some of Japan's foremost companies. In that sense, I would like to express my respect for the forthright action taken by the Tokyo Stock Exchange.

PBR is equal to the share price divided by net assets per share. It is possible to raise PBR by shrinking the denominator through share repurchases or higher dividends, but in general, it's necessary to increase the numerator: the share price. A PBR of less than 1.0 indicates that the company is not generating returns above the cost of capital, or that investors doubt that it will be able to generate this level of returns in the future.

In other words, in either case, there are doubts about its sustainability. If the low PBR is a result of mispricing in the stock market, then one way for the company to rectify the situation is to actively engage in disclosure and dialogue with investors. However, if the low PBR is a result of low profitability, then it must swiftly act to revise its business portfolio. There might be other cases where the sustainability of the business is cast into doubt by the social and economic movement towards net zero. We think that dialogue between companies and investors will play a major role in addressing the low

PBR of Japanese companies, a substantial challenge facing the capital market. In this context, we would like to ask our external asset managers to pursue even more active engagement.

**Q** How do you view the sustainability of GPIF itself?

At GPIF, we have not recruited new graduates for years. In almost all cases, we recruit mid-career personnel from a diverse range of different backgrounds. In this sense, GPIF is a highly diverse organization. At the same time – and this seems to be a common concern across the asset management industry – our proportion of female employees is still at 27.7%, an extremely low level. This is shameful for us, as an organization that recognizes the importance of gender diversity and discloses related information to the public, including pursuing passive investment strategies based on gender diversity-related equity indexes.

In our ESG Report, we disclose gender pay gap indicator for GPIF in the same way as for other companies. The figure is nothing to be proud of. However, we think that an accurate understanding of the present situation is the first step in finding a solution. Creating workplace environments where everyone, not only women, can find fulfillment and work with a sense of purpose will not only boost business performance but also increase the sustainability of the organization. This, in turn, will lead to greater sustainability of pension reserves. This is not an issue that can be solved overnight, but we are working towards a solution.



# Chapter 1 GPIF's ESG Initiatives

GPIF has been promoting ESG initiatives since we signed the Principles for Responsible Investment (PRI) in 2015. In addition to building organizations and company structures to pursue ESG-related activities, we have also adopted ESG-themed indexes, undertaken stewardship activities, engaged with index providers and ESG rating agencies, and collaborated with overseas public pension funds and other institutions. In Chapter 1, we present these activities together with new initiatives undertaken in fiscal 2022.

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# Fiscal 2022 Activity Highlights

In fiscal 2022, GPIF continued to promote ESG activities in new areas. Here we present the highlights of our ESG activities during the year.

## Adoption of Additional ESG-Themed Domestic Equity Index

From the indexes submitted to the Index Posting System, GPIF adopted the Morningstar Japan ex-REIT Gender Diversity Tilt Index, which is a gender diversity index for domestic equities, and began passive investment tracking this index.



▶ Please refer to pages 23 to 24 for details.

## Engagement with Index Providers and ESG Ratings Agencies

GPIF has been actively conducting dialogue with index providers and ESG ratings agencies since 2017 when we started to select ESG indexes for Japanese equities. As GPIF's investments are predominantly passive, index providers and ESG rating agencies play a pivotal role in the success or failure of our fund management. By ongoing dialogue with these providers, efforts are underway to improve ESG rating coverage and rating methodologies.



▶ Please refer to pages 25 to 28 for details.

## Engagement Through Our Asset Managers

GPIF promotes constructive dialogue between asset managers and investee companies. Our asset managers for domestic equities engaged with 946 companies during the 2022 calendar year. This equates to 40% of all of GPIF's investee companies, or 94% in terms of market capitalization.



▶ Please refer to pages 31 to 34 for details.

## Implementation of a High-Level Study on the Integration of ESG and SDGs in Investment

In fiscal 2022, GPIF undertook a High-Level Study on the Integration of ESG and SDGs in Investment. This study was implemented to provide an overview of academic research on the topic, through a broad-based survey of the findings of leading papers on investment performance in the sustainability field, including ESG and the SDGs, in Japan and overseas.



▶ Please refer to pages 39 to 40 for details.

## Measuring the Impact of Projects Funded Using ESG Bonds in GPIF's Portfolio

GPIF is required to invest solely for the purpose of generating economic benefits for pension beneficiaries and cannot invest for the purpose of creating an impact. However, we focus on impact because we believe that the business activities of our investee companies generate a social and environmental impact which creates revenue and costs, consequently affecting their corporate value. For our ESG Report for fiscal 2022, we have measured the impact of eligible projects financed by ESG Bonds in GPIF portfolio.



▶ Please refer to pages 79 to 82 for details.

## TNFD Trial Analysis

At GPIF, we think it is vital to understand our investee companies' dependence on the natural environment and their effect on this environment, and to comprehend the natural risks and opportunities that they face. In fiscal 2022, we engaged in a trial analysis concerning natural capital, including biodiversity, based on the Locate and Evaluate steps of the LEAP approach under the TNFD analysis framework.



▶ Please refer to pages 83 to 89 for details.



# ESG-Related Governance and Organizational Structure

The Board of Governors discusses and oversees approaches to ESG investment at GPIF. The Executive Office advances ESG initiatives through the ESG & Stewardship Department and other departments related to asset management, and reports to the Board of Governors.

## Deliberations by the Board of Governors

The Board of Governors, established in October 2017, makes decisions concerning important matters such as the formulation of the policy asset mix and medium-term plans by council decision-making system, and oversees the execution of operations by the Executive Office.

In fiscal 2022, the Board of Governors held 13

meetings, and ESG-related issues were discussed at three of those meetings. The Board of Governors discusses and oversees the promotion of ESG and approaches to ESG investment at GPIF. Details of the discussions by the Board of Governors are posted on the GPIF website in the form of a summary of the proceedings after a certain period of time.

## ESG-related items discussed and reported on at Board of Governor meetings

Meeting number	Meeting date	Reported matter	Agenda item
68th	May 2022	Reported matter	ESG Report (Outline)
72nd	September 2022	Reported matter	2021 ESG Report
79th	March 2023	Reported matter	Stewardship Activities Report 2022

### Composition of the Board of Governors

<https://www.gpif.go.jp/en/about/board.html>



### Status of the Board of Governors

<https://www.gpif.go.jp/operation/board/>

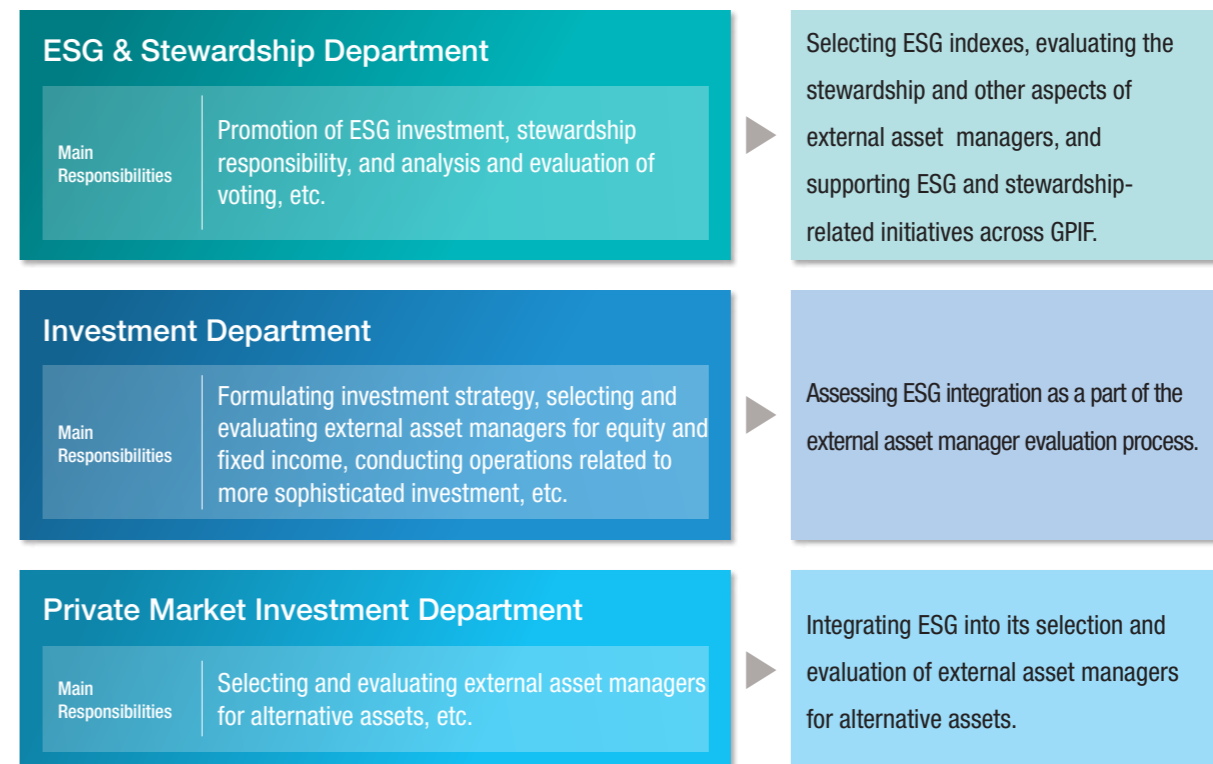


## ESG-related Executive Structure

GPIF adopted a new organizational structure on April 1, 2023 for the purpose of promoting initiatives related to more sophisticated investment. The ESG & Stewardship Department was newly established as an independent department to boost the expertise of GPIF's ESG and stewardship activities, as well as to promote and deepen its initiatives. The Executive Office implements ESG initiatives in coordination of departments relevant to asset management, including the ESG & Stewardship Department, Investment Department, and Private Market

Investment Department,. The Investment Committee, chaired by the Chief Investment Officer (CIO), deliberates and makes decisions on asset management-related issues, including ESG-related initiatives . Important matters are reported to the Board of Governors after deliberation in the Investment Committee. In addition to comprehensive, regular checks of the portfolio management by the Investment Committee, the status of ESG investments is also monitored from a risk management perspective by the Portfolio Risk Management Committee, which meets monthly.

## Key departments responsible for ESG



# ESG Initiatives within GPIF



Number of SDGs training sessions and internal ESG study sessions held

## 5 times

GPIF is committed to promoting ESG investment and promotes initiatives designed to bolster the organization's ESG and SDGs-conscious internal values. Here we present ESG initiatives being undertaken within GPIF.

## SDGs and Diversity-Related Initiatives and Internal ESG Study Sessions

GPIF's Code of Conduct states, "We are committed to GPIF's mission by promoting communication and teamwork and nurturing a diversity of talents and capabilities." Building on this, in January 2020, GPIF established the SDGs Promotion Group—a committee reporting directly to the President in order to develop initiatives designed to bolster the organization's ESG-conscious internal values. The Group provides regular training sessions for all of the staff in GPIF on the SDGs and invites external experts to lecture on ESG related recent trends and other issues, for the purpose of improving staff's understanding on this topic. In fiscal 2022, we had one SDGs training session and four internal ESG study sessions. Here, we would like to introduce one of our SDGs training session: Promoting Women's Advancement and Diversity. Changes in the working-age population have made it imperative that Japan shifts from a highly homogeneous, organization-



Study session (July 2022)

centered working style predicated on long working hours to more flexible working styles based on individual lifestyles and value perceptions. In this training session, GPIF employees learned the importance of establishing systems and reforming attitudes to enable them to choose their own optimal working style to perform to their best.

### FY2022 SDGs training and internal ESG study sessions

July 2022	Title: Recent Trends in ESG Investing and GPIF's Role Lecturer: MIZUGUCHI Takeshi (President, Takasaki City University of Economics)
December 2022	Title: The Structure of Annual Reports by Major Overseas Pension Funds – Trends in Corporate Governance and Their Influence on Annual Reports by Overseas Pension Funds Lecturer: FURUSAWA Tomoyuki (former Director-General of the Policy and Markets Bureau, Financial Services Agency; currently a member of the PIOB)
December 2022	Title: ESG Investment at GPIF (Including introduction to ESG Report) Lecture: GPIF staff members
January 2023	Title: Renewable Energy Policy Trends Lecturer: USHIO Takafumi (Deputy Director, New and Renewable Energy Division, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry)
January 2023	Title: Promoting Women's Advancement and Diversity Lecturers: UTSUMI Tomoe (Managing Executive Officer, Head of Operations and Chief Diversity Officer, The Norinchukin Bank) AKAMATSU Takeshi (Head of Diversity Promotion, Diversity Group, Human Resources Division, The Norinchukin Bank)

(Note) Lecturers' titles were current at the time when the relevant session was held.

## Environmental and Other Initiatives

At GPIF, we promote environmentally and socially conscious initiatives in the area of procurement. As part of our environmentally conscious initiatives, we established a "Basic Policy on Promoting Green Procurement" for fiscal 2022 based on the Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Green Procurement Act). Pursuant to this policy, GPIF works to ensure that the paper and stationery, office furniture, office equipment, appliances, and other office products in the office have a minimal impact on the environment. The building where GPIF is located is promoting energy- and resource-

saving initiatives aimed at achieving a decarbonized city, and has been recognized with an S-rank certification under the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) system.

We have also established a "Basic Policy on Promoting Procurement from Facilities Employing Disabled Persons" for fiscal 2022 based on the Act on Promotion of Procurement of Goods and Services from Disability Employment Facilities by the State and Other Entities. We actively promote the procurement of goods and services from facilities that employ people with disabilities.

## Women in the Workplace at GPIF

The advancement of women in the workplace is a crucial part of diversity promotion. Through disclosure based on The Act on Promotion of Women's Participation and Advancement in the Workplace, companies have an obligation to confirm the status of women in their workplaces and analyze the issues they face. We calculated GPIF's scores for the five metrics that companies are required to disclose under The Act on Promotion of Women's Participation and Advancement in the Workplace, shown under (1) to (5) below. These five metrics are also the quantitative evaluation metrics used in the MSCI Japan Empowering Women Index (WIN index). The result shows that women only account for a little over 20% of GPIF's employees. GPIF still appears to have room to improve in the areas of recruitment and promotion of female employees, an

issue common to the entire asset management industry.

Moreover, with the revision of the Act on Childcare Leave, Caregiver Leave, and Other Measures for the Welfare of Workers Caring for Children or Other Family Members, companies with over 1,000 employees are required to disclose the childcare leave uptake rate among their male employees, starting in April 2023. Although GPIF is not obligated to disclose this information, our calculation reveals that 100% of eligible male employees took childcare leave in fiscal 2022. Creating work-friendly environments where everyone can find fulfillment and work with a sense of purpose could boost business performance as well as increase the sustainability of the organization. We will work to make our workplace environments even more work-friendly.

### Women in the Workplace at GPIF

	GPIF
(1) % Female New Hires	20.8
(2) % Women in the Workforce	27.7
(3) % Difference in Years Men and Women are Employed by the Company*	-43.5
(4) % Women in Senior Management	9.3
(5) % Women on Board**	16.7
[Reference] % Childcare Leave Uptake Rate Among Male Workers***	100.0

(Note 1) The data represents FY2022 results for (1) and childcare leave uptake rate among male workers, status as of April 1, 2023 for (2), (4) and (5), and the status as of March 31, 2023 for (3).  
 (Note 2) The data for (1) includes five staff members who transitioned from regular employees to specialist personnel and excludes staff employed under a continuing employment scheme, seconded staff, temporary staff, and contract workers. The data for (2) includes regular employees, specialist personnel, staff employed under a continuing employment scheme, seconded staff, temporary staff, and contract workers, but does not include executive managing directors or part-time staff. The data for (3) includes only regular employees and excludes staff employed under a continuing employment scheme and seconded staff. The data for (4) includes regular employees, specialist investment staff, staff employed under a continuing employment scheme, and seconded staff.  
 (Note 3) (3) Difference in Years Men and Women are Employed by the Company\* = (Average years women employed - Average years men employed) / Average years men employed.  
 (5) % Women on Board (Officers)\*\* is the percentage of women on the Board of Governors. Governors are appointed by the Minister of Health, Labour and Welfare.  
 [Reference] Childcare Leave Uptake Rate Among Male Workers\*\*\* = (Number of male workers who took childcare leave or equivalent) / (Number of male workers whose spouse gave birth) (This ratio fluctuates significantly from year to year due to GPIF's small workforce)

Column 1

# Gender Pay Gap within GPIF

With the revision of The Act on Promotion of Women's Participation and Advancement in the Workplace, companies normally employing 301 or more full-time employees are required to disclose their gender pay gap, starting in July 2022. Gender pay gap is one of the evaluation metrics used by the Morningstar Japan ex-REIT Gender Diversity Tilt Index, which GPIF has adopted as one of its gender diversity indexes. Exploring the background to the gender pay gap not only reveals the different treatment given to men and women but also exposes various organizational issues.

With employees less than 301, GPIF is not required by law to disclose this information. Nonetheless, we calculated the gender pay gap for fiscal 2022, revealing that female employees earn 70.6% of their male counterparts (see Figure 1).

We used GEM App, an application developed by UTokyo Economic Consulting Inc., to adjust these numbers for the various reasons that cause gender pay gap (such as age, education, and job category) through statistical processing based on economic insight, and

compared the pay received by comparable male and female employees (see Figure 2).

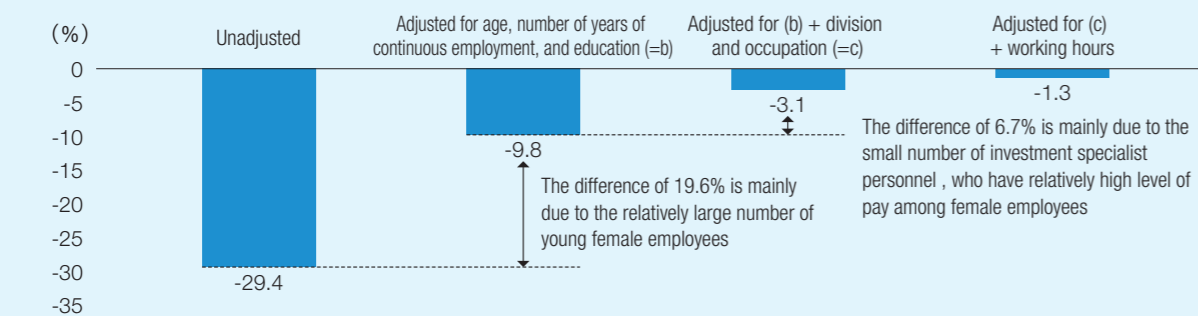
At present, GPIF not only has relatively larger proportion of young female employees, but also fewer number of female investment specialist personnel employed on a fixed-term basis, who have a relatively high level of pay. This is the main reason for the gender pay gap at GPIF. Investment specialist personnel require a high level of expertise and, at present, are mostly mid-career hires with experience at private sector financial institutions and similar organizations. The small proportion of women in this talent pool is affecting the recruitment of female staff. In order to increase GPIF's organizational diversity as well as inclusion, we think it is vital that we boost the attraction of our workplace by creating work-friendly environments where everyone, not only women, can find fulfillment and work with a sense of purpose, as well as implementing measures such as human resources development for young female staff. Executive Managing Director (Planning and General Affairs) MORI Kotaro

Figure 1. Gender Pay Gap at GPIF

Gender pay gap (average)	GPIF
Among all employees (%)	70.6

(Note 1) Data is based on the results for FY2022  
 (Note 2) Total annual pay includes basic salary, overtime pay, bonuses, etc., and excludes travel allowances.  
 (Note 3) Calculated excluding executive managing directors, staff joining or leaving during the fiscal year, staff employed under a continuing employment scheme, seconded staff, staff seconded to GPIF, temporary staff, contract workers, and staff on leave.

Figure 2. Causes of the Gender Pay Gap



(Note 1) The definition of each adjustment category is shown below.  
 No adjustment: Gender pay gap among all 138 employees surveyed  
 • Adjusted for age, number of years of continuous employment, and education (-b): Gender pay gap adjusted to compare male and female employees of the same age with the same number of years of continuous employment and education  
 • Adjusted for (b) + division and occupation (-c): Gender pay gap adjusted to compare male and female employees in the same division with the same occupation, in addition to the adjustments in (b)  
 • Adjusted for (c) + working hours: Gender pay gap adjusted to compare male and female employees working the same number of hours, in addition to the adjustments in (c)  
 (Source) Prepared by GPIF using the GEM App developed by UTokyo Economic Consulting Inc.

# GPIF's External Public Communication

Speech and Panel Discussions  
(FY2022)

## 32times

At GPIF, we proactively send information through media such as YouTube and Twitter, as well as through conferences and lectures. We aim to provide accessible information to the broad public, not just investment specialists.

## Communicating GPIF's Initiatives to the Public

We are working to enhance our public relations concerning GPIF's ESG initiatives to the broad public and the media, not just investment specialists. In addition to preparing and publishing our annual ESG Report, which presents GPIF's ESG initiatives and their effects, we announce our selection of ESG indexes on our website, together with an outline of each index.

In addition, we post information targeting a broad section of the public on Twitter and release the YouTube video, such as "Understanding GPIF in 10 minutes," series, mainly for company employees responsible for ESG, IR and engagement with investors. These YouTube videos introduce and explain GPIF's ESG investment and stewardship activities. In fiscal 2022, we joined 32 conferences and lectures (topics including unrelated to ESG), such as the

TCFD Summit organized by the Ministry of Economy, Trade and Industry and the Japan Investment Conference 2022 organized by the CFA Society Japan. We also published papers in academic journals and the like. We aim to further strengthen our public communication in fiscal 2023.



External Conference (December 2022)

## The YouTube video series "Understanding GPIF in 10 minutes"

### Understanding GPIF in 10 minutes

GPIF's ESG Investment



GPIF's ESG Investment



GPIF's Stewardship Activities



Climate change Risks and Opportunities



# Support for TCFD and Climate-Related Financial Disclosures



Disclosure consistent with TCFD recommendations

## 5th year

Climate change risks are difficult to eliminate completely merely through diversification and are highly likely to manifest over the long term. GPIF, as an asset owner, is taking the lead in addressing these risks.

## Climate-Related Financial Disclosure Consistent with TCFD Recommendations

The Financial Stability Board (FSB) established the Task Force on Climate-related Financial Disclosures (TCFD) in December 2015, and in June 2017, the TCFD released its recommendations on how companies and others can better disclose information related to climate change risks and opportunities. The recommendations published by the TCFD outline a series of information disclosure practices for companies and other organizations in (1) governance, (2) strategy, (3) risk management, and (4) metrics and targets, in relation to climate change.

For investors, climate change risks occur simultaneously across all companies and asset classes and cannot be completely eliminated through diversification. Moreover, these risks are highly likely to manifest at least over the long term, and we believe that GPIF, as an asset owner, should take the lead in addressing them. Accordingly, we declared support for the TCFD in December 2018 and began disclosing information in accordance with the TCFD recommendations in the following fiscal year's ESG Report. This year's 2022 ESG Report is the 5th year of such disclosure.

It is difficult to separate climate change-focused investment from ESG activities as a whole, and GPIF regards climate change as one of the most important themes in ESG activities in general. Therefore, our disclosures in line with



the TCFD framework include all ESG activities and are not confined to initiatives that is only relevant to climate change. This section presents an overview of what information GPIF discloses for the four TCFD disclosures, along with the corresponding pages in this report.

GPIF will work to enhance the sustainability of the entire market by further improving its disclosure on ESG in general, including climate-related financial information.

### Governance Disclose the organization's governance around climate-related risks and opportunities

- GPIF's Investment Principles and Stewardship Principles clearly state that climate change and other ESG factors shall be taken into account in fund management, and GPIF actively works to achieve this declaration (page 92).
- The Board of Governors, which oversees the Executive Office, receives reports on ESG from the Executive Office as necessary (page 15).
- GPIF's Executive Office convenes Investment Committee meetings to make decisions on climate change and other ESG-related initiatives. Organizational structure is in place to implement these initiatives (page 16).

### Strategy Disclose the actual and potential impacts of climate related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.

- GPIF proactively integrates ESG across all asset classes. In equity investment, we incorporate external asset managers' ESG activities into their evaluations as well as conduct passive investment based on ESG indexes (page 29). In fixed income investment, we propose investment opportunities in ESG bonds to our external asset managers (page 30). We also promote ESG integration in our alternative investments (page 35-36).
- In relation to the environment (E) in particular, we use indexes for equity investment that focus on each company's carbon efficiency (page 23-24) and invest in ESG bonds including green bonds (page 30).
- In addition to measuring the carbon footprint of GPIF's portfolio (page 63-66), we measure the impact of eligible projects financed by ESG Bonds in GPIF Portfolio and analyze the contribution of some of our stock holdings reducing GHG emissions (page 75-82).

### Risk management Disclose how the organization identifies, assesses, and manages climate-related risks.

- GPIF is developing an organizational structure for monitoring the greenhouse gas (GHG) emissions (carbon footprint and carbon intensity) of our entire portfolio as well as for each fund for which we outsource the management.
- The Portfolio Risk Management Committee meets monthly to report on risk management status of ESG indexes and other investments.
- As well as requiring asset managers to actively engage with companies on key ESG issues (pages 31-34), GPIF engages with index providers to encourage improvement in the evaluation techniques used within the methodologies of the carbon efficient indexes and ESG indexes for domestic and foreign equities that GPIF adopts (pages 25-28).

### Metrics and targets Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.

- GPIF aims to control portfolio risks and secure opportunities for investment return by contributing to curbing greenhouse gas (GHG) emissions across the entire economy, through engagement with external asset managers and ESG investment (pages 23-24 and 31-34).
- GPIF calculates Scope 1 to Scope 3 carbon footprint and compares these with each portfolio benchmark by asset class. We also calculate each portfolio's carbon intensity using weighted average carbon intensity (page 63-66).

# ESG Index Adoption and ESG Index-Based Asset Management



Number of ESG indexes adopted by GPIF

# 9

In order to improve the long-term risk/return profile of the portfolio by reducing ESG risks, GPIF engages in passive investment based on ESG indexes. In fiscal 2022, GPIF newly adopted the Morningstar Japan ex-REIT Gender Diversity Tilt Index.

## Adoption of a Gender Diversity Index for Domestic Equities

GPIF has used ESG indexes as passive benchmarks since fiscal 2017. We believe that passive investment based on indexes that focus on corporate sustainability will not only improve the risk/return profile of the portfolio over the long run, but also enhance the Japanese equity market through secondary effects such as the improvement of ESG ratings.

In fiscal 2022, GPIF screened those gender diversity indexes for domestic equities that were posted on the Index Posting System, the framework for collecting index

information on a continuous basis, and adopted the Morningstar Japan ex-REIT Gender Diversity Tilt Index (GenDi J).

The GenDi J Index determines investment weights based on the Equileap Gender Equality Scorecard, in the same way as the Morningstar Developed Markets ex-Japan Gender Diversity Index, which GPIF adopted for foreign equities in fiscal 2020. The Equileap assessment also includes gender pay gap as an evaluation metric, which many companies are required to disclose from fiscal 2022.

### <Characteristics of the GenDi J Index>




- (1) The weighting of constituent stocks is adjusted based on the Equileap assessment of companies' commitment to gender diversity.
- (2) 928 companies are eligible for the index, covering a broad spectrum of domestic equities.
- (3) Industry sectors are neutrally weighted, achieving low tracking error and a low portfolio turnover rate.

## GPIF's Expanding of ESG Investment




At GPIF, we have progressively expanded our ESG index-based passive investment since fiscal 2017, when we adopted our first three domestic equity ESG indexes. We have since adopted several new indexes, allocating and withdrawing assets accordingly. GPIF adopted the GenDi J Index in fiscal 2022. This is the ninth ESG index (including domestic and foreign equities) that we invest in as of March

31, 2023, as shown in the table on the right. The total asset size of passive investments tracking ESG indexes has reached ¥12.5 trillion. Please refer to "ESG Index Performance" on pages 49-50 for information on the performance of each index. By investing in these indexes, GPIF aims to enhance long-term investment returns through the sustainable growth of our investees and of the market as a whole.




## Domestic equities: Comprehensive ESG indexes

	 FTSE Blossom Japan Index	 FTSE Blossom Japan Sector Relative Index	 MSCI Japan ESG Select Leaders Index
Concept and characteristics of index	<ul style="list-style-type: none"> <li>This index uses the ESG assessment scheme used in the FTSE4Good Japan Index Series, which has one of the longest track records globally for ESG Russell indexes.</li> <li>It is a comprehensive ESG index that selects stocks with high absolute ESG scores and adjusts industry weights to neutral at the industry level.</li> </ul>	<ul style="list-style-type: none"> <li>Assessments are performed based on FTSE Russell's ESG rating. For the companies with high carbon intensity (greenhouse gas emissions/sales), management attitude toward climate-change risks/opportunities is also assessed.</li> <li>The index selects stocks with relatively high ESG ratings within each industry, and adjusts industry weights to neutral.</li> </ul>	<ul style="list-style-type: none"> <li>The MSCI Japan ESG Select Leaders Index is a comprehensive ESG index that integrates various ESG risks into today's portfolio. The index is based on MSCI ESG Research used globally by more than 1,000 clients.</li> <li>The index is comprised of stocks with relatively high ESG scores in each industry.</li> </ul>
Index construction	Best-in-Class	Best-in-Class	Best-in-Class
Constituent universe (parent index)	FTSE Japan All Cap Index (1,423 stocks)	FTSE Japan All Cap Index (1,423 stocks)	MSCI Japan IMI (1,083 stocks)
Number of index constituents	255	530	249
Assets under management (Billion yen)	1,030.5	1,001.6	2,056.2

## Domestic equities: ESG thematic indexes (women's advancement / climate change)

	 MSCI Japan Empowering Women Index ("WIN")	 Morningstar Japan ex-REIT Gender Diversity Tilt Index ("GenDi J")	 S&P/JPX Carbon Efficient Index
Concept and characteristics of index	<ul style="list-style-type: none"> <li>MSCI calculates the gender diversity scores based on information disclosed under the Act on Promotion of Women's Participation and Advancement in the Workplace and selects companies with higher gender diversity scores from each sector.</li> <li>The first index designed to cover a broad range of factors related to gender diversity.</li> </ul>	<ul style="list-style-type: none"> <li>Domestic equities index that determines investment weighting based on assessment of companies' commitment to gender equality, using the Equileap Gender Equality Scorecard.</li> <li>Ratings are conducted in four categories: (1) gender balance in leadership and workforce; (2) equal compensation and work-life balance; (3) policies promoting gender equality; and (4) commitment, transparency, and accountability.</li> </ul>	<ul style="list-style-type: none"> <li>Constructed by S&amp;P Dow Jones Indices based on carbon data provided by Trucost, a pioneer in environmental assessment.</li> <li>This index is designed to overweight companies that have lower carbon footprints (annual greenhouse gas emissions divided by annual revenues) and that actively disclose their carbon emission information.</li> </ul>
Index construction	Best-in-Class	Tilted	Tilted
Constituent universe (parent index)	MSCI Japan IMI Top 700 (699 stocks)	Morningstar Japan ex-REIT (928 stocks)	TOPIX (2,160 stocks)
Number of index constituents	374	928	1,832
Assets under management (Billion yen)	649.2	520.6	1,643.4

## Foreign equities: Comprehensive ESG indexes and ESG thematic indexes (women's advancement / climate change)

	 MSCI ACWI ESG Universal Index (ex Japan and ex China A-shares)	 Morningstar Developed Markets Ex-Japan Gender Diversity Index ("GenDi")	 S&P Global LargeMidCap Carbon Efficient Index
Concept and characteristics of index	<ul style="list-style-type: none"> <li>One of MSCI's flagship ESG indexes, this comprehensive index adjusts the weight of constituents based on each issuer's current ESG rating and ESG trends to elevate the ESG metrics of the index overall.</li> <li>The index was developed for large investors seeking to enhance ESG integration while achieving the same level of investment opportunity and risk exposure as the parent index.</li> </ul>	<ul style="list-style-type: none"> <li>Foreign equities index that determines investment weighting based on assessment of companies' commitment to gender equality, using the Equileap Gender Equality Scorecard.</li> <li>Ratings are conducted in four categories: (1) gender balance in leadership and workforce; (2) equal compensation and work-life balance; (3) policies promoting gender equality; and (4) commitment, transparency, and accountability.</li> </ul>	<ul style="list-style-type: none"> <li>Constructed by S&amp;P Dow Jones Indices based on carbon data provided by Trucost, a pioneer in environmental assessment.</li> <li>This index is designed to overweight companies that have lower carbon footprints (annual greenhouse gas emissions divided by annual revenues) and that actively disclose their carbon emission information.</li> </ul>
Index construction	Tilted	Tilted	Tilted
Constituent universe (parent index)	MSCI ACWI ex Japan ex China A ESG Universal with Special Taxes Index (2,148 stocks)	Morningstar® Developed Markets Ex-Japan Large-Mid (1,965 stocks)	S&P Global Ex-Japan LargeMidCap (3,174 stocks)
Number of index constituents	2,087	1,938	2,136
Assets under management (Billion yen)	1,655.0	488.4	3,477.0

(Note) Data is current as of March 31, 2023 (Source) Prepared by GPIF based on data from FactSet and individual index providers.

# Engagement with Index Providers and ESG Ratings Agencies

GPIF has been actively conducting dialogue with index providers and ESG ratings agencies since selecting ESG indexes for Japanese equities in 2017. In fiscal 2022, we focused our engagement on improving index methodologies through consultation<sup>1</sup>.

## Improving ESG Ratings and Index Methodologies Through Consultation

As GPIF's investments are predominantly passive, index providers and ESG rating agencies play a pivotal role in the success or failure of our fund management. GPIF conducts dialogue with index providers and ESG rating agencies to improve the sustainability of the market and enhance our long-term investment performance.

In fiscal 2022, we mainly held dialogue on the themes presented in Figure 1. In this section, we will present GPIF's concerns that was discussed with index providers and ESG rating agencies, regarding changes to the methodology used for the MSCI Japan Empowering Women Index (WIN index) and the S&P Carbon Efficient Index series adopted by GPIF.

Figure 1. Topics Discussed with Index Providers and ESG Rating Agencies

<Changes made by MSCI>	
Timing when the consultation was announced	Major Updates
March 2022	<b>Change in index methodology: MSCI Japan ESG Select Leaders Index</b> The parent index was changed from MSCI Japan IMI Top 700 to MSCI Japan IMI. This expansion of the investment universe was made possible by the expansion of MSCI's ESG rating coverage.
November 2022	<b>Change in ESG ratings: Gender Diversity Score used in MSCI Japan Empowering Women Index (WIN)</b> The percentile value calculation of Gender Diversity Score base year was changed to apply its recent evaluation from Q1 2023.
February 2023	<b>Change in index methodology: MSCI Japan Empowering Women Index (WIN)</b> Removed the weighting adjustment based on quality factor scores from the formula used to calculate the weighting of constituent stocks.
<Changes made by S&P Dow Jones Indices>	
Timing when the consultation was announced	Major Changes
January 2023	<b>Change in index methodology: S&amp;P Carbon Efficient Index series</b> Added the disclosure status to the TCFD framework as a weighting criterion for constituent stocks, in addition to the disclosure of greenhouse gas emissions.

(Source) Prepared by GPIF based on data from MSCI and S&P Dow Jones Indices.

<sup>1</sup> Consultation is held by the index providers and ESG rating agencies to gather opinions from users of the index or ESG rating to decide on changes to index construction and ESG rating methodology.

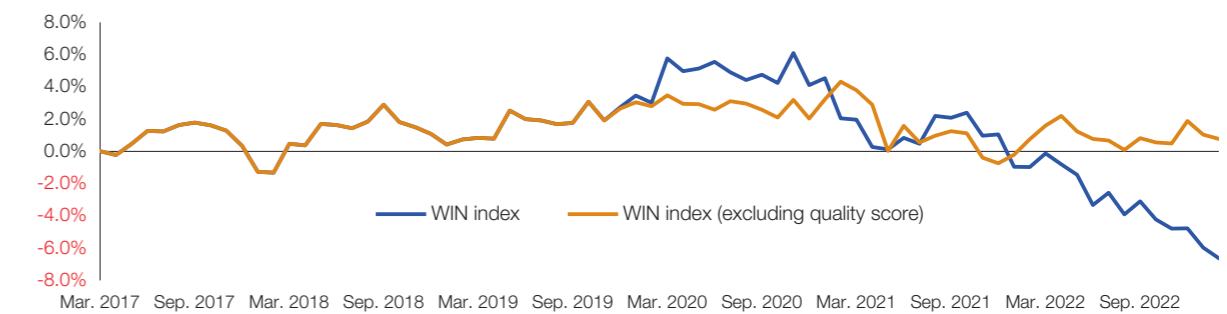
## Improving Index Methodology – Revising the WIN Index

The WIN index, which GPIF adopted in July 2017, is composed of companies selected for their high gender diversity scores. These scores are calculated from the three perspectives of Attraction (the ability to attract women), Retention (an environment where women can continue to work), and Promotion (the promotion of women), based on information disclosed under the Act on Promotion of Women's Participation and Advancement in the Workplace. The weighting of constituent stocks reflects their gender diversity scores, in addition to quality scores which measure financial quality (ROE, debt to equity, and earnings variability). Weights are calculated using the formula: Market capitalization weight × Gender diversity score ×

Quality score.

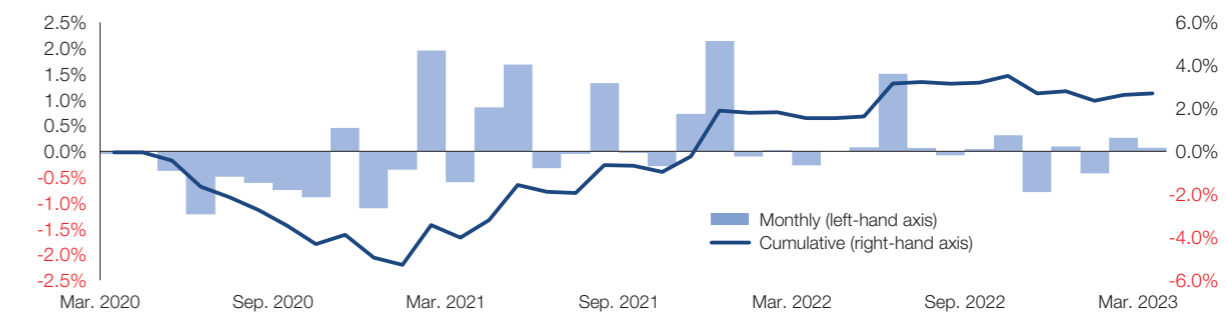
We have conducted passive investment linked to the WIN index for approximately six years. In view of the relatively high risk (large variation in performance) of this index compared to other ESG indexes, as well as its poor performance recently, we set out to discover the cause of these issues and measures for improvement. As a result of our analysis, it became clear that while the gender diversity score (which evaluates the company's efforts for women's advancement) made a positive contribution to share price performance, the deterioration in performance was mainly due to weighting adjustments based on the quality score (see Figure 2 and Figure 3).

Figure 2. Excess Return Compared to the Parent Index (MSCI Japan IMI Top 700) (March 31, 2017 – February 28, 2023)



(Source) Prepared by GPIF based on data from MSCI, etc.

Figure 3. Gender Diversity Score Spread Return



(Note) We split the constituents of the MSCI Japan IMI TOP 700 index into high and low groups based on their gender diversity scores, and calculated mean returns for each group. The graph above represents the cumulative spread between the high-scoring group and the low-scoring group  
(Source) Prepared by GPIF based on data from MSCI, etc.

At GPIF, we believe that the sustainable growth of investee companies and the capital market as a whole are crucial in enhancing long-term investment returns. As an organization that promotes ESG investment, we do not welcome variations in the performance of ESG indexes due to factors outside the scope of ESG. Based upon this concern, we communicated with MSCI, which provides the WIN index. As a result, a consultation was held in February 2023 regarding the removal

of the quality score weighting adjustment, and it was decided to remove this adjustment.

We believe that ESG investment is the most effective when continued over a long period. However, this does not mean that an investment, once made, should then be neglected for years. We will continue to make improvements to our ESG investments, as necessary, while monitoring changes in factors such as performance and disclosure rules.

### Improving Index Methodology – Revising the S&P Carbon Efficient Index Series

Japan's Corporate Governance Code, as revised in 2021, requires that "companies listed on the Prime Market should collect and analyze the necessary data on the impact of climate change-related risks and earning opportunities on their business activities and profits, and enhance the quality and quantity of disclosure based on the TCFD recommendations, which are an internationally well-established disclosure framework, or an equivalent framework." An increasing number of companies, especially large companies, provide ESG disclosures as non-financial disclosures in their integrated reports, sustainability reports, or equivalent documents. However, according to the TCFD's 2022 Status Report, in which it analyzes whether or not 1,434 companies around the world are actually disclosing climate change-related information in line with the TCFD recommendations, only 4% of companies disclosed in line with all 11 recommended disclosures by the TCFD. It is clear

that many companies are not yet able to provide full disclosure consistent with the TCFD recommendations.

The S&P Carbon Efficient Index series adopted by GPIF is constructed to give a higher investment weight to companies that disclose their greenhouse gas (GHG) emissions. As noted above, in view of the rising standards required by the market, S&P Dow Jones Indices (S&P) started seeking feedback from market participants concerning its plan to add information disclosure in line with TCFD recommendations as additional adjustment to the weighting in its index methodologies, which are currently adjusted based on whether the company discloses GHG emissions. As a market participant, GPIF also engaged in dialogue with S&P on multiple occasions. As a result of consultation, S&P included disclosure consistent with the TCFD recommendations in its methodology from June 2023, in addition to the disclosure of GHG emissions (see Figure 4).

Figure 4. Weight Adjustment Table Used to Determine Investment Weights in the S&P Carbon Efficient Index Series (In the Case of Mid Impact Sectors)

Carbon Emissions / Net Sales Ranking Within Industry	Carbon Emissions Disclosure Status		Investment weight adjustment
	Disclosure	Disclosure Consistent with TCFD Recommendations	
1st decile (Top 10%)	Disclosed	Consistent	40%
		Not consistent	35%
	Not disclosed	–	30%
2nd decile (Top 20%)	Disclosed	Consistent	30%
		Not consistent	25%
	Not disclosed	–	20%
3rd decile (Top 30%)	Disclosed	Consistent	20%
		Not consistent	15%
	Not disclosed	–	10%
4th–7th decile	Disclosed	Consistent	10%
		Not consistent	5%
	Not disclosed	–	0%
8th decile (Bottom 30%)	Disclosed	Consistent	0%
		Not consistent	-5%
	Not disclosed	–	-10%
9th decile (Bottom 20%)	Disclosed	Consistent	-10%
		Not consistent	-15%
	Not disclosed	–	-20%
10th decile (Bottom 10%)	Disclosed	Consistent	-20%
		Not consistent	-25%
	Not disclosed	–	-30%

(Note) In the case of high and low impact sectors, the investment weight adjustment is equal to the amount shown in the table above multiplied by 3.0 and 0.5, respectively. (Source) Prepared by GPIF based on material and other information provided by S&P Dow Jones Indices.

### Compliance with the Code of Conduct for ESG Evaluation and Data Providers

ESG rating agencies play an increasingly prominent role in the investment chain. Ever since 2017, when GPIF adopted ESG indexes for its domestic equity investments, GPIF has advocated the need to ensure the transparency of the methods used by these organizations and to improve their communication with companies.

Recently, the growth of ESG investment has fueled expectations of an even greater contribution by ESG rating agencies. The Financial Services Agency published the Code of Conduct for ESG Evaluation and Data Providers in December 2022 to ensure that these organizations provide appropriate evaluations and data based on rational

grounds and expert professional judgement, while keeping abreast of society-wide trends associated with ESG. This code applies a "comply or explain" approach. Even if a company publicly announces its support for the code, it is not obligated to implement all of the principles and guidelines therein. An explanation of its reasons for non-implementation would also facilitate a broader understanding by investors and companies. At GPIF, we monitor our contracted ESG rating agencies for their support and compliance with the code. We hope to refer to this information in our future engagement activities.

Figure 5. Support and Compliance Status of GPIF's Main Contracted ESG Rating Agencies

ESG Rating Agencies	Website
FTSE	<a href="https://www.ftserussell.com/ja/governance/regulation">https://www.ftserussell.com/ja/governance/regulation</a>
Sustainalytics*	<a href="https://www.sustainalytics.com/governance-documents">https://www.sustainalytics.com/governance-documents</a>
MSCI	<a href="https://www.msci.com/legal/disclosures/esg-disclosures">https://www.msci.com/legal/disclosures/esg-disclosures</a>
S&P Global Sustainable1	<a href="https://www.spglobal.com/esg/jfsa-statements">https://www.spglobal.com/esg/jfsa-statements</a>

(Note) Sustainalytics\* is a member of the Morningstar Group

### More Sophisticated Dialogue with ESG Ratings Agencies and Companies

As in previous years, GPIF conducted meetings with ESG rating agencies during fiscal 2022 to discuss the inquiries and opinions they received from the companies that they rate. More and more companies are consulting with ESG rating agencies over the course of the rating process, and according to MSCI, Japan is counted as one of the areas with a high rate of companies that consult with them out of the world's major economies.

We also requested Morningstar to engage actively in dialogue with companies for its Morningstar Japan ex-REIT Gender Diversity Tilt Index, which GPIF newly adopted in fiscal 2022. Even if companies are working to address women's advancement with the aim of increasing their investment weight in the index, it would be extremely difficult for them to make efficient and pertinent

improvements if they do not understand their present rating. We request Morningstar that when they receive an inquiry from a company concerning the company's own rating, they should provide it with a report indicating the company's current rating.



# ESG in Equity and Fixed Income Mandate

When GPIF evaluates our equity and fixed income managers, we examine their ESG initiatives on their management. We have also formed partnerships with several multilateral development banks and governmental financial institutions to expand investment opportunities in green and other ESG bonds.

## ESG Integration in Asset Manager Evaluations

Most of GPIF's portfolio assets are managed by external asset managers in Japan and overseas. The Investment Department and ESG & Stewardship Department work together to select and evaluate asset managers. Asset managers are evaluated on their investment policies, investment processes, organizational structure and human resources. ESG integration is a key part of the investment process review.

As a PRI signatory, in 2018 we defined ESG integration as "the explicit and systematic inclusion of ESG factors into

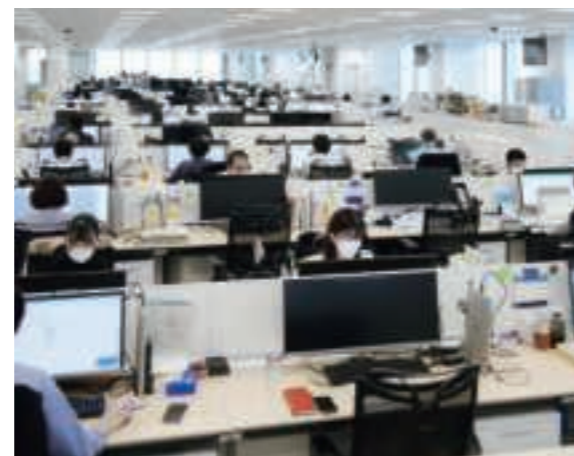
investment analysis and investment decisions," based on the definition provided by PRI. In fiscal 2019, we established evaluation criteria for ESG integration based on this definition and began comprehensive assessment for asset managers according to these new criteria. In addition to evaluating external asset managers currently working with GPIF, the new ESG integration criteria are also used when selecting new external asset managers.

## ESG Integration in Fixed Income Investments

GPIF and the World Bank Group have been working together on ESG integration in fixed income investment through efforts such as publishing a joint research paper in 2018. Following up on this research, in 2019, the International Bank for Reconstruction and Development (IBRD) and the International Finance Corporation (IFC) – both members of the World Bank Group– drew up a new proposal to provide GPIF's external asset managers with an opportunity to invest in green, social and sustainability bonds.

GPIF provides its external asset managers with opportunities to both integrate ESG into their fixed income investments and gain excess return by building platforms in which they can invest in green, social and sustainability bonds issued by multilateral development banks and governmental financial institutions. As of March 31, 2023, we have built investment platforms with 16 institutions.

GPIF is committed to promoting ESG investment, not only in equities but also in fixed income and other assets, in order to reduce negative environmental and social externalities and enhance the long-term return of the portfolio across all asset classes.



## Breakdown of Green, Social, Sustainability and Other ESG Bonds in GPIF's Portfolio

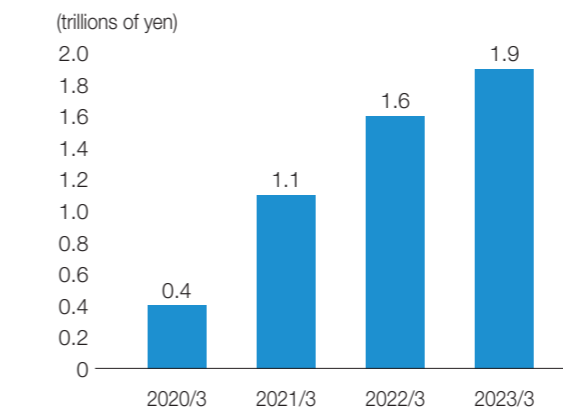
Four years have passed since GPIF first formed its partnership with the World Bank Group in 2019. GPIF's portfolio of ESG bonds has grown in diversity over these four years.

GPIF's external asset managers make their own investment decisions to invest in ESG bonds through investment platforms and other channels on GPIF's behalf. The size of those investments has grown to around ¥1.9

trillion<sup>1</sup> as of March 31, 2023 (Figure 1). Green bonds account for 61.5% of the total, followed by sustainability bonds (23.0%), social bonds (14.2%) and transition bonds (1.2%) (Figure 2).

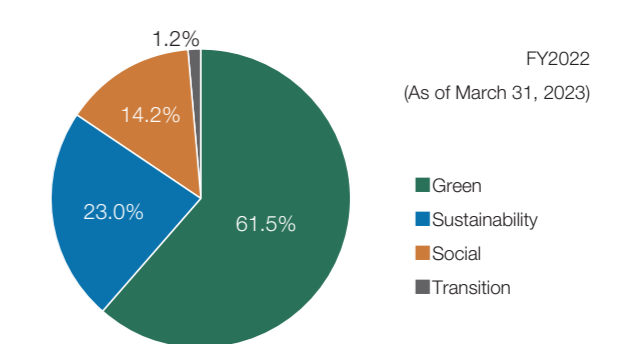
In Chapter 3 "Measuring the Impact of Projects Funded Using ESG Bonds in GPIF's Portfolio," we measure the environmental and social impact generated by the projects funded by these bonds (see pages 79-82).

Figure 1. GPIF's Investment in ESG Bonds



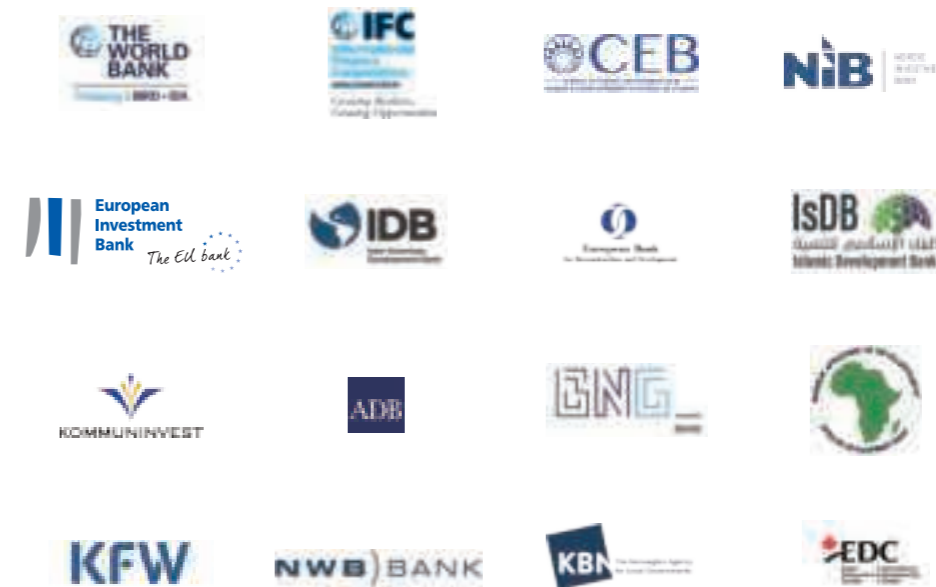
(Source) GPIF

Figure 2. Breakdown of GPIF's ESG Bond Portfolio (By Type)



(Source) GPIF

## International Organizations with Investment Platforms in Green Bonds, etc.



<sup>1</sup> Track record in investment in bonds, calculated by GPIF, in compliance with International Capital Market Association (ICMA) principles, etc.



# Stewardship Activities and ESG Promotion



Dialogue coverage  
(market capitalization basis)

## 94%

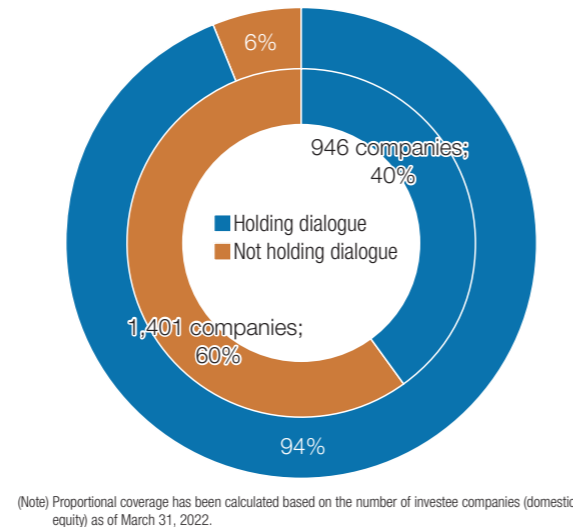
GPIF promotes constructive dialogue between its external asset managers and investee companies. Our external asset managers for domestic equities engaged in dialogue with 946 companies during 2022. This equates to 94% of all of GPIF's investee companies on a market capitalization basis.

## Status of Engagement Through Our Asset Managers for Domestic Equities

GPIF entrusts its equities investments to external asset managers, including engagements with investee companies and exercising its voting rights. For this reason, GPIF monitors the stewardship activities of its external asset managers and requires them to engage in constructive dialogue with investee companies. Here, we will introduce the status of dialogue by our external asset managers for domestic equities during 2022 calendar year.

As shown in Figure 1, our external asset managers for domestic equities engaged with 946 companies from January to December, 2022. This equates to 40% of all of GPIF's investee companies, or 94% in terms of total market capitalization.

**Figure 1. Dialogue Coverage of GPIF's Portfolio**  
(Inside: Based on the number of companies; Outside: Based on market capitalization)



**Figure 2. Average Number of Asset Managers Holding Dialogue and Number of Dialogues per Company per Year for Each Market Capitalization Category**  
(Number of asset managers; Number of dialogues)

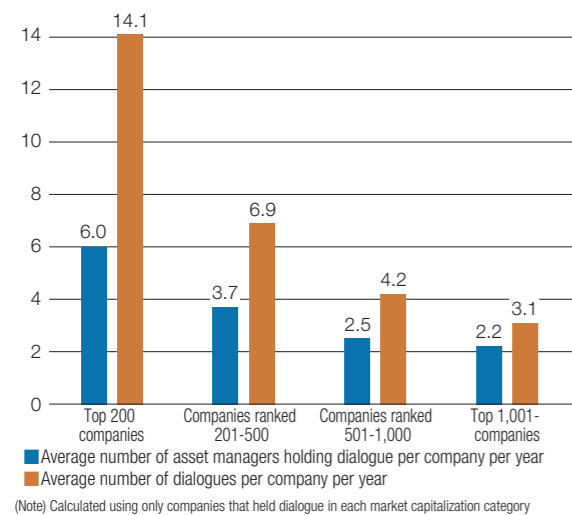
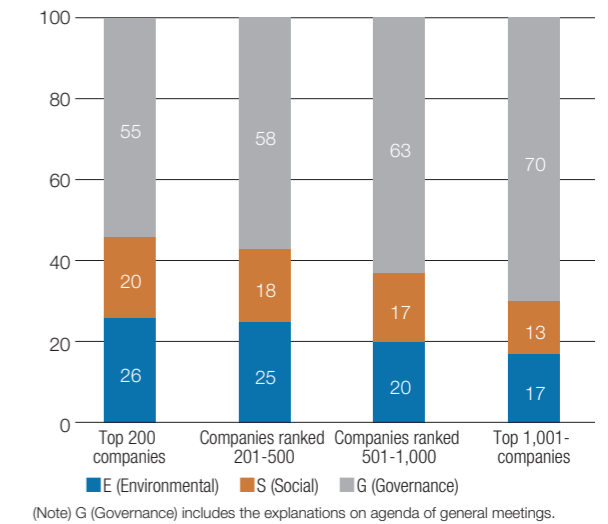


Figure 2 presents a graphic analysis from the perspective of dialogue frequency. For each market capitalization, the number of asset managers conducting dialogue per company, and the number of dialogues per company are demonstrated. In terms of companies that held dialogue, companies in each market capitalization category held dialogue with an average of at least two asset managers totaling at least three dialogues per year. Larger companies held dialogue more frequently. The top 200 companies by market capitalization held dialogue with an average of approximately six asset managers totaling at approximately 14 dialogues per year (an average of 2.3 dialogues with each asset manager per year). This result is likely to be affected by the tendency towards greater

overlaps and portfolio weights for investee companies with larger market capitalization.

In Figure 3, we present a graph of the proportions of each theme in ESG-related engagement for each market capitalization category. The most common ESG theme in dialogues with companies in all market capitalization categories is G (Governance). However, whereas E (Environmental) and S (Social) themes account for slightly less than half of all dialogue themes among the top 200 companies, the proportion of dialogues focused on governance tends to be greater among smaller companies. This suggests that the emphasis given to each theme by asset managers depends on the company scale.

**Figure 3. Proportion of Each Theme in ESG Engagement for Each Market Capitalization Category (%)**



## Survey of Listed Companies

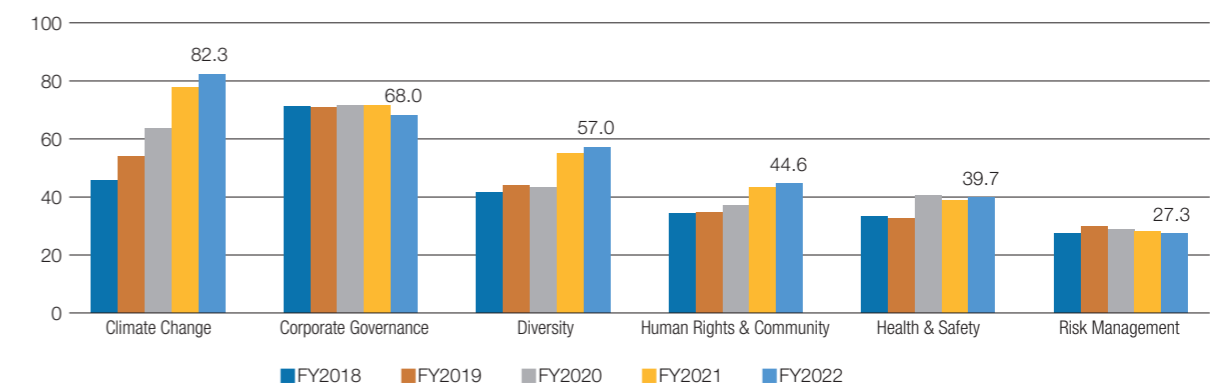
GPIF conducts an annual survey of companies in order to get their feedback on the stewardship activities of our external asset managers and to monitor the nature and progress of their engagement. We also use the survey to gather their opinions on the ESG indexes we invest in and understand companies' ESG disclosure initiatives. In our eighth survey, conducted in fiscal 2022, we surveyed companies in the TOPIX and received responses from 735 companies, representing 72% of total market capitalization.

The results of the fiscal 2022 survey indicate little change in the ranking of the major themes of companies' ESG activities (Figure 4). Compared to the results of the last survey, the largest jumps in the rates of recognition as major

themes were for Climate Change, Diversity, and Human Rights and Community. This suggests an increased awareness among companies of the supplementary principles added in the revision of the Corporate Governance Code. Figure 5 shows a summary of the major ESG themes for each of the 17 TOPIX sector categories. The highest-ranked themes are generally common between most sectors, but some sector traits are also visible, such as the high ranking of Health & Safety in the Foods sector, where it is ranked second.

As noted above, many companies now perceive climate change as the main ESG theme, and progress is being made in climate change-related corporate disclosure. In Figure 6,

**Figure 4. Responses to the Question, "What are the major themes of the ESG activities of your company?" (Multiple responses allowed, up to five)**



the number of companies making disclosures in line with the TCFD recommendations has increased substantially, from 249 to 462. Moreover, 72% of these companies held dialogue with institutional investors regarding TCFD disclosure. Looking

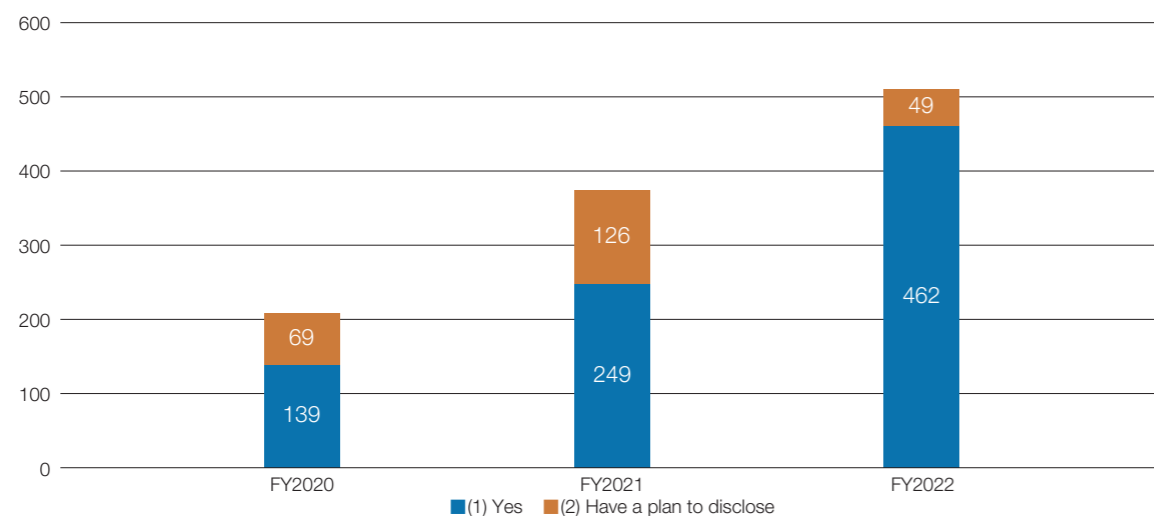
ahead, we expect to see further progress in dialogue with investors and enhancement of disclosure.

Figure 5. Top Five ESG Themes in Each of the 17 TOPIX Sector Categories

17 TOPIX Sector Categories	n	Top Five ESG Themes					
Foods	34	1_Climate Change	2_Health & Safety	3_CG	3_Human Rights & Community	5_Supply Chain	
Energy Resources	4	1_Climate Change	2_CG	3_Diversity	3_Health & Safety	3_Human Rights & Community	3_Disclosure
Construction & Materials	65	1_Climate Change	2_CG	3_Diversity	4_Health & Safety	5_Human Rights & Community	
Raw Materials & Chemicals	83	1_Climate Change	2_CG	3_Diversity	4_Health & Safety	5_Human Rights & Community	
Pharmaceutical	16	1_CG	1_Diversity	3_Climate Change	4_Health & Safety	4_Product Liability	
Automobiles & Transportation Equipment	26	1_Climate Change	2_CG	3_Diversity	4_Supply Chain	4_Human Rights & Community	
Steel & Nonferrous Metals	19	1_Climate Change	2_CG	2_Human Rights & Community	4_Health & Safety	5_Diversity	
Machinery	54	1_Climate Change	2_CG	3_Human Rights & Community	4_Diversity	5_Product Liability	
Electric Appliances & Precision Instruments	85	1_Climate Change	2_CG	3_Diversity	4_Supply Chain	5_Health & Safety	
IT & Services, Others	119	1_CG	2_Diversity	3_Climate Change	4_Human Rights & Community	5_Risk Management	
Electric Power & Gas	13	1_Climate Change	2_CG	3_Diversity	4_Human Rights & Community	5_Disclosure	
Transportation & Logistics	39	1_Climate Change	2_Diversity	3_CG	4_Human Rights & Community	5_Health & Safety	5_Product Liability
Commercial & Wholesale Trade	56	1_CG	2_Climate Change	3_Diversity	4_Health & Safety	5_Supply Chain	5_Human Rights & Community
Retail Trade	41	1_Climate Change	2_Human Rights & Community	3_CG	4_Diversity	5_Health & Safety	
Banks	31	1_Climate Change	2_Diversity	3_CG	4_Human Rights & Community	5_Disclosure	5_Others
Financials (Ex Banks)	30	1_Diversity	1_Climate Change	3_CG	4_Risk Management	5_Health & Safety	
Real Estate	20	1_Climate Change	2_CG	3_Diversity	4_Health & Safety	4_Human Rights & Community	
Total	735	1_Climate Change	2_CG	3_Diversity	4_Human Rights & Community	5_Health & Safety	

Legend: E (Environmental), S (Social), G (Governance), Multiple ESG themes. (Note) Numerical prefixes represent the rank of each theme. CG is an abbreviation of corporate governance.

Figure 6. Number of Company Responses to the Question “Do You Disclose Information in Line with the TCFD Recommendations?” Among Companies That Endorse the Recommendations



### Critical ESG Issues Cited by GPIF's External Managers

GPIF's Stewardship Principles require external asset managers to engage proactively on critical ESG issues. On that basis, every year, GPIF surveys our asset managers on what ESG issues they consider to be critical.

This time, “Human Rights & Community” newly emerged as a critical ESG issue among all passive managers for equities.

In Europe, some countries have made it mandatory to conduct human rights due diligence. In some cases, the consequences extend beyond reputation risk to include an increasing risk of more direct economic impact. It is clear that human rights have also become a key issue for Japanese companies that trade internationally.

There is also a growing awareness of human rights among investors, with the December 2022 launch of the PRI Advance, a collaborative engagement initiative on the theme of human rights and other S (Social) issues. Also for the first time, all active managers for domestic equities have perceived “Climate Change” and “Capital Efficiency” as critical issues. In other words, both passive and active

domestic equities managers have come to recognize “Climate Change” as a critical issue. In addition to the “Capital Efficiency” mentioned above, active asset managers continue to cite G (Governance) issues including “Board Structure and Self-evaluation” and “Minority Shareholders Rights (cross-shareholdings, etc.)” as critical ESG issues. Meanwhile, passive managers continue to perceive a broad range of long-term E (Environmental) and S (Social) issues such as “Diversity,” “Supply Chain,” and “Misconduct” as critical ESG issues.

For foreign equities, all passive managers emphasize an expanding range of critical ESG issues including “Health & Safety,” “Biodiversity,” “Deforestation,” and “Others (Governance),” in addition to “Human Rights & Community.” The launch of the Task Force on Nature-related Financial Disclosures (TNFD), an initiative concerning natural capital and biodiversity, established in June 2021, has likely played a part in the increased focus on “Biodiversity” and “Deforestation.”

Figure 7: Critical ESG Issues Recognized by External Asset Managers (%)

Domestic Equities – Passive		Domestic Equities – Active		Foreign Equities – Passive		Foreign Equities – Active		Domestic Bonds		Foreign Bonds	
Climate Change	100	Climate Change	100	Climate Change	100	Climate Change	86	Disclosure	100	Climate Change	88
Supply Chain	100	Disclosure	100	Disclosure	100	Disclosure	71	Climate Change	93	Human Rights & Community	76
Disclosure	100	Minority Shareholder Rights (cross-shareholdings, etc.)	100	Diversity	100	CG	71	CG	86	Supply Chain	71
Misconduct	100	Board Structure Self-evaluation	100	Biodiversity	100	Board Structure Self-evaluation	71	Supply Chain	71	Pollution & Resources	65
CG	100	Capital Efficiency	100	Human Rights & Community	100	Board Structure Self-evaluation	71	Board Structure Self-evaluation	71	CG	65
Human Rights & Community	100	Misconduct	86	Health & Safety	100	Human Rights & Community	71	Human Rights & Community	71	Diversity	65
Diversity	100	Diversity	86	Deforestation	100	Misconduct	64	Misconduct	64	Waste Management	59
Biodiversity	83	Supply Chain	71	Others (Governance)	100	Labor Standards	64	Labor Standards	64	Disclosure	59
Capital Efficiency	83	Others (Governance)	71	CG	75	Diversity	64	Diversity	64	Anti-corruption	59
Board Structure Self-evaluation	83	CG	71	Board Structure Self-evaluation	75	Environmental Opportunities	57	Environmental Opportunities	57	Deforestation	53
Minority Shareholder Rights (cross-shareholdings, etc.)	83	Labor Standards	71	Labor Standards	75	Water Stress		Water Stress		Water Security	53
		Human Rights & Community	71	Capital Efficiency	75	Water Security	75	Water Security	75	Others	53
				Water Stress	75	Others	75	Others	75	Board Structure Self-evaluation	53
				Supply Chain	75	Supply Chain	75	Health & Safety	53	Health & Safety	53
				Risk Management	75	Risk Management	75	Product Liability	53	Product Liability	53
				Minority Shareholder Rights	75	Minority Shareholder Rights	75	Labor Standards	53	Labor Standards	53
				Environmental Opportunities	75	Environmental Opportunities	75				
				Others (Environmental)	75	Others (Environmental)	75				

(Note) The percentage represents the ratio of the number of managers that selected the relevant issues to the number of active/passive managers. Only the issues cited as “critical ESG issues” by more than 70% of equity asset managers and more than 50% of fixed income asset managers are listed. For domestic equities, if an asset manager is entrusted to both active and passive mandates, it is counted as the one with larger amount of mandate entrusted by GPIF. The figures for “Foreign Equities – Active” include the responses of external asset managers newly added in fiscal 2022. CG is an abbreviation of corporate governance. (Source) Survey of GPIF's external equity and fixed income asset managers as of December 2022

# ESG in Alternative Asset Management

Avoided Emissions

Equivalent to  
**117,000**  
households

GPIF has been developing initiatives to properly integrate ESG in its alternative asset manager selection and post-selection monitoring process.

## ESG in Alternative Assets

The holding period for alternative assets (infrastructure, real estate, and private equity) is generally quite long, and in many cases, the asset manager itself is involved in the corporate management and business operations of the investee. As a result, more asset managers are focusing on integrating ESG into their investment processes not only for identifying the risks that may arise during the holding period but also for finding opportunities for sustainable asset value growth and improvement of corporate value. This trend is

### (1) ESG Evaluation in Selecting Asset Managers

Since GPIF began selecting alternative asset managers that adopt a multi-manager strategy in April 2017, we have added an evaluation of prospective asset managers' ESG initiatives to the assessment. Assessments are conducted from many different aspects, including through due diligence questionnaires, interviews with ESG staff, and evaluations by third-party consultants. Among other things, we look at the manager's company-wide ESG policies, ESG integration in the investment process, their oversight company structure, and how they report to investors after an investment is made.

### (2) Post-Investment Monitoring

There is still no standardized rating criteria for ESG factors

particularly prominent among overseas asset managers.

Although we use the collective phrase "alternative asset management", ESG factors and its impacts vary, depending on the individual characteristics of the asset and/or business in question. Approaches to ESG integration also differ depending on individual investment strategies. With an understanding of these differences, GPIF as an asset owner monitors asset managers' ESG evaluation and monitors the status of their investment.

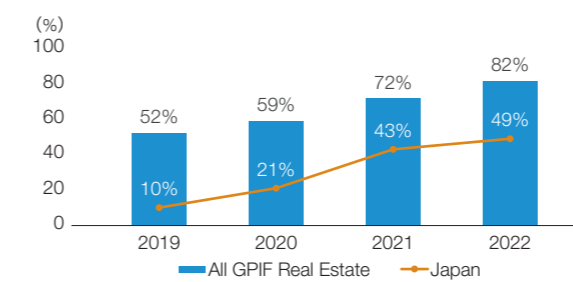
that can be applied across all alternative assets. As such, each asset manager creates its own unique ESG rating criteria and scoring methodology based on the characteristics of the asset and the fund manager's investment strategy. GPIF monitors asset managers for any changes in their ESG-related organizational structure, whether or not the diversified funds in which they invest are managed by PRI signatories, and the status of their ESG initiatives. As well as requiring individual asset managers to provide a report detailing the status of their ESG-related investment capabilities and initiatives, we engage in dialogue with them to understand the status of the ESG-related aspects of their portfolios.

## Real Estate Portfolio Initiatives / GRESB (Global Real Estate Sustainability Benchmark)

In 2022, 82% of the funds in GPIF real estate portfolio by value participated in GRESB Real Estate Assessment (weighted average asset value as of the end of December each year). This was an increase of 10%, or 6 funds, from the previous year. In regions where GRESB was introduced early on, such as Europe

and Australia (APAC), participation rates have remained stable at 90% or more ever since measurement began in fiscal 2019. Fiscal 2022 saw an increase in the number of participating funds in North America and Japan, boosting the participation rate across GPIF's entire real estate portfolio.

Trends in GRESB Participation Rate (All GPIF real estate / Japan)



GRESB is an investor-led organization that provides a standardized benchmark and validated data of the ESG performance of Real Assets including Real Estate and Infrastructure. GPIF joined GRESB in fiscal 2019 as an investor member in the real estate sector. In fiscal 2022, GPIF became the first investor member in the infrastructure sector in Japan.

## Analysis of Real Estate Portfolio Using Climate Value-at-Risk

In our climate-related financial disclosures for this fiscal year, we have used climate Value-at-Risk (CVaR) to measure the effect of climate change (physical risks and transition risks) on real estate asset values in GPIF's Japanese domestic real estate portfolio, part of the alternative asset portfolio. In our analysis of physical risks, we evaluated risks across six categories of natural disasters: (1) coastal flooding, (2) extreme cold, (3) fluvial flooding, (4) extreme heat, (5) tropical cyclones, and (6) wildfire.

In terms of property value, the results of the analysis of physical risks show that in most cases the risk was "negligible risk," with only a few cases where the risk was classified as "severe risk" or "significant risk." In terms of the risks of each category of natural disaster, for (2)

extreme cold, there was a large proportion of "negligible risk reduction," while for (3) fluvial flooding, (4) extreme heat, (5) tropical cyclones, and (6) wildfire, the effect on asset value was "negligible risk" or "no identifiable risk" in most cases. However, there were some properties for which the risk of (1) coastal flooding fell under "severe risk," "significant risk," or "moderate risk."

In our analysis of transition risks, we evaluated the potential cost impact caused by the transition to a low-carbon economy, based on several climate change scenarios (NGFS). This analysis revealed that a higher reduction target in the scenario tended to result in higher transition risks.

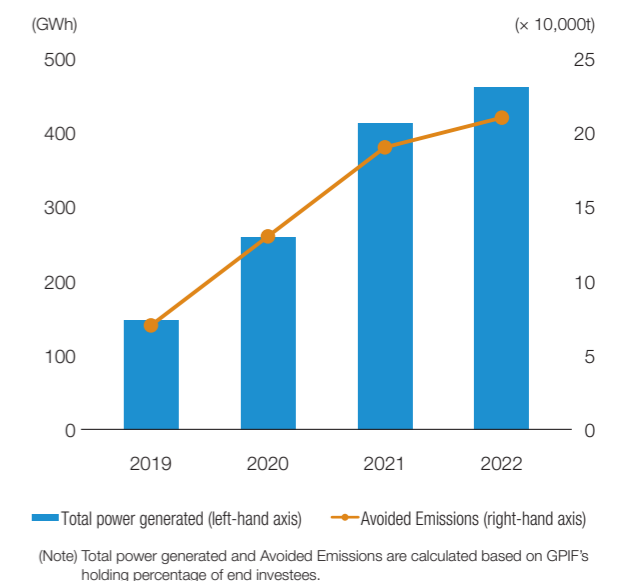
\*Please refer to pages 73–74 for details of this analysis.

## Analysis of Avoided Emissions from Domestic Renewable Energy Projects

We conducted an analysis of the avoided emissions from the domestic renewable energy facilities in GPIF's infrastructure portfolio.

The total power generated by the renewable energy facilities in Japan that GPIF invests in through infrastructure amounted to approximately 461GWh in 2022, an increase from the previous year. We increased our total investment in infrastructure funds, which progressively invested in solar power facilities. In addition, some solar power facilities benefitted from good weather conditions, leading to an increase in the power generated. The theoretical amount of avoided emissions from the switch to renewable energy-fueled power generation in 2022 increased to approximately 210,000t. This figure is calculated based on the power generated, using the Japan Photovoltaic Energy Association (JPEA) guidelines and other information such as the GHG emission factors published by power companies. This is

Total Power Generated and Avoided Emissions through GPIF's Portfolio of Domestic Renewable Energy Projects



equivalent to the annual GHG emissions from electricity usage of approximately 117,000 households.

# Collaboration with Overseas Public Pension Funds and Other Institutions

GPIF collaborates with a wide range of domestic and global institutions. From fiscal 2022, GPIF participates as an observer in the ESG Disclosure Study Group.

**November 2016** **Joined the Thirty Percent Coalition and the 30% Club**

Both the Thirty Percent Coalition in the U.S. and the 30% Club in the U. K. are initiatives that seek greater diversity in listed company boards by increasing the proportion of female board members to 30%. GPIF has participated in the Thirty Percent Coalition in the U.S. and the Investor Group of the 30% Club in the U. K. as an observer since November 2016. Since December 2019, we have also participated in the 30% Club Japan Investor Group.



**April 2018** **Published a Joint Research Paper with the World Bank Group**

In 2018, GPIF and the World Bank Group published a joint research paper entitled "Incorporating Environmental, Social and Governance Factors into Fixed Income Investment." Following up on this research, in April 2019, the World Bank Group drew up a new proposal to provide GPIF's external asset managers with an opportunity to invest in green bonds.



**December 2018** **Declared Support for the TCFD**

GPIF declared our support for the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) in December 2018. We commenced information disclosure in accordance with the TCFD recommendations in August 2019 with our ESG Report 2018 and have done so every year since.




**November 2020** **Joined JPX ESG Knowledge Hub**

The ESG Knowledge Hub, established by the Japan Exchange Group (JPX), is a platform that aims to encourage listed companies to disclose ESG information by providing one-stop access to content and information that will assist in understanding ESG investment. GPIF joined the ESG Knowledge Hub as a supporter when it was first established in November 2020.



**February 2023** **Joined the ESG Disclosure Study Group**

GPIF joined the ESG Disclosure Study Group (EDSG) as an observer in February 2023. This study group provides a forum for free and vigorous discussion between listed companies, investors, and others regarding approaches to the disclosure of non-financial information to contribute to enhancing corporate value over the long term. We believe that our participation will be useful in GPIF's efforts to promote stewardship activities.





**September 2015** **Signed the Principles for Responsible Investment (PRI)**

GPIF has been stepping up its ESG initiatives since we signed the PRI in September 2015. Each signatory organization reports its ESG initiatives to the PRI and receives a full assessment of its progress. In the most recent assessment, as of March 31, 2023, GPIF achieved a four-star rating in the PRI Investment and Stewardship Policy.



**October 2018** **Joined Climate Action 100+**

Climate Action 100+ is an investor-led climate change initiative launched in September 2017. Members of this initiative hold constructive dialogues with companies that have a significant impact on the resolution of climate change issues. Participants discuss improving climate change-related governance, making efforts to reduce greenhouse gas emissions, and enhancing information disclosure. GPIF has participated in Climate Action 100+ as a supporter since October 2018, and also participates as an asset owner in the Asia Advisory Group (AAG), which advises the Steering Committee on circumstances and conditions in the Asia region.



**August 2019** **Joined ICGN**

International Corporate Governance Network (ICGN) is an international network of institutional investors and other organizations. It promotes better corporate governance and stewardship activities with the aim of advancing efficient markets and sustainable economies. GPIF joined ICGN in August 2019.



**August 2019** **Joined CII**

The Council of Institutional Investors (CII) is a network of institutional investors established by U.S. public pension funds, with the aim of advocating and collaborating in the areas of shareholder rights and corporate governance in the U.S. GPIF joined CII in August 2019.



# Implementation of a High-Level Study on the Integration of ESG and SDGs in Investment



**73%**

In fiscal 2022, GPIF undertook a High-Level Study on the Integration of ESG and SDGs in Investment. Of the 300 academic papers considered in the study, 73% indicated a positive relationship between ESG and investment performance.

Sustainability-related fields such as ESG and the SDGs are connected with a diverse range of research fields: not only conventional fields such as economics, finance, and financial engineering but also eclectic areas such as environmental economics, climate science, and urban engineering. Active efforts are also being made to leverage data science to quantify non-financial information, which has been difficult to quantify so far. In fiscal 2022, given this situation, GPIF embarked on a High-Level Study on the Integration of ESG and SDGs in Investment.

This high-level study was implemented to provide an

## Selection Methods

1. Number of citations received (cited over 100 times)
2. Qualitative judgement
3. Coverage of the latest topics
4. Coverage of topics unique in Japan

Of the 300 academic papers considered in this high-level study, 73% indicated a positive relationship between ESG and investment performance. In particular, approximately 90% of papers indicated a positive effect in the categories "C: Risk control" and "F: Engagement" (Figure 2).

Overall, a large majority of papers presented positive results, but there was a chance that differences in analysis methods and publishing journals may have given rise to different tendencies, so we also surveyed the relationship between their polarity (positive or negative) and six factors: affiliation of the author(s), period analyzed, analysis universe, data source, investment performance measurement, and

overview of academic research on the topic, including trends in analysis methodologies. This was done through a broad-based survey of leading papers on investment performance in the sustainability field, including ESG and the SDGs, in Japan and overseas.

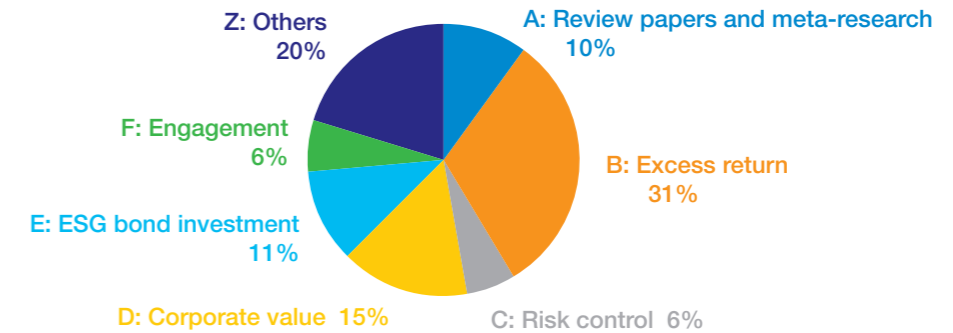
For the study, we selected 300 academic papers published from 1991 to 2023 using the selection methods shown in 1 to 4 below, based on a consideration of the balance between fairness and comprehensiveness. These 300 papers were classified into six themes (A to F) and checked their analysis methodology and other characteristics (Figure 1).

field of journal in which the paper was published.

As a result, we found clear differences in polarity, especially for the factors "ESG data source used in the analysis" and "Investment performance measurement used in the analysis," while there was little effect from "Field of the journal of publication." Here, of the six factors considered, we will explain the difference in polarity due to "Investment performance measurement used in the analysis" and "Field of the journal of publication."

The academic papers we considered used return, market measures (such as Tobin's Q and cost of capital), and accounting measures (such as ROE and ROA) as

Figure 1. Composition of Academic Papers Surveyed by Theme Category



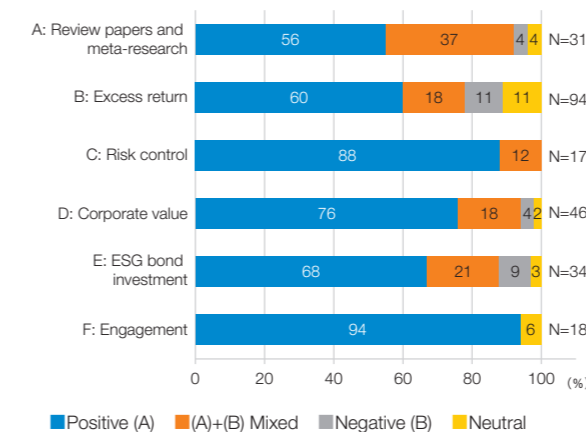
(Source) Report on the High-Level Study on the Integration of ESG and SDGs in Investment

measures of investment performance. Return was the most common perspective from which ESG and investment performance were assessed, with 84 papers using this measure. Where return was used, a positive relationship between ESG and investment performance was observed in 55% of cases. By contrast, a positive relationship was observed in 81% of cases where market measures were used (Figure 3). From another perspective, we examined polarity tendencies by classifying papers by their journal of publication (financial economics and investment theory, accounting and business management, corporate ethics, and other). Among papers published in journals that discuss ESG from the perspective of corporate ethics, such as the Journal of Business Ethics, a relatively large proportion, 73%, found a positive relationship between ESG and

investment performance. A positive relationship was also indicated in 62% of papers published in financial economics and investment theory journals, such as the Journal of Financial Economics.

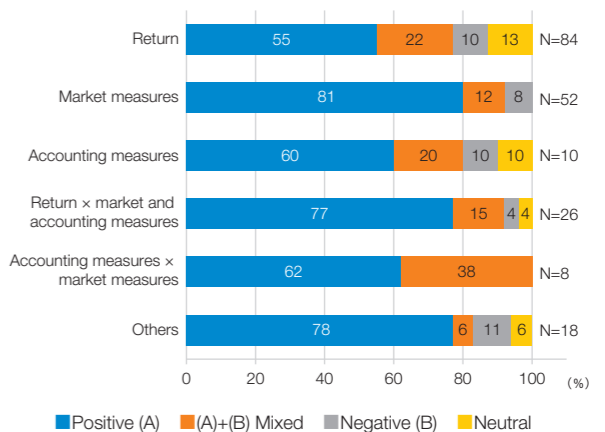
From fiscal 2023, we will commence a review of the effects of GPIF's ESG investments and stewardship activities using statistical methods such as causal inference (the Effect Measurement Project). Through the high-level study described above, we were able to gain useful insights for our Effect Measurement Project, including examples of research using causal analysis for engagement impact, as well as prior research considering spillover effect<sup>1</sup> and market risk control effect. We will refer to these results in GPIF's Effect Measurement Project.

Figure 2. Proportion of Polarity (Positive or Negative Impact) for Each Theme Category



(Note) Polarity (positive/negative) types and definitions:  
 Positive (Negative): Papers indicating a positive (negative) relationship between ESG and investment performance  
 Positive + Negative: Papers indicating both positive and negative results  
 Neutral: Papers not indicating any statistically significant results

Figure 3. Proportion of Polarity for Each Type of Performance Measurement



(Note) Measure definitions:  
 Market measures: Market price-based measures such as Tobin's Q and PBR, as well as cost of capital, risk-based measures, etc.  
 Accounting measures: Capital efficiency and profitability measures such as ROE and ROA, as well as net sales growth rate, cash flow, etc.

(Source) Figures 2 and 3: Report on the High-Level Study on the Integration of ESG and SDGs in Investment

<sup>1</sup> This refers to the phenomenon and effect where, for example, the advance adoption of a CSR policy by one company leads to the adoption of similar CSR policies by a number of other similar companies.

Column 2

# Academic Research Related to GPIF's Stewardship Activities and ESG Investment

At GPIF, we collect information on the latest empirical academic studies in the fields of ESG investment and stewardship activities as part of our efforts to review our activities from diverse perspectives. The extent of such empirical research is limited, however, as companies do not normally disclose the specific details of engagement with institutional investors. Moreover, it is impossible to know from outside whether changes in corporate behavior after such engagement are due to the effectiveness of the engagement or whether they are voluntary changes of their own accord. However, as data in this field accumulate over the years, in an increasing number of cases, researchers are able to obtain and analyze information from institutional investors on their engagement activities. In this column, we will introduce three examples of empirical research into the effects of ESG investment and stewardship activities related to GPIF.

## Empirical Research on the Improvement in ESG Performance Due to Engagement by Passive Investment Managers

First, we will present some of the research findings published by a research group including Professor Marco Becht of Vrije Universiteit Brussel, Professor Kazunori Suzuki of Waseda University, and others (Becht, Franks, Miyajima, and Suzuki [2023]<sup>1</sup>) using information on engagement activities provided by Asset Management One Co., Ltd., one of GPIF's engagement-enhanced passive investment managers.

The research group analyzed whether institutional investors' engagement with companies had a subsequent effect on the companies' ESG scores. The researchers applied regression analysis using the difference-in-differences method<sup>2</sup>, comparing two groups of companies from within the TOPIX 500: companies with which Asset Management One had engaged during the period from 2018 to 2022 (the treated group) and other companies that have not been engaged (the control group). They tested the influence (treatment effect) of engagement on

ESG scores.

Their findings are presented in Figure 1. The FTSE ESG score (overall score) of the treatment group, where there was some form of engagement, was estimated to be 0.21pt higher than that of the control group. The effect of engagement on E (Environmental) themes was estimated to raise the E score of the treated group by 0.29pt compared to the control group. The effect of engagement on comprehensive ESG themes was estimated to raise the ESG score of the treated group by 0.16pt compared to the control group. Meanwhile, for the MSCI scores, there was no significant difference between the ESG score (overall score) of the treated group and the control group in the absence of any form of engagement; however, engagement on G (Governance) themes was estimated to raise the G score by 0.10pt (Figure 1).

Figure 2 shows the effects of engagement on each ESG score in more detail by splitting the companies in the

TOPIX 500 into five groups based on their ESG scores, from lowest to highest. The results indicate that, for FTSE scores, engagement was effective for companies with relatively low E scores. Environmentally-themed engagement with companies that had relatively low E scores was estimated to boost the E scores of the treated group by 0.50pt compared to the control group. Meanwhile, for MSCI scores, the results indicate that

engagement was effective for companies with relatively low G scores. Governance-themed engagement with companies that had relatively low G scores was estimated to boost the G scores of the treated group by 0.15pt compared to the control group.

The study's authors pointed out that the divergence in results between the FTSE and MSCI ESG scores is due to differences in their ESG scoring methodologies.

Figure 1. Results of Analysis: Does Engagement Affect ESG Scores?

	Score	ESG Score (Overall)	E Score	S Score	G Score	ESG Score (Overall)
	Details of Engagement	All Engagement	E	S	G	ESG (Comprehensive)
FTSE	Difference	0.21***	0.29***	0.09	0.01	0.16***
	Standard error	(0.049)	(0.064)	(0.074)	(0.043)	(0.046)
MSCI	Difference	0.02	-0.08	-0.00	0.10***	0.03
	Standard error	(0.028)	(0.064)	(0.064)	(0.035)	(0.026)

Figure 2. Results of Analysis: Does Engagement Affect ESG Scores? (By ESG Score Percentile)

	Percentile	FTSE					MSCI				
		10th	25th	Median	75th	90th	10th	25th	Median	75th	90th
E Score <sup>1</sup>	Difference	0.50***	0.50**	0.30	0.20	-0.10	-0.00	-0.15	-0.05	-0.05	-0.15
	Standard error	(0.136)	(0.196)	(0.230)	(0.202)	(0.137)	(0.070)	(0.106)	(0.122)	(0.106)	(0.178)
S Score <sup>2</sup>	Difference	0.20	0.20	0.10	0.10	-0.20	0.10	0.15	0.05	-0.00	-0.05
	Standard error	(0.151)	(0.224)	(0.259)	(0.221)	(0.148)	(0.124)	(0.119)	(0.138)	(0.119)	(0.165)
G Score <sup>3</sup>	Difference	0.10	0.10	-0.20	0.10	-0.20*	0.15**	0.05	0.10	-0.00	0.10
	Standard error	(0.120)	(0.166)	(0.203)	(0.160)	(0.115)	(0.063)	(0.092)	(0.108)	(0.094)	(0.063)

(Notes) 1 Engagement on E themes; 2 Engagement on S themes; 3 Engagement on G themes

Figures 1 and 2:

(Note1) ESG score percentiles have been classified into five groups from lowest to highest ("extremely low," "low," "medium," "high," and "extremely high")

(Note2) FTSE's scores are for the period from June 2016 to December 2021. MSCI's scores are for the period from December 2016 to June 2020 (due to a major change in the method used to calculate MSCI's scores in November 2020)

(Note3) \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

(Source) Becht, Franks, Miyajima, and Suzuki, "Does Paying Passive Managers to Engage Improve ESG Performance?" (2023 working paper)

<sup>1</sup> (Source) Becht, Franks, Miyajima, Suzuki, "Does Paying Passive Managers to Engage Improve ESG Performance?" (2023 working paper: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4506415](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4506415))

<sup>2</sup> Difference-in-differences method: a method used to estimate the effect of treatment as the difference between the average change (difference) in the treated group and the average change (difference) in the control group

### Empirical Research on the Selection and Effect of Engagement by Institutional Investors

Next, we will introduce a study using engagement data (for companies in Japan) from four companies: Amundi, Tokio Marine Asset Management, and Fukoku Capital Management, as well as FIL Investments (Japan) Limited, one of GPIF's engagement-enhanced passive investment managers.

This study (Hayashi, Kimura, and Inoue [2023]<sup>3</sup>) was conducted by a research group led by Professor Kotaro Inoue of the Tokyo Institute of Technology (the Inoue lab) and used data on engagement with Japanese companies during the period from 2017 to 2020, provided by the four companies listed above. The researchers applied difference-in-differences analysis and other methods to examine what kind of companies were chosen as engagement targets by institutional investors and what changes were brought about by this engagement. The Inoue lab had previously conducted empirical research into engagement<sup>4</sup> in 2021, which we introduced in our 2020 ESG Report. This new study is built

### Empirical Research on the Effects of Adopting the Women's Advancement Thematic Index

Lastly, we will present a study analyzing the effects of GPIF's adoption of the MSCI Japan Empowering Women Index (WIN index), including its effect in promoting the employment of women by companies. In this study, a group of researchers from the University of Alberta and elsewhere (Mehrotra, Roth, Tsujimoto, and Wiwattanakantang [2023]<sup>5</sup>) used the difference-in-differences method to analyze data from 2013 to 2020, including MSCI gender diversity scores and data on employment from the Toyo Keizai CSR Surveys conducted by Toyo Keizai Inc. The researchers divided the data into two groups: companies close to the standards for inclusion in the WIN index (the treated group) and companies far from inclusion in the WIN index (the control group). Their results

on the results of the previous research.

The study found that institutional investors tended to pursue E and S engagement with companies for which monitoring was highly necessary, companies with outstanding capital efficiency, and companies with outstanding disclosure of governance structure as well as environmental and social information. This tendency was found to be stronger among active investment funds. Regarding the effect of engagement, the study found that E engagement encouraged companies to establish CO<sub>2</sub> emission reduction targets and consequently reduce their CO<sub>2</sub> emissions, while S and G engagement raised companies' proportion of female in management position. The study also examined the effect of engagement on corporate value. The results suggest that Tobin's Q improved as a result of G engagement, and that there is a difference in effect depending on the engagement theme.

show a larger increase in the proportion of women employed in the treated group than the control group during the period after GPIF adopted the WIN index, especially in positions at the senior management level and above. Moreover, the study revealed a decrease in overtime work and an increase in the childcare leave uptake rate among male employees at companies in the treated group. There was also an increase in holdings of these stocks by institutional investors. The study's authors explained that the adoption of the WIN index provided companies with an incentive for inclusion in the index and encouraged them to change their behavior.

<sup>3</sup> (Source) Hayashi, Kimura, and Inoue, "The Selection and Effect of ES Engagement by Institutional Investors" (paper presented at the 2023 Conference of the Nippon Finance Association)  
<sup>4</sup> (Source) Hidaka, Ikeda, and Inoue, "Motivations and Effects of Engagement by Institutional Investors" (2021 REIT discussion paper)  
<sup>5</sup> (Source) Mehrotra, Roth, Tsujimoto, and Wiwattanakantang, "Empowering Women by Index Membership: Evidence from a Unique Experiment from Japan" (2023 working paper)

# Measuring the Effects of Stewardship Activities and ESG Investment

Number of Themes  
to be Analyzed

## 4 themes

GPIF will conduct a project using statistical methods such as causal inference to examine the effects of its stewardship activities and ESG investments. We will implement this project in collaboration with external consultants and researchers from academia and elsewhere across each of four themes.

## About Measuring the Effects of Stewardship Activities and ESG Investment Project

It takes a long time for stewardship activities and ESG investment to produce tangible results such as improving the sustainability of financial markets and boosting risk-adjusted returns. Therefore, to appropriately implement the PDCA cycle (Plan→Do→Check→Act) for stewardship activities and ESG investment, it is crucial to examine issues such as whether GPIF's activities are connected with companies' behavioral changes and higher ESG ratings, including causal effect between the two, as a first step, without waiting for eventual outcomes such as more sustainable financial markets and higher boosting of risk-adjusted returns.

From fiscal 2023 to fiscal 2024, after the elapse of an appropriate period for data accumulation since the start of our stewardship and ESG investment initiatives, we will collaborate with external consultants and researchers from academia and elsewhere to implement a review of the effects of these initiatives using statistical methods such as causal inference, across each of the four themes shown below (Figure 1).

Through the appropriate implementation of the PDCA cycle, we will continue to improve and revise our stewardship and ESG investment initiatives.

Figure 1. Overview of the Effect Measurement Project

	Project Themes	Details (Examples)
Measuring the effects of stewardship activities	Verification of the effects of engagement	Research into causal effect on ESG ratings and improvement of corporate value, caused by engagement
	Verification of the exercise of voting rights by investment managers	Trend analysis in voting behavior differences for companies with which they have a potential conflict of interest and other investee companies
Measuring the effects of ESG investment	Verification of the effects of passive equity investment based on ESG indexes	Analysis of the effects of ESG investment on corporate behavior
	Research into ESG factors that contribute to improving corporate value and investment returns	Research into the causal effect between ESG factors and corporate value/ investment returns

(Note) Project themes and the timing of implementation may be subject to change

Column 3

## Investors Keeping Close Eye on Companies' Human Rights Initiatives

Companies may have the risks of, perhaps unintentionally, violating human rights through their business activities. Therefore the international community requires them to act in accordance with regulations such as the OECD Guidelines for Multinational Enterprises and the Tripartite Declaration of Principles Concerning Multinational Enterprises and Social Policy.<sup>1</sup> In Japan, the National Action Plan on Business and Human Rights was formulated in 2020. This was followed in 2022 by the Guidelines on Respect for Human Rights in Responsible Supply Chains. These guidelines present the significance of respect for human rights in terms of controlling corporate management risks and enhancing corporate value.

The PRI Advance, a collaborative engagement initiative launched in December 2022, is gaining attention in the context of recent developments related to human rights. Advance is an initiative by institutional investors for collaborative engagement on human rights issues and other social (S) themes. As of June 2023, the number of institutions participating in the initiative has grown to 255, with combined AUM of US \$37 trillion.<sup>2</sup>

The target companies for engagement under the

Advance initiative are selected<sup>3</sup> based on factors such as their human rights benchmark scores, evaluated by the World Benchmarking Alliance (WBA)<sup>4</sup> on the basis of corporate disclosures. As of June 2023, 40 companies had been selected from the resource mining and renewable energy sectors. The WBA has also conducted evaluations for the food and agricultural products sector, the ICT manufacturing sector, and the automotive manufacturing sector in November 2022. It may be possible that we would be able to see companies added from these sectors to our engagement targets in the future.

A comparison of the human rights benchmark scores (average) of 22 Japanese companies in these three sectors with their foreign counterparts, evaluated in November 2022, reveals that the Japanese companies lag behind in almost all measurement themes (Figure 1). There are no established international standards for the disclosure of human rights information. In this context, we think that the WBA's human rights benchmark score framework provides a useful reference point for understanding the factors emphasized by institutional investors around the world.

Figure 1. Comparison of the (Average) Human Rights Benchmark Scores of Japanese and Foreign Companies

	Perfect Score	Japanese Companies	Foreign companies	Difference
A: Governance and Policies	10	2.03	2.12	-0.09
A1: Policy commitments	5	1.72	1.61	0.11
A2: Board level accountability	5	0.31	0.51	-0.20
B: Embedding Respect and Human Rights Due Diligence	25	5.07	5.36	-0.29
B1: Embedding respect for human rights in culture and management systems	10	2.40	2.39	0.01
B2: Human rights due diligence	15	2.67	2.97	-0.30
C: Remedies and Grievance Mechanisms	20	2.61	4.40	-1.79
D: Performance: Company Human Rights Practices	25	2.02	3.25	-1.22
E: Performance: Responses to Serious Allegations	20	2.29	2.91	-0.63
Total score	100	14.02	18.04	-4.02

(Source) Prepared by GPIF based on data from 2022 Corporate Human Rights Benchmark.

<sup>1</sup> Guidelines on Respect for Human Rights in Responsible Supply Chains (2022)

<sup>2</sup> Linked from the Advance website, as of June 22, 2023

<sup>3</sup> Advance selects engagement targets based on its sector and company selection methodology.

<sup>4</sup> An initiative established in 2018 by the United Nations Foundation, Aviva, and the Index Initiative. It provides various benchmarks for the evaluation of companies' achievement of the SDGs.

## Review of ESG Activities and Future Outlook

GPIF's Investment Principles state that "sustainable growth of investee companies and the capital market as a whole are vital in enhancing long-term investment returns." Sustainable growth of our investments and the market as a whole could never be achieved by GPIF alone. GPIF will pursue ESG investment from the perspective of securing long-term investment returns with the cooperation of all concerned parties.

In fiscal 2022, GPIF secured a positive annual return on its investments of pension reserves. However, substantial market fluctuations persisted throughout the fiscal year, making it an extremely difficult investment environment to navigate. Under these conditions, ESG indexes for foreign equities adopted by GPIF all outperformed the policy benchmarks, but ESG indexes for the domestic equities all underperformed. This was partly due to a recoil after the extremely favorable results recorded in the previous fiscal year, and investment success should not be measured in terms of single-year performance. However, it is also important to revise our approach if there are any problems. In fiscal 2022, we repeatedly engaged in dialogue with index providers regarding issues such as changes to index methodology and the adoption of a new gender diversity index (the GenDi J index) for domestic equities.

In fiscal 2023, we will step up our review and verification work to further refine our ESG investments and stewardship activities. As stated in our Investment Principles, GPIF's ESG investments and stewardship activities are not

merely aimed at enhancing the long-term returns from the funds we invest in (gaining excess returns). For example, for our ESG index-based passive equity investments, we ask the disclosure of evaluation methodologies to the index providers in order to promote an awareness of potential inclusion in the ESG index among companies not currently part of the index. In our Effect Measurement Project, beginning this fiscal year, we plan to analyze the flow-on effects of GPIF's adoption of ESG indexes.

We also plan to use statistical methods such as causal inference to analyze a range of issues based on the engagement records submitted to us by our external asset managers. These include what kind of changes in corporate behavior investment managers actually bring about through their engagement activities and which asset managers pursue engagement most effectively. We hope to work with our external asset managers to examine efficient and effective approaches to engagement based on these results. Recently, the national government and local authorities are pursuing Evidence Based Policy Making (EBPM). At GPIF, we will also strive to engage in ESG investment and stewardship activities based on reasonable grounds.

We believe that ESG risks such as climate change are risks that GPIF must consider as a cross-generational investor with investments diversified across a wide spectrum of assets. Our motivation is neither political nor moral, nor are we chasing a passing trend. These are simply risks that must be considered in order for investors to achieve long-term investment returns. GPIF will pursue ESG investment from the perspective of securing long-term investment returns with the cooperation of all concerned parties.



Executive Managing Director and Chief Investment Officer (CIO)  
UEDA Eiji



## Chapter 2

# Measuring the Effects of ESG Activities



At GPIF, we measure whether our ESG activities are producing the expected results of improving the sustainability of financial markets and boosting risk-adjusted returns and hope that this will lead to the verification of the long-term impact of our initiatives. We therefore implement continuing, multi-faceted reviews, not only of our short-term investment performance but also of the factors responsible for the performance of ESG indexes, as well as various aspects of ESG ratings.

P.49 ESG Index Performance

P.51 Portfolio ESG Rating, ESG Rating Ranking by Country, and Correlation Between ESG Ratings

P.55 Gender Diversity in Japanese Companies

# ESG Index Performance

Sharpe Ratio of ESG Passive Fund for Domestic Equities

## 0.39

The total performance of passive funds tracking ESG indexes for domestic equities selected by GPIF had been outperforming market averages since the launch of the individual funds until fiscal March 2023. The risk-adjusted return (Sharpe Ratio) of these funds has also outperformed the market average. We will continue to review performance of ESG indexes from long-term perspectives.

## ESG Index Performance Attribution Analysis

Figure 1\* shows the performance of GPIF's selected ESG indexes since the launch of each fund until March 2023, and during the previous year (from April 2022 to March 2023). In fiscal 2022, the return from ESG indexes, for domestic equities in particular, underperformed the TOPIX. However, since the launch of each indexes, these indexes generally outperformed both their parent indexes and market averages (TOPIX for Japanese equities and MSCI ACWI (excluding Japan) for foreign equities).

Figure 2\*\* shows the excess return of passive funds tracking ESG indexes for domestic equities selected by GPIF (ESG passive fund) over the past six years, from June 2017 (when we started ESG index based passive investment) to March 2023. Here, we have broken down the excess return into two parts, 'Benchmark Effect' and 'Fund Effect'. When evaluating ESG passive funds performance, we would first need to calculate composite returns, considering the launch of individual ESG passive funds vary. For composite returns calculation, we have used time weighted average daily return and total amount of net assets to compute cumulative time weighted average return, and accumulate them. The definition for 'Benchmark Effect' is the difference in return of ESG indexes and TOPIX, while 'Fund Effect' is the difference in return of ESG passive funds and ESG indexes.

As shown in Figure 2, ESG passive funds excess return rate compared to TOPIX is approximately 1.6%. With regards

to 'Benchmark Effect,' excess return rate had an upward trend from March 2018 until March 2022. However, the situation changed completely after March 2022, which brought GPIF to revise the WIN index, which was underperforming the most within adopted ESG indexes. 'Fund Effect' had fell to minus at March 2020 due to fund allocation etc., and remained unchanged after that.

Also, in Figure 2, we have calculated Sharpe ratio (risk adjusted return) of ESG passive fund and TOPIX since the launch of ESG index based passive fund. The Sharpe Ratio of ESG fund was 0.39, which is 0.02 higher than the Sharpe Ratio of the TOPIX (0.37).

Figure 3 shows the relationship between the Sharpe Ratio and ESG Ratings. Each ESG index has a higher ESG rating than that of the TOPIX as a whole, and their Sharpe Ratios have tended to exceed the TOPIX over the six-year period from April 2017 to March 2023. In other words, it is confirmed that these indexes achieve both a reduction in ESG risk and better Sharp Ratios.

These results only cover investment outcomes over a limited period. We believe that the impact of portfolio ESG ratings on risk-adjusted returns requires further examination over the long term. GPIF will continue to examine the various aspects of the performance of ESG indexes from a long-term perspective, without being swayed by short-term investment results.

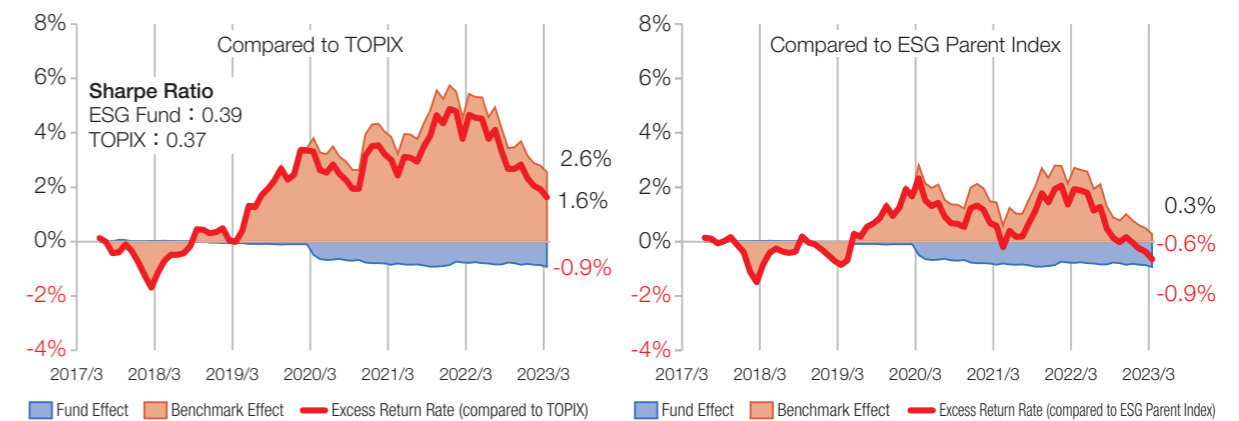
\* Figure 1 shows the investment performance of individual ESG indexes  
 \*\* Figure 2 shows the actual performance considering investment timings etc.

Figure 1. Returns of Nine ESG Indexes Selected by GPIF

	The launch of each fund	The launch of each fund to March 2023 (annualized)			(Reference) April 2022 to March 2023		
		Return Rates			Return Rates		
		ESG Index	Parent Index	TOPIX	ESG Index	Parent Index	TOPIX
(1) FTSE Blossom	2017/6	7.06%	0.65%	0.98%	4.96%	-0.43%	-0.85%
(2) MSCI ESG Select Leaders	2017/6	6.73%	0.32%	0.65%	2.80%	-2.40%	-3.02%
(3) MSCI WIN	2017/6	5.29%	-1.10%	-0.79%	0.05%	-4.99%	-5.77%
(4) S&P/JPX Carbon	2018/9	4.95%	-0.13%	-0.13%	4.89%	-0.93%	-0.93%
(5) FTSE BlossomSR	2021/11	3.34%	0.94%	0.64%	5.73%	0.34%	-0.08%
(6) Morningstar GenDiJ	2023/3	—	—	—	3.39%	0.02%	0.06%
		ESG Index	Parent Index	MSCI ACWI ex Japan	ESG Index	Parent Index	MSCI ACWI ex Japan
(7) S&P Global Carbon	2018/9	11.84%	0.22%	0.14%	2.65%	1.11%	0.77%
(8) MSCI ESG Universal	2020/11	15.85%	0.27%	0.25%	2.23%	0.45%	0.35%
(9) Morningstar GenDi	2020/12	16.42%	0.16%	1.55%	2.95%	0.87%	1.07%

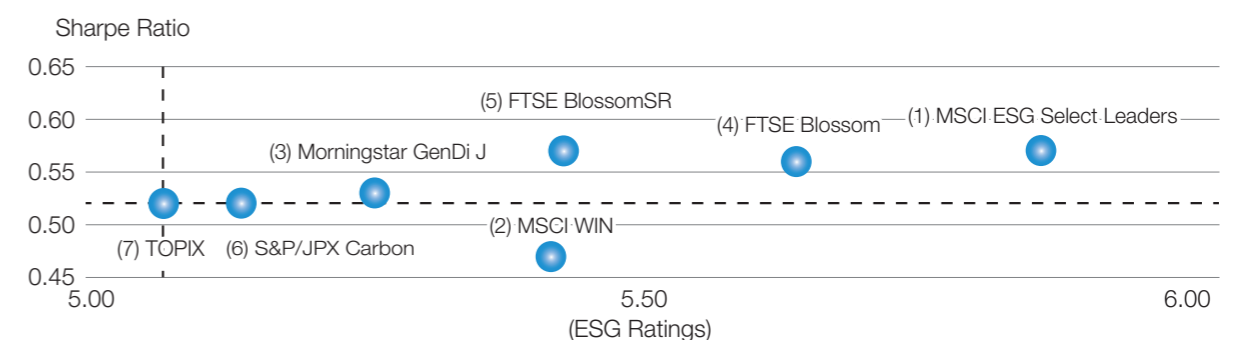
(Note 1) Index returns include dividends. For indexes with investment period less than 1 year, the actual return is shown.  
 (Note 2) The parent indexes for (1) to (9) (constituent universe) are as follows:  
 (1) FTSE Japan All Cap Index (5) was FTSE Japan until December 2020  
 (2) MSCI JAPAN IMI (MSCI JAPAN IMI TOP700 until May 2022)  
 (3) MSCI Japan IMI TOP700  
 (4) TOPIX  
 (6) Morningstar Japan ex REIT  
 (7) S&P Global Ex-Japan LargeMidCap  
 (8) MSCI ACWI ex Japan ex China A ESG Universal with Special Taxes Index  
 (9) Morningstar® Developed Markets Ex-Japan Large-Mid  
 (Source) Prepared by GPIF based on data from FactSet.

Figure 2. Excess Return Trend of ESG Passive Fund for Domestic Equity



(Note 1) ESG passive fund composite return is calculated by using time weighted average daily return and total amount of net assets.  
 (Note 2) The definitions for 'Benchmark Effect' and 'Fund Effect' on the left are the difference in return of ESG indexes and TOPIX and difference in return of ESG passive funds and ESG indexes, respectively.  
 (Note 3) The definitions for 'Benchmark Effect' and 'Fund Effect' on the right are the difference in return of ESG indexes and parent indexes and difference in return of ESG passive funds and ESG indexes, respectively.  
 (Source) Prepared by GPIF based on data from FactSet.

Figure 3. Relationship Between ESG Ratings and Sharpe Ratio for ESG indexes for Domestic Equity and TOPIX



(Note 1) ESG ratings are based on data as of the end of March 2023. Sharpe Ratios are from April 2017 to March 2023 (annualized).  
 (Note 2) ESG ratings are the average of FTSE and MSCI (Please refer to pages 52 for the calculation of portfolio ESG rating).  
 (Source) Prepared by GPIF based on data from FTSE and MSCI.  
 FTSE Russell. Reproduced by permission of MSCI ESG Research LLC ©2023.

# Portfolio ESG Rating, ESG Rating Ranking by Country, and Correlation Between ESG Ratings



Correlation coefficient of ESG ratings (Japanese companies)

## 0.53

At GPIF, we aim to assess the impact of ESG investment from a variety of perspectives. To this end, we have measured and provided stationary observations of the ESG ratings of our equity portfolio, the average ESG ratings and level of improvement by country, and the correlation between the ESG ratings of different providers every year since our activities report for fiscal 2017.

Figures 1 and 2 show the trend in each ESG rating for GPIF's equity portfolios as of the end of fiscal year (March 31), from 2017 to 2023, as well as the ESG rating for market representative indexes as of March 31, 2023. In the FTSE evaluation for the most recent year, the ESG rating for domestic equities and foreign equities both increased. This is partially attributable to a rise in E scores. Meanwhile, the MSCI ESG rating has continued to improve for both domestic and foreign equities since 2017, partly due to higher G scores in the most recent year. We compared the ESG ratings for GPIF's equity portfolios to ratings for the whole market (TOPIX and MSCI ACWI (excluding Japan)) as of March 31, 2023. The result shows that GPIF's equity portfolios are outperforming the ESG scores for the TOPIX and MSCI ACWI (excluding Japan), albeit marginally.

Figures 3 and 4 (P.53) show the ESG rating rankings by country from March 31, 2017 to 2023. These were calculated based on the ESG ratings of companies from nine representative countries included in the major indexes provided by FTSE and MSCI.

The rankings for both FTSE and MSCI are topped by countries from European and North American countries such as France, the United Kingdom, and Canada. Figures 5 and 6 (P.53) show the rate of improvement in each country over the last six years and the most recent year. Japanese

companies are among the biggest improvers over the past six years based on the ratings provided by both FTSE and MSCI. Figures 7 and 8 (P.54) compare the distributions of ESG ratings for Japanese companies as of March 31, 2017 and March 31, 2023. The distributions of ESG ratings from both FTSE and MSCI have shifted to the right, indicating a general improvement in the ratings of Japanese companies.

As ESG ratings deal with a diverse variety of non-financial information, unlike financial analysis, there are no established standard rating methodologies as yet. For this reason, there is considerable variation among ESG ratings by rating agencies, which is shown in Figures 9 and 10 (P.54). The scatter diagram in Figure 9 shows the ESG scores of the two rating agencies for the same target companies as of March 31, 2023, with the ESG scores by FTSE on the vertical axis and those by MSCI on the horizontal axis. Some degree of positive correlation is evident for both Japanese and foreign companies. Figure 10 shows the changes in correlation between each ESG score in chronological order as of March 31 every year from 2017 to 2023. Although the correlation coefficients are lower for Japanese companies than for foreign companies, the results indicate that the correlation between individual scores, especially for the ESG score, is gradually increasing for both Japanese and foreign companies.

Figure 1. FTSE ESG Ratings

	ESG	E	S	G	ESG	E	S	G
<b>GPIF (Domestic Equities)</b>				<b>GPIF (Foreign Equities)</b>				
2017/3	2.43	0.86	0.77	0.80	3.03	0.88	0.95	1.20
2018/3	2.61	0.92	0.83	0.86	3.16	0.93	1.00	1.23
2019/3	2.63	0.96	0.81	0.86	3.35	1.01	1.06	1.28
2020/3	2.95	1.02	0.95	0.99	3.38	1.00	1.09	1.28
2021/3	2.96	1.02	0.98	0.97	3.34	0.99	1.07	1.28
2022/3	3.11	0.96	1.09	1.06	3.26	0.91	1.11	1.24
2023/3	3.29	1.09	1.11	1.09	3.42	1.06	1.12	1.25
<b>TOPIX</b>				<b>MSCI ACWI ex Japan</b>				
2023/3	3.27	1.08	1.10	1.09	3.40	1.05	1.11	1.25
Excess Score	+0.03	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.00
<b>Change in Score</b>				<b>Change in Score</b>				
Past Six Years	+0.86	+0.23	+0.34	+0.29	+0.39	+0.17	+0.17	+0.05
Past One Year	+0.18	+0.13	+0.02	+0.03	+0.16	+0.14	+0.01	+0.01

(Note 1) Among the stocks held by GPIF, we analyzed those with ESG ratings by FTSE.  
 (Note 2) ESG scores are calculated as the average ESG scores of companies weighted by their market capitalization in GPIF's portfolio (excluding stocks for which an ESG rating was not available).  
 (Source) Prepared by GPIF based on data from FTSE. FTSE Russell.

Figure 2. MSCI ESG Ratings

	ESG	E	S	G	Industry Adjustment	ESG	E	S	G	Industry Adjustment
<b>GPIF (Domestic Equities)</b>					<b>GPIF (Foreign Equities)</b>					
2017/3	5.29	1.56	2.19	1.02	0.52	5.31	1.40	1.91	1.44	0.56
2018/3	5.44	1.56	2.25	1.09	0.55	5.56	1.34	2.02	1.62	0.58
2019/3	5.51	1.39	2.31	1.16	0.65	5.69	1.21	2.06	1.68	0.74
2020/3	5.79	1.36	2.38	1.34	0.71	6.01	1.21	2.18	1.79	0.84
2021/3	5.92	1.21	2.11	1.58	1.02	6.04	1.13	2.08	1.80	1.03
2022/3	6.37	1.22	2.18	1.79	1.18	6.47	1.17	2.19	1.87	1.24
2023/3	6.93	1.26	2.19	2.11	1.37	6.80	1.21	2.16	2.13	1.29
<b>TOPIX</b>					<b>MSCI ACWI ex Japan</b>					
2023/3	6.87	1.25	2.18	2.10	1.34	6.76	1.21	2.15	2.13	1.27
Excess Score	+0.06	+0.01	+0.01	+0.01	+0.03	+0.03	-0.00	+0.01	+0.00	+0.02
<b>Change in Score</b>					<b>Change in Score</b>					
Past Six Years	+1.64	-0.30	-0.00	+1.09	+0.86	+1.48	-0.19	+0.25	+0.69	+0.74
Past One Year	+0.56	+0.04	+0.01	+0.32	+0.20	+0.32	+0.04	-0.03	+0.26	+0.05

(Note 1) Among the stocks held by GPIF, we analyzed those with ESG ratings by MSCI.  
 (Note 2) ESG scores are calculated as the average ESG scores of companies weighted by their market capitalization in GPIF's portfolio (excluding stocks for which an ESG rating was not available).  
 (Note 3) Industry adjustment: Difference between the final rating and the weighted average of each company's rating for environmental (E), social (S) and governance (G), arising due to the normalization of ratings by industry.  
 (Source) Prepared by GPIF based on data from MSCI. Reproduced by permission of MSCI ESG Research LLC ©2023.

Figure 3. FTSE ESG Rating Ranking by Country

FTSE							
March 2017	March 2018	March 2019	March 2020	March 2021	March 2022	March 2023	Latest Value
							3.76
							3.68
							3.31
							3.06
							2.93
							2.88
							2.79
							2.38
							1.73

Figure 4. MSCI ESG Rating Ranking by Country

MSCI							
March 2017	March 2018	March 2019	March 2020	March 2021	March 2022	March 2023	Latest Value
							8.00
							7.59
							6.94
							6.89
							6.42
							5.09
							4.65
							4.52
							2.94

Figure 5. Rate of Improvement in FTSE ESG Ratings by Country

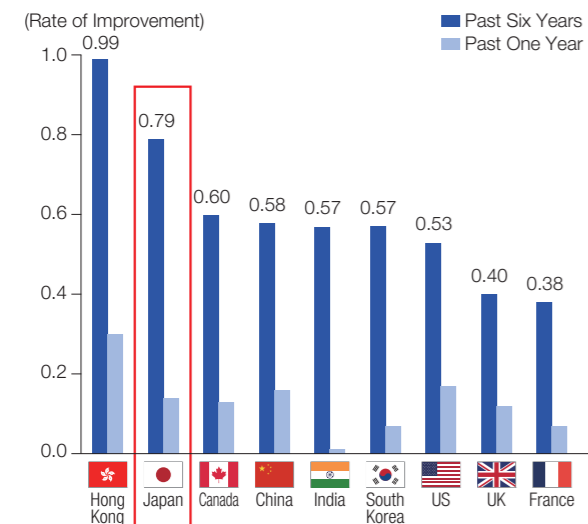
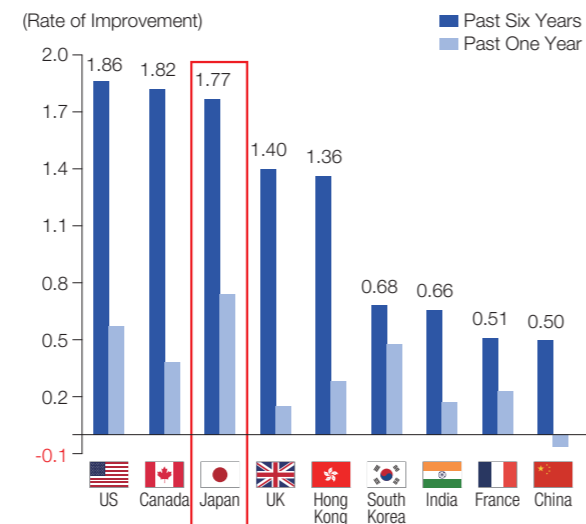
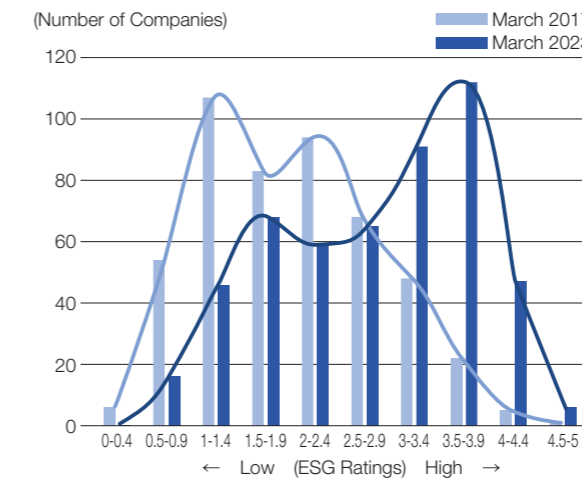


Figure 6. Rate of Improvement in MSCI ESG Ratings by Country



(Note) This figure shows the change over the six years from the end of March 2017 to the end of March 2023 and over the most recent year.  
 (Note) ESG rating of constituents by country on Figure 3 to 6 is calculated as the arithmetic average.

Figure 7. FTSE ESG Rating Distribution for Japanese Companies



(Note) Among the companies included in FTSE's "FTSE All World Index" and MSCI's "MSCI All Country World Index," the analysis presented in Figures 3 to 8 focuses on companies for which an ESG rating is available.  
 (Source) Prepared by GPIF based on data from FTSE and MSCI. FTSE Russell. Reproduced by permission of MSCI ESG Research LLC ©2023.

Figure 8. MSCI ESG Rating Distribution for Japanese Companies

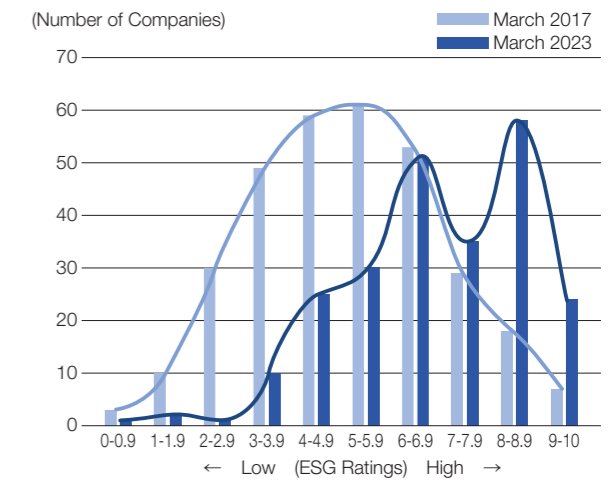
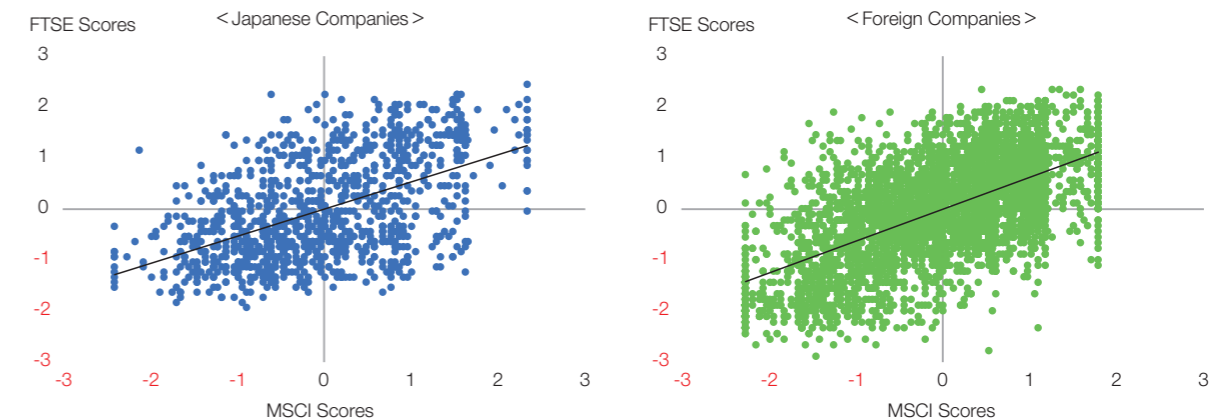


Figure 9. FTSE and MSCI ESG Score Correlation Chart (as of March 31, 2023)




(Note) Normalized (mean 0, variance 1) and plotted ESG rating data from FTSE and MSCI.  
 (Source) Prepared by GPIF based on data from FTSE and MSCI. FTSE Russell. Reproduced by permission of MSCI ESG Research LLC ©2023.

Figure 10. Trends in Correlation Coefficient of ESG Score Data from FTSE and MSCI

< Japanese Companies >						< Foreign Companies >								
	ESG	E	S	G		ESG	E	S	G		ESG	E	S	G
<b>Correlation Coefficient</b>						<b>Correlation Coefficient</b>								
2017/3	0.37	0.47	0.11	0.04	2017/3	0.48	0.37	0.20	0.26					
2018/3	0.44	0.47	0.06	0.10	2018/3	0.49	0.34	0.23	0.31					
2019/3	0.43	0.43	0.05	0.15	2019/3	0.53	0.33	0.24	0.32					
2020/3	0.41	0.45	0.02	0.11	2020/3	0.58	0.38	0.24	0.28					
2021/3	0.46	0.48	0.09	0.14	2021/3	0.57	0.38	0.25	0.34					
2022/3	0.51	0.49	0.12	0.14	2022/3	0.59	0.44	0.27	0.37					
2023/3	0.53	0.45	0.07	0.15	2023/3	0.63	0.35	0.26	0.42					
<b>Change in Correlation Coefficient</b>						<b>Change in Correlation Coefficient</b>								
Past One Year	+0.02	-0.04	-0.05	+0.02	Past One Year	+0.04	-0.10	-0.01	+0.05					
Past Six Years	+0.16	-0.02	-0.05	+0.11	Past Six Years	+0.15	-0.03	+0.07	+0.17					

(Note) Including stocks for which an ESG rating is available for FTSE and MSCI.  
 (Source) Prepared by GPIF based on data from FTSE and MSCI. FTSE Russell. Reproduced by permission of MSCI ESG Research LLC ©2023.

# Gender Diversity in Japanese Companies



Proportion of women on the board (Japanese companies)

## 14.3%

Gender diversity is a central element of the S (Social) category in ESG. This is a major issue for Japanese companies, but at the same time, it is an area with tremendous potential for improvement. In this section, we provide an overview of the current status of Japanese companies through a comparison with foreign companies.

## Gender Diversity in Japanese Companies

GPIF adopted the MSCI Japan Empowering Women Index (WIN) in 2017 and the Morningstar Developed Markets Ex-Japan Gender Diversity Index (GenDi) for foreign equities in 2020 as passive equity benchmarks. In 2022, GPIF went on to adopt the Morningstar Japan ex-REIT Gender Diversity Tilt Index (the GenDi J index). In December 2019, GPIF joined the 30% Club Japan Investor Group, a group that aims to increase the ratio of female executives in Japanese companies. A large body of evidence shows that companies with greater gender diversity are able to access a wider pool of talent, which may potentially enhance corporate value.

From a macro-economic perspective as well, higher

gender diversity has the potential to boost the economic performance of individual countries. Based on this understanding, by investing in companies with greater gender diversity, GPIF aims to increase long-term investment returns caused by the sustainable growth of our investees and the market as a whole.

Similar to last year, we reviewed data of the quantitative factors used in the WIN index to gauge progress in gender diversity at Japanese companies as shown below.

The percentage of women for each factor (median) is steadily improving overall, although (4) % Women in Senior Management remains at a low level (Figure 1).

Figure 1. Actual Values for WIN Index Quantitative Factors (Median)

	2017	2018	2019	2020	2021	2022	2023
(1) % Female New Hires	25.0%	27.9%	28.0%	28.9%	28.1%	27.0%	26.9%
(2) % Women in the Workforce	17.0%	18.6%	18.8%	20.2%	21.2%	22.0%	22.0%
(3) % Difference in years men and women are employed by the company	-16.6%	-16.5%	-16.5%	-17.5%	-18.2%	-17.9%	-18.0%
(4) % Women in Senior Management	3.5%	4.5%	4.6%	5.1%	5.5%	6.0%	6.0%
(5) % Women on Board*	10.0%	10.0%	10.0%	11.1%	12.5%	12.5%	14.3%
Rate of Disclosure for (1) to (5)	73.6%	72.7%	77.3%	75.4%	74.0%	76.8%	76.1%
Reference: % Companies with Female Directors	40%	42%	52%	61%	72%	83%	91%

(Note) Includes companies evaluated in the WIN index (500 major companies up to 2019, and 700 major companies from 2020).  
 \*% Women on Board is calculated excluding the value of 0%.  
 (Source) Prepared by GPIF based on data from MSCI. Reproduced by permission of MSCI ESG Research LLC@2023.

## Advancement of Women into Executive Positions Remains a Challenge

Continuing from last year, we examined the deviation scores for Japanese companies (excluding small-caps) for each of the 19 criteria included in Equileap's scoring methodology (the "Score") used in the GenDi and GenDi J indexes to verify which areas had particular room for improvement (Figure 2).

The Score is used to evaluate the companies in question

from 0 to 100 points in each of four categories.

While Japanese companies rank highly globally in terms of "parental leave" and "flexible work style options," they still lag significantly behind the global standard in terms of the gender balance of boards of directors, executives, senior management, and equivalent positions.

Figure 2. Individual Criteria of Average Gender Scorecard and Deviation Scores of Japanese Companies for Each Criterion

Area	Criterion	Deviation Score	Change from previous year
A. GENDER BALANCE IN LEADERSHIP & WORKFORCE	1 Board of Directors	35.8	5.3
	2 Executives*	33.6	6.5
	3 Senior Management**	31.6	2.0
	4 Workforce	42.6	4.1
	5 Promotion & Career Development Opportunities	35.6	2.6
B. EQUAL COMPENSATION & WORK LIFE BALANCE	6 Living Wage	48.2	0.6
	7 Gender Pay Gap	42.9	-1.0
	8 Parental Leave	61.0	-2.9
	9 Flexible Work Options	62.1	0.6
C. POLICIES PROMOTING GENDER EQUALITY	10 Training and Career Development	51.0	0.3
	11 Recruitment Strategy	20.7	-8.7
	12 Freedom from Violence, Abuse and Sexual Harassment	47.2	-2.3
	13 Safety at Work	45.2	2.6
	14 Human Rights	53.1	-2.4
	15 Social Supply Chain***	47.2	4.1
	16 Supplier Diversity	46.6	16.2
D. COMMITMENT, TRANSPARENCY & ACCOUNTABILITY	17 Employee Protection****	36.0	-4.2
	18 Commitment to Women's Empowerment	49.6	-0.5
	19 Audit	46.7	0.6

(Note 1) Deviation scores have been calculated based on the average score for each criterion among companies evaluated from 49 countries. Deviation scores of 40 or lower are shown in red.  
 (Note 2) The definition of each criterion marked with \* is shown below.  
 2 Executives\*: Gender balance among the company's executives and executive board  
 3 Senior Management\*\*: Gender balance of the company's senior management  
 15 Social Supply Chain\*\*\*: Commitment to reduce social risks in the company's supply chain, such as forbidding business-related activities that condone, support, or otherwise participate in trafficking, force and child labor or sexual exploitation  
 17 Employee Protection\*\*\*\*: Systems and policies for the reporting of internal ethical compliance complaints without retaliation or retribution, such as access to confidential third-party ethics hotlines or systems for confidential written complaints  
 (Source) Prepared by GPIF based on data from Equileap.

## Efforts to Boost the Proportions of Female Managers and Executives in Japan

The results of the quantitative evaluation metrics used in the WIN index and Equileap's gender equality scores indicate that the proportions of female managers and executives at Japanese companies are far below international levels. At present, both governments and private companies are working to improve this situation. The Intensive Policy for Women's Empowerment and Gender Equality 2023 (Basic Policies Related to Women 2023) announced by the Japanese government in June 2023 included the goals for Prime Market-listed companies of appointing at least one female executive by around 2025 and at least 30% female

executives by 2030. It is not only the Japanese government that is concerned about this issue: investors in Japan and elsewhere are also adopting a firmer stance. United States voting advisory companies such as ISS and Glass Lewis have announced a policy of recommending shareholders of Japanese companies reject, in principle, any proposal for the election of directors that does not include women candidates, at general meetings of shareholders held from February 2023 onward. There is also a movement among institutional investors in Japan and abroad to consider voting against such proposals.

# Chapter 3

## Evaluation and Analysis of Climate Change Risks and Opportunities

Ever since GPIF declared its support for the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) in 2018, we have engaged in annual evaluations and analysis of climate change risks and opportunities. As part of these efforts, we examine a range of different indicators and engage in new methods of analysis. This time, we analyzed factors such as contribution to greenhouse gas reductions and the measurement of impact from projects funded by the ESG bonds that GPIF invests in. The scope of this analysis is not limited to climate change-related factors but also includes trial analysis concerning natural risks and biodiversity, which are progressively becoming topics of debate in recent years.

- P.59 Disclosure and Analysis of Climate-Related Financial Information: Composition and Key Points
- P.61 Analysis of Portfolio Greenhouse Gas Emissions — Characteristics of GPIF's Portfolio —
- P.63 Analysis of Portfolio Greenhouse Gas Emissions — Carbon Footprint and Carbon Intensity —
- P.67 Analysis of the Status of GHG Information Disclosure and Target Setting

- P.69 Implied Temperature Rise Analysis
- P.71 Analysis of Government Bond Portfolio Using Sovereign Bond Climate Value-at-Risk
- P.73 Analysis of Real Estate Portfolio Using Climate Value-at-Risk
- P.75 Analysis of Avoided Emissions Based on the Bottom-up Approach
- P.79 Measuring the Impact of Projects Funded Using ESG Bonds in GPIF's Portfolio
- P.83 Nature-Related Risks including Biodiversity and TNFD Trial Analysis

# Disclosure and Analysis of Climate-Related Financial Information: Composition and Key Points

As part of our climate-related financial disclosures compliant with the TCFD recommendations, in the “Analysis of Implied Temperature Rise,” we evaluated the credibility of the GHG reduction targets set forth by companies, analyzed contribution to GHG reductions, and measured the impact of projects funded by the ESG bonds that GPIF invests in. Moreover, for the first time, we implemented a trial analysis concerning nature-related risks in line with the recommendations of the Taskforce on Nature-related Financial Disclosures (TNFD).

## Composition of Chapter 3 and TNFD Trial Analysis

For this year’s report, we appointed the Intercontinental Exchange Group (ICE) and MSCI to provide analysis support for our climate-related financial disclosures in line with TCFD recommendations, conducting a multifaceted analysis that drew on the characteristics of each of these companies. In our analysis of the carbon footprint and carbon intensity of our entire portfolio, GPIF conducts evaluations based on the greenhouse gas (GHG) emissions data provided by S&P Global (formerly Trucost), which we have been using for some time.

Moreover, for the first time, we implemented a trial analysis concerning the nature-related risks of GPIF’s portfolio in line with the recommendations of the Taskforce on Nature-related Financial Disclosures (TNFD), in cooperation with S&P

Global. The TNFD, as a framework following TCFD, was envisaged at the 2019 World Economic Forum in Davos and is now an international organization established to build a framework for organizational risk management and disclosure related to nature. GPIF has not declared its endorsement of the TNFD, but we believe that nature-related risks, just like climate-related risks, can potentially affect assets under management through their impact on the corporate value of investee companies. However, it is also true that, unlike individual companies, pension funds that manage portfolios have a limited range of options for managing these risks, and we have positioned our analysis in this report as a trial analysis mainly aimed at deepening understanding.

**Figure 1. Major Analysis of Climate Change-Related Risks and Opportunities Conducted for This Report**

Contents of Analysis	Asset Class	Analysis Performed by / Data Provided by
Carbon footprint / Carbon intensity analysis	Equities / corporate bonds	S&P Global
Analysis of the Status of GHG Information Disclosure and Target Setting	Equities	S&P Global/MSCI
Implied Temperature Rise Analysis	Equities / corporate bonds	MSCI
Climate Value-at-Risk (CVaR) analysis	Government bonds / real estate	MSCI
Analysis of Contribution to GHG Reduction Based on the Bottom-up Approach	Equities (Zero emissions vehicles and power generation business)	ICE
Measuring the Impact of Projects Funded Using ESG Bonds in GPIF’s Portfolio	ESG bonds	ICE
Biodiversity and Other Nature-Related Risks and TNFD Trial Analysis	Equities	S&P Global

(Source) Prepared by GPIF based on various materials

## Key Points of the Analysis

In the FY2022 ESG Report, we introduce new analyses and improvements to our previous reports. Here, we present three key points.

Recently, there is a trend towards the quantitative evaluation of “avoided emissions,” indicating how much a company’s own products and services have contributed to reducing the GHG emissions of others. Companies that possess products and services associated with high “avoided emissions” have a significant competitive advantage in the context of the global movement to reduce GHGs, and this may also be a key element that affects investment performance for investors as well. At GPIF, we first analyzed the contribution to GHG reduction — “avoided emissions” — in our ESG Report 2020. In “Analysis of Inter-Industry Transfer of Transition Risks and Opportunities” in our ESG Report 2020, we calculated the contribution to GHG reduction from each industrial technology field and evaluated net opportunities of GHG reduction, equal to the difference between this contribution and the required GHG reductions in each industry. This analysis by industry took a semi-macro approach based on each technology field. This time, in our “Analysis of Contribution to GHG Reduction Based on the Bottom-up Approach (pages 75 to 78),” we have carried out a bottom-up analysis based on the avoided emissions from the technologies used by individual companies, such as sales and production plans for zero emissions vehicles and power generation plans using renewable energy sources. Unlike last time, we narrowed down the subjects to the automotive industry and the power generation industry, two industries where the reduction of GHGs is considered to have a substantial effect on corporate value and other measures. For electric vehicles, we considered factors such as the GHG emissions associated with generating the electricity used to run the vehicle, for which a deeper analysis can be achieved.

Meanwhile, for the first time we conducted an analysis concerning ESG bonds, in “Measuring the Impact of Projects Funded Using ESG Bonds in GPIF’s Portfolio” (pages 79 to 82). ESG bonds entail different issuer responsibilities from regular


bonds in terms of managing and disclosing information on the use of proceeds. For example, under Green Bond Principles (GBP)<sup>1</sup> established by the International Capital Market Association (ICMA), green bonds are defined as “any type of bond instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects (...) and which are aligned with the four core components of the GBP.” (These four core components are 1. Use of Proceeds, 2. Process for Project Evaluation and Selection, 3. Management of Proceeds, and 4. Reporting.) Regarding reporting, the GBP state that the “annual report should include a list of the projects to which Green Bond proceeds have been allocated, as well as a brief description of the projects, the amounts allocated, and their expected impact.” At GPIF, we collect and analyze information on expected impact, and the status of information disclosure from the projects to be funded from the proceeds of ESG bonds based on these reports prepared by the bond issuers (impact reports). Given the recent criticism of greenwashing and SDGs-washing, it is becoming increasingly important for investors to understand the use of ESG bond proceeds and information disclosure.

Lastly, we present the improvements made in “Analysis of Portfolio’s Implied Temperature Rise” (pages 69 to 70). Recently, a steady increase can be seen in number of companies not only disclose their GHG emissions but also publish emissions reduction targets. At the same time, however, there is growing doubt over the credibility of the GHG emissions reduction targets published by companies. In our “Analysis of Implied Temperature Rise,” we evaluated the credibility of the GHG emissions reduction targets published by companies using four perspectives: (1) short-term targets set for each emissions scope, (2) third-party verification by the Science Based Targets initiative (SBTi), (3) the issuer’s track record for achieving past targets, and (4) progress towards current targets. By calculating the implied temperature rise based on this evaluation, we aim to improve the accuracy of the calculation.

<sup>1</sup> ICMA’s 2021 Green Bond Principles Voluntary Process Guidelines for Issuing Green Bonds <https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/Green-Bond-Principles-June-2022-060623.pdf>

# Analysis of Portfolio Greenhouse Gas Emissions – Characteristics of GPIF’s Portfolio –

**Industry sectors with high GHG emissions per unit of net sales**



**(Domestic equities)**  
Energy  
Utilities  
Materials

In Chapter 3, we measure the greenhouse gas emissions from the assets in GPIF’s portfolio and conduct an analysis of the portfolio’s physical risks. As a preliminary step, this section presents the characteristics of GPIF’s portfolio and our measurements of greenhouse gas emissions per million yen of sales for each industry sector.

## Characteristics of GPIF’s Portfolio

In Chapter 3, we analyze the measurement of greenhouse gas emission volumes (“GHG emissions”) and transition risks<sup>1</sup>, as well as analyzing the physical risks<sup>2</sup> relating to the assets in GPIF’s portfolio, using data as of March 31, 2023. The analysis mainly looks at four asset classes in GPIF’s portfolio: domestic bonds, foreign bonds, domestic equities, and foreign equities. In this report, we also attempted an analysis of some alternative assets<sup>3</sup> (GPIF’s domestic real estate portfolio). Because analysis results are heavily influenced by the investment amount and sector weighting of each asset class, it is important to understand the characteristics of our portfolio prior to interpreting these results.

The GPIF portfolio is composed of roughly half bonds and half equities by overall market value. As of March 31, 2023, domestic bonds accounted for 26.79% of the total portfolio, foreign bonds for 24.39%, domestic equities for 24.49%, and

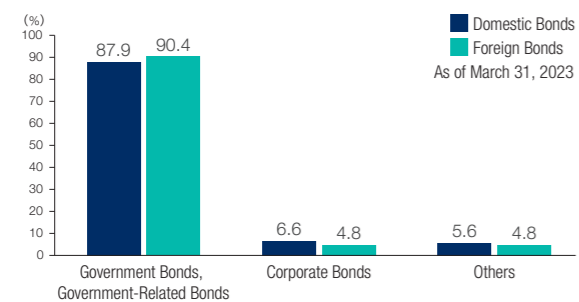
foreign equities for 24.32%. The majority of bond holdings, both domestic and foreign, consist of government bonds and government-related bonds (Figure 1).

When examining GPIF’s equities portfolios by sector, there is a difference in the composition of the domestic and foreign equity portfolios (Figure 2). The domestic equities portfolio has a higher proportion invested in the relatively high-emitting industrials and consumer discretionary sectors, while the foreign equities portfolio has a high proportion in the low-emitting information technology, financials, and healthcare sectors.

There is also a difference in the composition by industry sector in GPIF’s corporate bond portfolio between domestic bonds and foreign bonds (Figure 3). Financials account for the largest proportion for both domestic and foreign bond portfolios, but among domestic corporate bonds, the proportion invested in the sectors such as utilities and industrials is higher than that for foreign corporate bonds. Moreover, among foreign corporate bonds, the proportion invested in the high-emitting energy sector is higher than that of domestic corporate bonds, but there is also a high proportion invested in the low-emitting sectors of communications services, healthcare, and information technology.

The next figure (Figure 4) looks at characteristics of GHG emissions by asset class and industry sector. The data shown here is for GHG emissions per million yen of sales. The

**Figure 1. Breakdown by Category in GPIF Bond Portfolio**



(Note) \*Others\* includes securitized products.  
(Source) GPIF

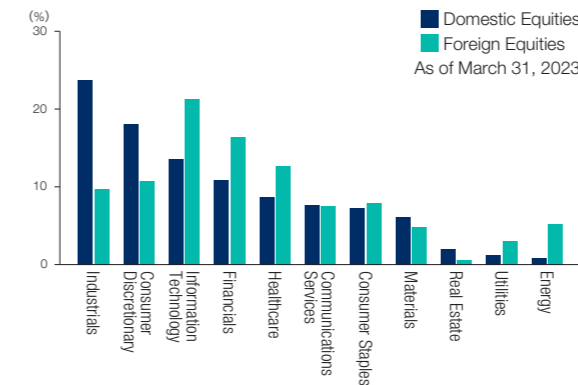
1 Transition risks are risks that arise from policy, technological innovation, demand change, etc. that accompany the transition to a low-carbon economy.  
2 Physical risks are risks from direct damage to an asset, supply chain disruption, etc., caused by climate change.  
3 Alternative assets account for around 1.38% of the pension reserve fund (up to 5% of the policy asset mix), and are generally allocated to the four main portfolio asset types according to their characteristics.

calculation scope of GHG emissions includes indirect emissions from the consumption and use of sold products and services (Scope 3 downstream) in addition to direct emissions by the company itself (Scope 1), indirect emissions related to purchased electricity (Scope 2), and indirect emissions from procured products and services other than purchased electricity (Scope 3 upstream) (Figure 5). For domestic equities, emissions are high in the energy, utilities, and materials sectors. The same tendency can be observed in other asset classes as well. Since the energy sector includes oil and coal companies, the utilities

sector includes electric power companies, and the materials sector includes chemicals and iron and steel manufacturers, these three sectors tend to emit higher GHG emissions than other sectors.

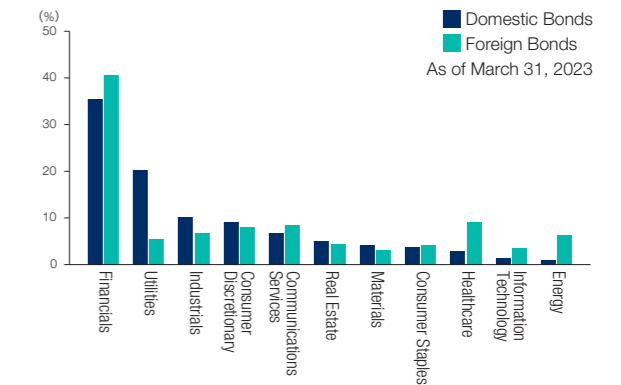
It is necessary to bear this sector characteristic in GHG emissions in mind when understanding the results of the analysis presented in the following sections. Around 90% of stock investments and 70% of bond investments by GPIF are passive investments, which means our investment is largely identical to the sector ratios of each benchmark.

**Figure 2. Breakdown of GPIF Equities Portfolio by Sector<sup>4</sup> Based on Total Market Value**



(Source) GPIF

**Figure 3. Breakdown of GPIF Corporate Bond Portfolio by Sector Based on Total Market Value**



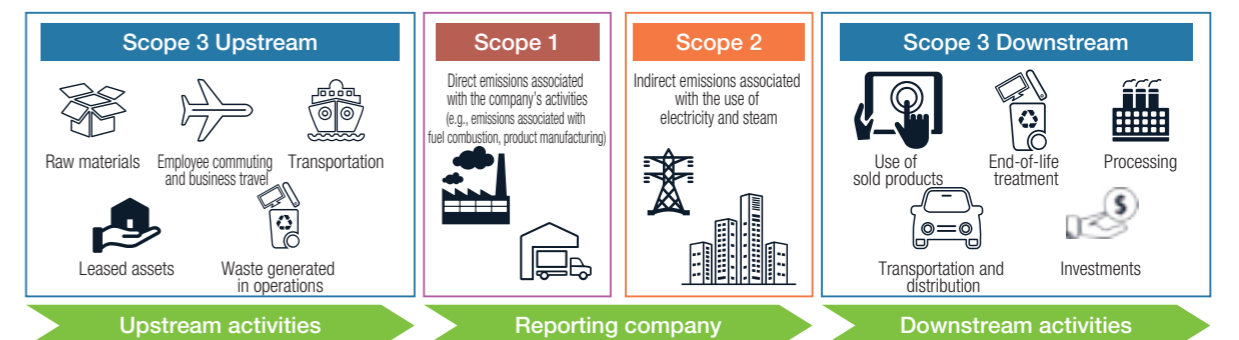
(Note) Only corporate bonds are analyzed. Bonds by unlisted companies are classified according to the sector of their parent company or equivalent.  
(Source) GPIF

**Figure 4. Greenhouse Gas Emissions per Million Yen of Sales (CO<sub>2</sub> Equivalent Tons)**

	Energy	Utilities	Materials	Industrials	Consumer Discretionary	Consumer Staples	Real Estate	Information Technology	Communications Services	Financials	Healthcare
Domestic Equities	30.03	19.80	19.01	17.79	10.02	5.00	3.71	3.06	1.65	1.54	1.13
Foreign Equities	44.03	25.56	27.10	27.47	7.18	5.55	8.33	5.83	1.19	2.95	0.97
Domestic Corporate Bonds	28.66	16.52	26.11	10.94	12.15	4.39	3.05	3.87	1.34	3.36	1.22
Foreign Corporate Bonds	39.49	25.59	20.14	17.54	12.40	8.99	6.05	2.50	1.05	4.84	0.88

(Note) The calculation scope of greenhouse gas emissions includes Scopes 1, 2, and 3. The year-to-year percentage changes in GHG emissions of plus or minus 1% have been excluded from calculations as outliers. Data is as of March 31, 2023 (GHG emissions data is calculated from available data as of March 31, 2023).  
(Note) Carbon footprint is apportioned based on the percentage of the stocks/bonds holdings of the issuing companies. The apportion is calculated using the size of the holding in stocks/bonds in the issuing companies at the time of analysis as the numerator and the enterprise value including cash (EVIC) as the denominator.  
(Source) Prepared by GPIF based on data from S&P S&P Global Sustainable1, S&P Trucost Limited ©Trucost 2023

**Figure 5. Greenhouse Gas Emissions by Scope**



(Note) The above figure indicates the major sectors included in each scope.  
(Source) Created by GPIF based on the Greenhouse Gas Protocol, etc.

<sup>4</sup> Based on the 11 sectors of the Global Industry Classification Standard (GICS).



# Analysis of Portfolio Greenhouse Gas Emissions – Carbon Footprint and Carbon Intensity –

**Portfolio carbon footprint**



**(Domestic equities)**  
YoY  
**+0.07%**

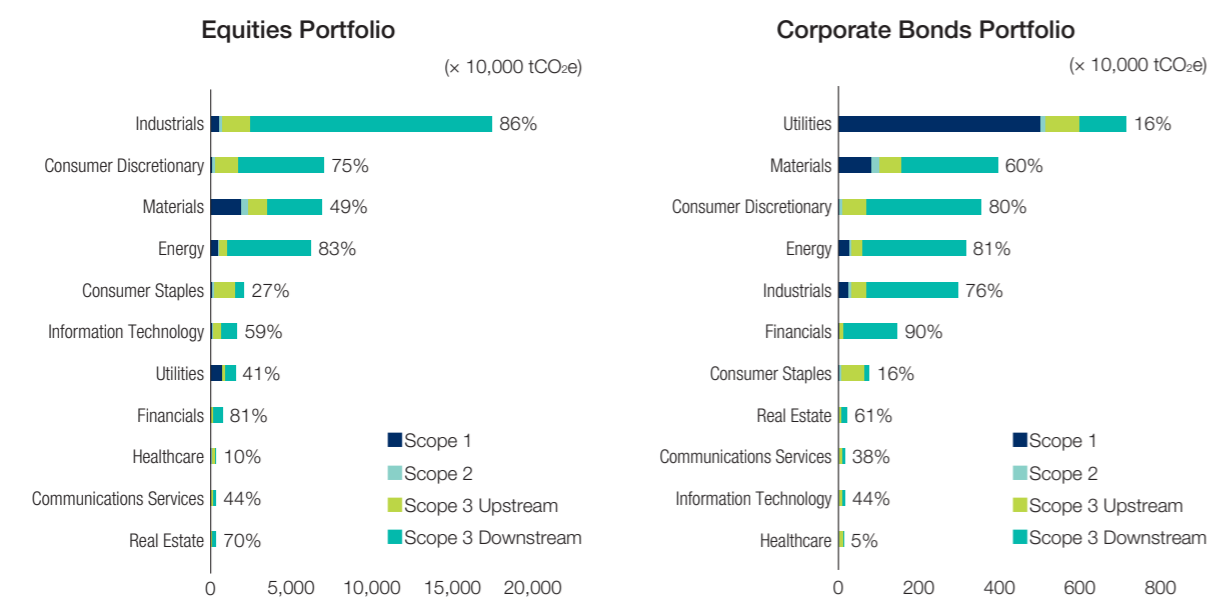
This analysis measures the greenhouse gas emissions (carbon footprint) of the companies held in GPIF's portfolio, as part of our climate-related financial disclosures in line with the TCFD recommendations. The changes in greenhouse gas emissions in each asset class are significantly affected by the changes in stocks/bonds held and amounts held in GPIF's portfolio.

## Greenhouse Gas Emissions by Sector Significantly Affected by Scope 3

Figure 1 shows GHG emissions<sup>1</sup> for the equity and corporate bond portfolios at the end of FY2022 by sector and by scope. As in Figure 4 on the previous page, this includes Scope 1, Scope 2, and Scope 3 GHG emissions. For both the equity and corporate bond portfolios, total emissions were high in the industrials, consumer discretionary, materials, and energy sectors. Scope 3 Downstream emissions account for an extremely high proportion of total emissions in these sectors. Caution is required for portfolios with a higher weight of

companies in these sectors, as analysis results change significantly depending on whether or not Scope 3 is included in the calculation. In the analyses below, the top and bottom 1% of equities and bonds in terms of year-to-year percentage change in GHG emissions have been excluded from our calculations as outliers. Further, many companies do not disclose their Scope 3 emissions, leading to a dependence on estimates from models. For this reason, scope 3 emissions are excluded from calculations of emission trends (Figures 3 and 6).

Figure 1. Greenhouse Gas Emissions by Scope



(Note) Available data as of March 31, 2023.  
 (Note) Numbers on graph are the percentage of Scope 3 Downstream emissions to total emissions.  
 (Source) Prepared by GPIF based on data from S&P, S&P Global Sustainable1, S&P Trucost Limited ©Trucost 2023

<sup>1</sup> Carbon footprint is apportioned based on the percentage of the stocks/bonds holdings of the issuing companies. The apportion is calculated using the size of the holding in stocks/bonds in the issuing companies at the time of analysis as the numerator and the enterprise value including cash (EVIC) as the denominator.

## Carbon Footprint (GHG Emissions) Analysis

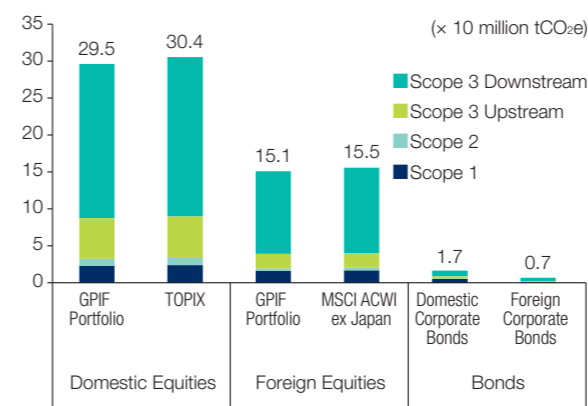
Figure 2 shows the calculation of Scope 1–3 emissions<sup>1</sup> for the equity and corporate bond portfolios as of the end of FY2022. Looking at the total GHG emissions by asset class, domestic equities were found to have the highest level of emissions, followed by foreign equities, domestic corporate bonds, and foreign corporate bonds. This reflects the relative size and sector of holdings of each asset class within GPIF's portfolio as shown in Figures 1 to 4 on the previous page. The breakdown of GHG emissions in each asset class shows that Scope 3 accounts for the major proportion of total emissions for all assets.

Figure 3 shows the trend in GHG emissions (Scope 1+2), using 100 for fiscal 2016 emissions as a base. The five years from fiscal 2016 saw a general decline in all asset classes, but the trend has levelled-off for domestic equities, foreign equities, and foreign bonds, and has begun rising for domestic bonds.

Figure 4 shows the main causes of the change in GHG

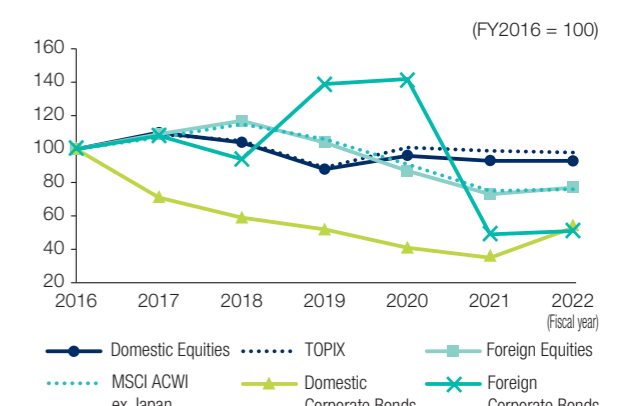
emissions (Scope 1+2) from FY2021 to FY2022 by asset class. For example, for domestic equities, GHG emissions rose slightly by approximately 20,000t (+0.07%) YoY. We have analyzed the causes for this rise in terms of "investee emissions," which represents the change due to GHG emissions by investee companies, "portfolio weighting," which represents the change due to the proportional weights of stocks and bonds in the portfolio, and "other," which represents other causes. For domestic asset classes, whereas investee emissions decreased, an increase was caused by portfolio weighting. In other words, changes in the stocks held and the amount of the holdings in the portfolio were mainly responsible for the rise in GHG emissions. On the other hand, investee emissions were the main cause of the increase in emissions for foreign asset classes. (Please refer to Figure 8 on page 66 for the carbon footprint and an analysis of the main causes by sector for each asset class.)

Figure 2. Carbon Footprint by Scope



(Note) Figure 2: Available data as of March 31, 2023.  
 (Source) Figures 2 & 3: Prepared by GPIF based on data from S&P, S&P Global Sustainable1, S&P Trucost Limited ©Trucost2023

Figure 3. Carbon Footprint Trends



(Note) Figure 3. Carbon footprint is calculated based on Scope 1+2  
 (Source) Figures 2 & 3: Prepared by GPIF based on data from S&P, S&P Global Sustainable1, S&P Trucost Limited ©Trucost2023

Figure 4. Analysis of Main Causes of Change in Carbon Footprint (By Asset Class)

	Domestic asset classes					Foreign asset classes				
	Emissions FY2022	Change in emissions due to			Other	Emissions FY2022	Change in emissions due to			Other
	Investee emissions	Portfolio weighting				Investee emissions	Portfolio weighting			
Equities	3,248	+2	-282	+317	-33	1,965	+91	+80	+3	+7
Corporate Bonds	605	+205	-23	+221	+7	110	+4	+9	-2	-3

(Source) Prepared by GPIF based on data from S&P, S&P Global Sustainable1, S&P Trucost Limited ©Trucost2023

### Carbon Intensity Analysis

Figure 5 measures Scope 1–3 carbon intensity for the equity and corporate bond portfolios at the end of FY2022. For this analysis, weighted average carbon intensity (WACI), the disclosure of which is recommended by the TCFD, was used as the basis for the calculation of carbon intensity. WACI is calculated by multiplying each company's GHG emissions per million yen of sales by the company's weighting in the portfolio, then taking the sum of those products to obtain the weighted average of carbon intensity. By asset class, WACI was highest in the domestic corporate bond portfolio, with domestic equities having the lowest WACI. Scope 3 accounts for the majority of WACI for all asset classes.

Figure 6 shows the trend of WACI (Scope 1+2), using 100 for fiscal 2016 as a base. The five years from fiscal 2016 saw a general decline in all asset classes, but recently, WACI has risen

significantly for domestic corporate bonds.

Figure 7 shows the main causes of the change in WACI (Scope 1+2) from FY2021 to FY2022 by asset class. We have analyzed the causes of this change in terms of "investee carbon intensity," which represents the change due to the carbon intensity (GHG emissions divided by net sales) of investee companies, "portfolio weighting," which represents the change due to the proportional weights of stocks and bonds in the portfolio, and "other," which represents other causes. For all asset classes, whereas investee carbon intensity decreased, an increase was caused by portfolio weighting. In other words, changes in the stocks held and the amount of the holdings in the portfolio were mainly responsible for the rise in WACI. (Please refer to Figure 9 on page 66 for WACI and an analysis of the main causes by sector for each asset class.)

Figure 5. Weighted Average Carbon Intensity (WACI) by Scope

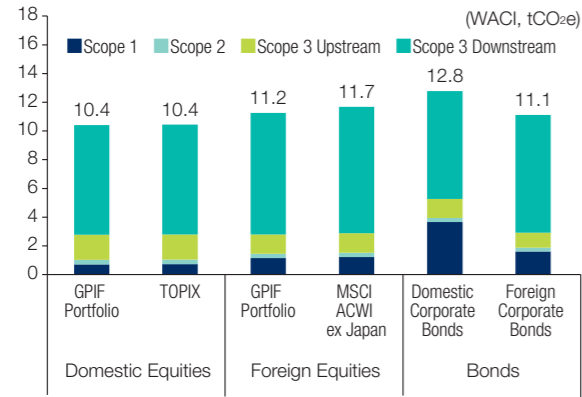
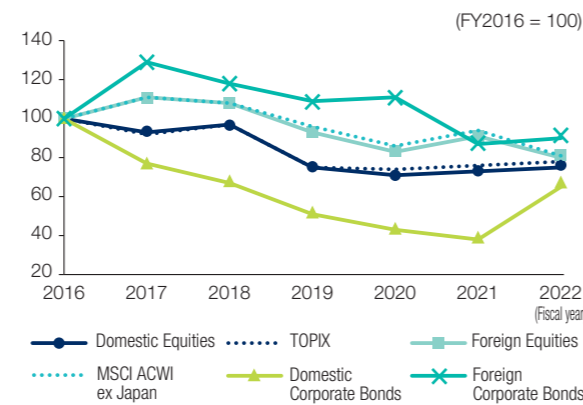


Figure 6. Trends in Weighted Average Carbon Intensity (WACI)



(Note) Figure 5: Available data as of March 31, 2023. (Note) Figure 6: WACI is calculated based on Scope 1+2. (Source) Figures 5 & 6: Prepared by GPIF based on data from S&P, S&P Global Sustainable1, S&P Trucost Limited ©Trucost2023

Figure 7. Analysis of Main Causes of Change in Carbon Intensity (By Asset Class) (WACI, tCO<sub>2</sub>e)

	Domestic asset classes					Foreign asset classes				
	WACI FY2022	Change in WACI due to			Other	WACI FY2022	Change in WACI due to			Other
	Investee carbon intensity	Portfolio weighting				Investee carbon intensity	Portfolio weighting			
Equities	1.02	+0.02	-0.03	+0.04	+0.01	1.46	-0.19	-0.23	+0.06	-0.03
Corporate Bonds	3.94	+1.67	-0.00	+1.68	-0.01	1.87	+0.06	-0.25	+0.30	+0.00

(Source) Prepared by GPIF based on data from S&P, S&P Global Sustainable1, S&P Trucost Limited ©Trucost2023

Figure 8. Analysis of Main Causes of Change in Carbon Footprint (By Sector) (× 10,000 tCO<sub>2</sub>e)

	Emissions FY2022	Change in emissions due to			Emissions FY2022	Change in emissions due to			
		Investee emissions	Portfolio weighting	Other		Investee emissions	Portfolio weighting	Other	
Domestic Equities					Foreign Equities				
Communications Services	38	-0	+0	-0	19	+0	+1	-1	+0
Consumer Discretionary	229	-8	-9	+0	49	-0	-2	+0	+2
Consumer Staples	160	-11	-6	-4	74	-6	-4	-1	-1
Energy	136	-28	-14	-14	388	+66	+23	+42	+2
Financials	9	-1	-1	-0	30	+4	+3	+1	+0
Healthcare	41	-0	-1	+0	23	+0	+1	-1	-0
Industrials	606	-193	-191	+23	134	+8	+11	-3	+0
Information Technology	115	-15	-4	-11	62	+8	+6	+1	+0
Materials	1,659	+268	-60	+340	689	+2	+8	-8	+2
Real Estate	15	-3	-2	-1	9	-1	-1	-0	-0
Utilities	239	-7	+7	-16	489	+9	+34	-27	+2
Domestic Bonds					Foreign Bonds				
Communications Services	2	-1	-0	-1	1	-0	+0	-0	-0
Consumer Discretionary	7	-1	-0	-1	4	+0	+0	-0	-0
Consumer Staples	4	-0	-0	-0	3	+0	+0	+0	-0
Energy	15	-7	-1	-7	19	-3	+3	-4	-2
Financials	2	-0	-0	+0	1	+0	+0	+0	-0
Healthcare	1	-0	+0	-0	2	-0	+0	-0	-0
Industrials	24	-20	-14	-11	8	-1	+1	-2	-0
Information Technology	2	+0	+0	+0	1	-0	-0	-0	+0
Materials	78	+12	+1	+11	24	-2	+3	-4	-1
Real Estate	2	+0	-0	+0	1	-0	-0	-0	+0
Utilities	469	+221	-9	+229	47	+10	+1	+9	+0

Figure 9. Analysis of Main Causes of Change in WACI (By Sector) (WACI, kgCO<sub>2</sub>e)

	WACI FY2022	Change in WACI due to			WACI FY2022	Change in WACI due to			
		Investee carbon intensity	Portfolio weighting	Other		Investee carbon intensity	Portfolio weighting	Other	
Domestic Equities					Foreign Equities				
Communications Services	20	-0	-1	+0	18	-4	-2	-2	+0
Consumer Discretionary	65	-1	-2	+1	61	-9	-11	+2	-0
Consumer Staples	49	+3	-3	+6	42	-3	-7	+5	-0
Energy	32	-14	-13	-2	219	-45	-76	+55	-24
Financials	7	-2	-1	-1	30	-2	-4	+0	+1
Healthcare	27	+2	+0	+2	24	-7	-5	-2	+1
Industrials	229	-3	-11	+10	118	-17	-16	+0	-1
Information Technology	56	-10	-4	-6	66	-9	-8	-2	+1
Materials	424	+44	+11	+25	363	-78	-69	-5	-4
Real Estate	12	-2	-2	-1	20	-5	-4	-2	+1
Utilities	102	+5	-0	+5	496	-16	-26	+15	-6
Domestic Bonds					Foreign Bonds				
Communications Services	18	-5	-2	-3	22	-3	+1	-4	+0
Consumer Discretionary	29	+1	+6	-3	104	+28	+7	+18	+3
Consumer Staples	18	+2	-1	+2	25	+1	-3	+4	+0
Energy	60	-25	-11	-12	302	-123	-105	-17	-0
Financials	32	-6	-6	-1	26	-2	-5	+2	+1
Healthcare	7	-2	+0	-2	21	-8	-3	-6	+1
Industrials	215	-16	+57	-59	114	-27	-14	-17	+4
Information Technology	15	-0	+0	-0	9	-1	-1	-1	-0
Materials	291	+65	+21	+44	227	-59	-43	-11	-5
Real Estate	23	-3	-2	-1	44	-25	-12	-16	+3
Utilities	3,232	+1,656	-65	+1,711	973	+275	-70	+347	-1

(Source) Figures 8 & 9: Prepared by GPIF based on data from S&P, S&P Global Sustainable1, S&P Trucost Limited ©Trucost2023

# Analysis of the Status of GHG Information Disclosure and Target Setting

**Scope 1 Disclosure by companies**

(Domestic equities)

**78%**

We examined the status of information disclosure and target-setting on greenhouse gas emissions by individual companies in GPIF's portfolio. While companies' disclosure is improving, we found that, from the perspective of setting GHG emissions reduction targets, companies in many sectors have not yet been able to establish targets in line with actual emissions.

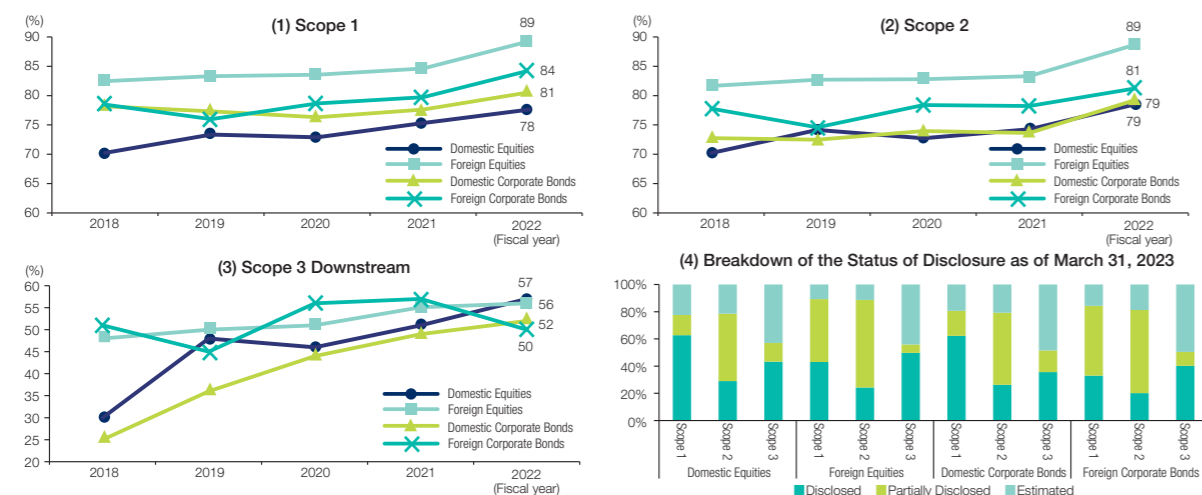
## Percentage of Disclosure by Scope

Figure 1 shows the trend in corporate disclosure on GHG emissions in GPIF's equity and corporate bond portfolios since FY2018 and the status of disclosures as of March 31, 2023 by scope. For Scope 3 emissions, the Scope 3 Upstream GHG emissions data provided by S&P Global for all categories (except for air freight, rail transportation, and trucking) are estimates based on models, and we have therefore only included Scope 3 Downstream. We have weighted the rate of disclosure based on the amount of each asset held in our portfolio.

The trend since FY2018, presented in Figure 1 (1) to (3), shows that the disclosure rate (including partial disclosure) has been rising for both Scope 1 and Scope 2

across all asset classes. However, the disclosure rate for domestic asset classes still lags behind the level for foreign asset classes. The most recent disclosure rate for Scope 3 Downstream is still around 50% across all asset classes, but is rising for all asset classes except for foreign corporate bonds. Unlike in the case of Scope 1 and Scope 2, the Scope 3 Downstream disclosure rate for domestic equities is at roughly the same level as for foreign equities. A breakdown of the status of disclosures (Figure 1 (4)) shows a large proportion of Scope 1 disclosures in domestic asset classes, indicating progress in the disclosure on direct emissions.

Figure 1. Trend in Disclosure Rates ((1), (2) and (3)) and Status of Disclosure as of March 31, 2023 ((4)) Weighted by Portfolio Holdings



(Note) Disclosure includes partial disclosure, except in panel (4).  
 (Source) Prepared by GPIF based on data from S&P, S&P Global Sustainable1, S&P Trucost Limited ©Trucost2023

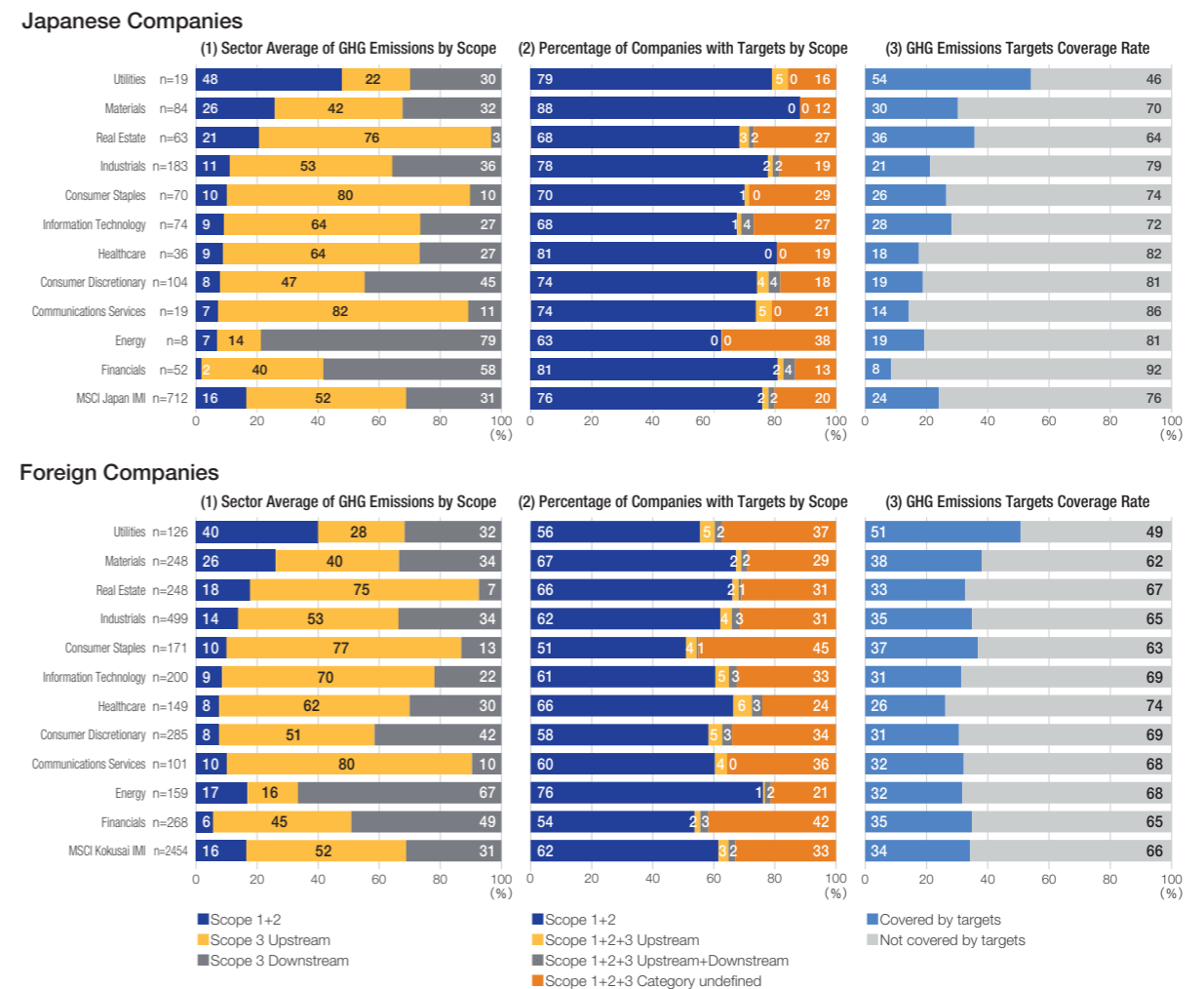
## Status of GHG Emissions Reduction Targets

In this section, we use target-level data provided by MSCI to examine the GHG emissions reduction targets set among Japanese companies<sup>1</sup> and foreign companies (in developed countries).<sup>2</sup> In compiling data for Figure 2, we examined the degree to which each company had (1) measured its GHG emissions by scope, then (2) assessed targets set for GHG emissions by scope. We calculated the emissions targets coverage rate (3) based on (1) and (2).

Panel (1) in Figure 2 shows different tendencies among industry sectors. Whereas, for both Japanese and foreign companies, a large proportion of emissions for "Utilities" are Scope 1+2, "Financials" have a larger proportion of Scope 3

emissions. Meanwhile, panel (2) shows that companies tend to set targets for Scope 1+2, regardless of the proportion of Scope 1+2 emissions. Panel (3) shows that, as a result, sectors such as "Utilities," which have a large proportion of Scope 1+2 emissions, tend to have a high coverage rate, while sectors such as "Financials," which have a large proportion of Scope 3 emissions, tend to have a low coverage rate. Some areas of Scope 3 emissions are difficult for companies to reduce directly through their own efforts, and we conjecture that this results in many companies not setting Scope 3 targets. However, in some sectors, the reduction of Scope 3 emissions may significantly affect companies' future competitive strength.


Figure 2. Status of GHG Emissions Reduction Targets (Japanese and Foreign Companies)



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1 Includes only companies in the MSCI Japan IMI that have set GHG emissions reduction targets  
 2 Includes only companies in the MSCI Kokusai IMI that have set GHG emissions reduction targets

# Implied Temperature Rise Analysis



**Implied temperature rise of GPIF's portfolio**

Based on projected GHG emissions from the companies in GPIF's portfolio until 2050, we have evaluated their possible impact on global warming in terms of the rise in temperature. By asset class, we found an implied temperature rise of 2.5°C for domestic asset classes and 2.6°C for foreign asset classes, indicating an overall rise exceeding 2°C.

Domestic asset classes: **2.5°C**

Foreign asset classes: **2.6°C**

## Implied Temperature Rise Analysis of GPIF's Portfolio

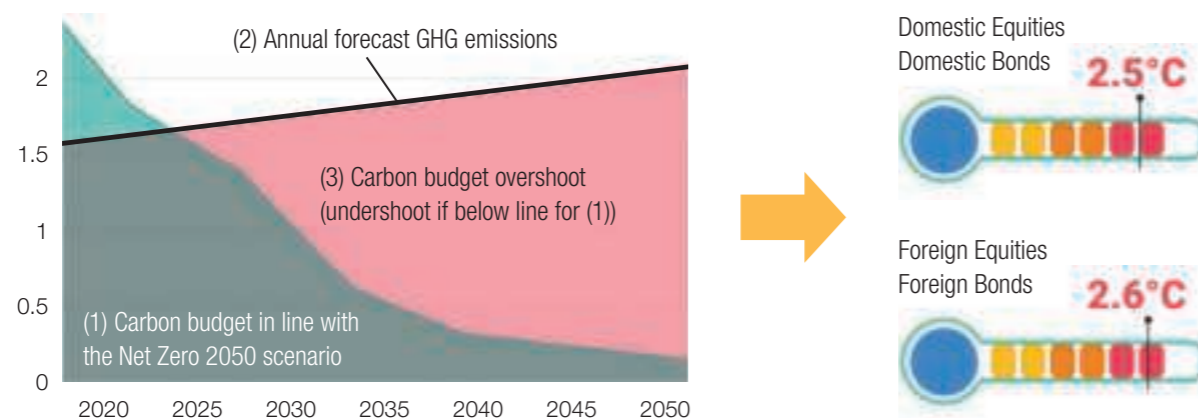
In this section, we will examine the results of our analysis using MSCI's Implied Temperature Rise (ITR). ITR evaluates the extent of potential to cause global warming from a target company's projected greenhouse gas (GHG) emissions, shown as an increase in temperature.

We calculate implied temperature rise as follows. (1) The Net Zero 2050 scenario provided by NGFS<sup>1</sup> is used to calculate the carbon budget<sup>2</sup> available to individual companies based on elements such as the company's present revenue, carbon intensity, and the emissions reduction pathways for each emitting sector indicated in the NGFS scenario. (2) The company's future GHG emissions are projected from its current GHG emissions and a target credibility assessment of its declared GHG emissions reduction targets (described below), and the difference from (1) is calculated on an emissions basis. After dividing that difference by the allocated carbon budget to determine (3)

to what extent emissions overshoot or undershoot budget, (3) is multiplied by the global-level carbon budget required for the world to achieve the 1.5°C target. Then, by multiplying the Transient Climate Response to Cumulative Emissions (TCRE) factor<sup>3</sup> based on scientific findings, the estimated corporate GHG emissions are converted into a measurement of temperature increase (Figure 1).

The results of the analysis showed that the implied temperature rise across GPIF's portfolio was 2.5°C for domestic equities, 2.5°C for domestic bonds, 2.6°C for foreign equities, and 2.6°C for foreign bonds (Figure 1). In all asset classes, the forecast temperature rise exceeds 2°C, with a slightly lower rise for domestic asset classes. This is thought to be due mainly to the lower proportion of Japanese companies for which ITR is 10°C or above, compared to foreign companies (Figure 2).

Figure 1. Temperature Rise Potential in GPIF Portfolio



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Figure 2. Company Distribution of ITR Evaluation Across Four Asset Classes

Result	Temperature Range	Domestic Equities (1,268)	Foreign Equities (3,201)	Domestic Bonds (327)	Foreign Bonds (1,481)
Aligned with 1.5°C target	1.5°C or below	15.0%	20.2%	13.1%	21.3%
Aligned with 2°C target	Over 1.5°C and up to 2°C	28.8%	27.8%	23.5%	25.4%
Misaligned with 2°C target	Over 2°C and up to 3.2°C	39.9%	31.5%	39.1%	32.1%
Strongly misaligned with 2°C target	Over 3.2°C and up to 9.9°C	14.1%	17.6%	22.6%	17.8%
	10°C or above	2.2%	2.8%	1.5%	3.4%

(Note 1) Only companies for which ITR evaluations exist have been included.  
 (Note 2) The numbers of companies for which ITR evaluations exist have been shown in parentheses.  
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## Target Credibility Assessment of GHG Emissions Reduction Targets

We have already examined the status of companies' GHG emissions reduction target setting on page 68. Here, we present an assessment of the credibility of the emissions reduction targets reflected in the analysis of implied temperature rise provided by MSCI.

We evaluate the credibility of GHG emissions reduction targets using four perspectives: (1) short-term targets set for each emissions scope, (2) third-party verification by the Science Based Targets initiative (SBTi), (3) the issuer's track record for achieving past targets, and (4) progress towards current targets<sup>4</sup>.

Evaluating the credibility of GHG emissions reduction targets set by companies from these perspectives, we found that 88.6% of Japanese companies that had set targets of 1.5°C or below had emissions aligned with a 1.5°C target. This was slightly higher than the 84.5% proportion of foreign companies. The proportion of foreign companies pursuing a 1.5°C target was 23.4%<sup>5</sup> — higher than the 17.1% of Japanese companies pursuing that level. This suggests that many foreign companies set more ambitious targets, while the credibility of these targets is slightly inferior to those set by Japanese companies (Figure 3).

Figure 3. Credibility Assessment of GHG Emissions Reduction Targets (Japanese and Foreign Companies)

		Credibility assessed			
		Aligned with 1.5°C target (1.5°C or below)	Aligned with 2°C target (over 1.5°C and up to 2°C)	Misaligned with 2°C target (over 2°C and up to 3.2°C)	Strongly misaligned with 2°C target (over 3.2°C)
Credibility not assessed	Japanese Companies	88.6%	9.1%	2.3%	0.0%
	Foreign Companies	84.5%	12.2%	3.2%	0.1%
Credibility not assessed	Japanese Companies	0.0%	93.0%	6.4%	0.5%
	Foreign Companies	0.0%	91.9%	7.7%	0.4%

(Note 1) \*Future emissions were projected, taking the company's decarbonization target at face value, to measure the degree of overshoot or undershoot from the company's allocated carbon budget, and this was used to evaluate the company's ITR.  
 (Note 2) The analysis included GHG emissions reduction targets set by companies in GPIF's portfolio as of March 31, 2023, among issuers included in the analysis for MSCI's Target Summary Model. The number of companies analyzed for each item have been shown in parentheses.  
 (Source) GPIF, Reproduced by permission of MSCI ESG Research LLC ©2023. All rights reserved.

1 The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) is an international network of the central banks and financial supervisory authorities of major countries.  
 2 Carbon budget is the upper limit of how much GHG emissions would be possible until the temperature increase reaches a certain value due to global warming.  
 3 This factor indicates the contribution to temperature rise of the release of 1Gt of GHG emissions.  
 4 For details, please refer to "Modeling target-based emissions projections using a Target Summary Model" in the "2023 Analysis of Climate Change Related Risks in the GPIF's Portfolios," a report on MSCI's analysis for the preparation of this report.  
 5 The calculation method is as follows. Foreign companies: 863/3,693 = 23.4%; Japanese companies: 220/1,284 = 17.1%.

# Analysis of Government Bond Portfolio Using Sovereign Bond Climate Value-at-Risk

**Impact of climate change risks on Japanese government bonds in GPIF's portfolio**

**-6.6%**

~-1.0%

If we consider the fiscal burden and other impacts from the response to climate change risks, these risks have the potential to affect GPIF's government bond portfolio through interest rate rises. Our analysis indicates that the overall value of Japanese government bonds in the portfolio may fall by between 6.6% and 1.0% due to climate change risks.

## Analysis of Government Bond Portfolio Using Sovereign Bond Climate Value-at-Risk

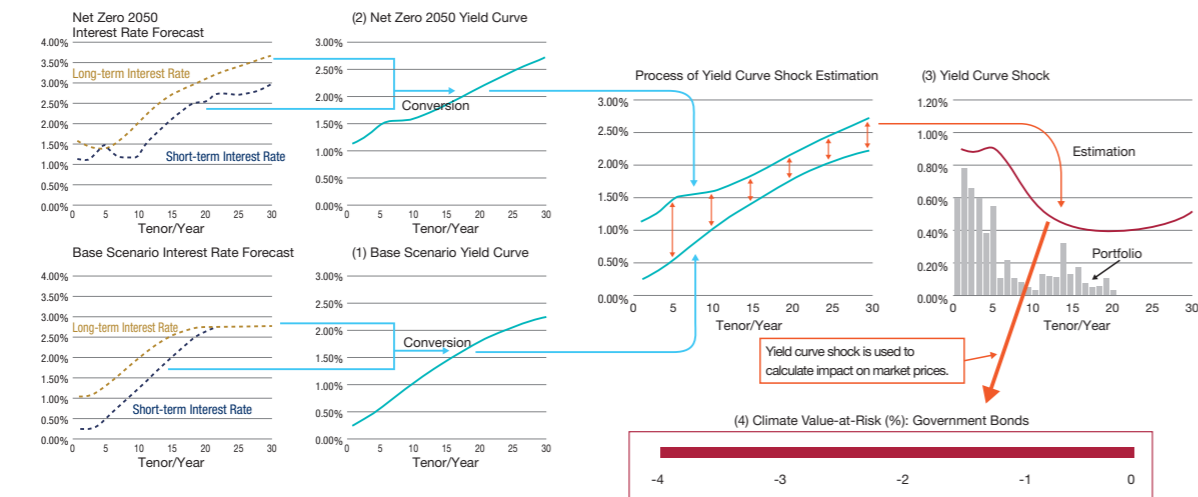
This section uses Sovereign Bond CVaR<sup>1</sup> to analyze climate change risk to government bonds. For Sovereign Bond CVaR, we analyze the impact of climate change on the price of government bonds based on interest rate forecasts under the various climate change scenarios provided by the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), an international network of the central banks and financial supervisory authorities of major countries.

The specific analysis process is shown in Figure 1. Firstly, we produced (1) a 30-year yield curve to serve as the baseline scenario for the countries being analyzed, using the interest rate forecasts for the scenario that does not factor in the impact of

climate change. Next, we adopted five of NGFS's six climate scenarios,<sup>2</sup> namely "Net Zero 2050," "Below 2°C," "Divergent Net Zero," "Delayed Transition," and "Nationally Determined Contributions (NDCs)" as the scenarios to be compared with the base scenario. We then produced (2) 30-year yield curves for each scenario for the countries being analyzed.

After that, comparing (1) and (2), we estimated (3) yield curve shock, which indicates how much the interest rate forecasts would change. Next, using (3), we calculated (4) the price of the target countries' government bonds. Finally, a comparison of (4) with the current prices of the same bonds indicates to what extent returns will increase or decrease (Figure 1).

**Figure 1. Conceptual Diagram of Calculation of Sovereign Bond CVaR**



(Note) While the chronic impact of changes in climate patterns has been factored into physical risks in each scenario to a certain extent, acute impacts, such as disasters caused by extreme weather events, have not been taken into account. (Source) GPIF, Reproduced by permission of MSCI ESG Research LLC ©2023.

<sup>1</sup> Climate Value-at-Risk (CVaR) is an analytical method of measuring how climate policy changes and disasters caused by climate change impact corporate value. <sup>2</sup> We have used the Phase III climate scenarios published by the NGFS in September 2022. Please refer to NGFS Scenarios for Central Banks and Supervisors (September 2022) for the levels of physical and transition risks anticipated under each scenario.

In this section, we will examine the results of an analysis of CVaR by country for the government bond portfolio as of March 31, 2023. This analysis shows that the Divergent Net Zero scenario resulted in the greatest negative CVaR for the seven major countries (Figure 2). This scenario assumes that, while the world will achieve net zero emissions by 2050, the carbon price and other costs will rise due to the introduction of different policies in each industry and fossil fuels will be phased out earlier than in other scenarios, resulting in rising interest rates due to inflationary pressures (larger yield curve shocks). It is thought that the results of the analysis have been impacted by this rise in interest rates. CVaR by country is affected by (1) the size of yield curve shocks and (2) the duration (the average time taken to recoup bond investments)<sup>3</sup> of bonds in GPIF's portfolio. However, it should be noted that the price risk is generated by two factors, namely the duration of the government bond and the size of the yield shock at maturity (for example, in

the Net Zero 2050 scenario, the yield curve shock is greater in the short term in some countries). In other words, if the size of the yield curve shock is the same, it is possible to say that the longer the duration of a government bond, the larger the negative CVaR impact will be. From this perspective, we conducted a comparison of yield curve shocks under the Net Zero 2050 scenario (Figure 3). A roughly similar size of yield curve shock is estimated for France, Germany, and Italy, but a larger negative CVaR is calculated for France and Germany than for Italy. This is thought to be due to the relatively longer duration of French and German government bonds in GPIF's portfolio, compared to Italian government bonds.

Next, we estimated the impact of yield curve shock on government bond prices using a simplified method, assuming zero-coupon bonds (Figure 4). Because the estimated yield curve shock for Canada is the largest out of the seven major countries, Canadian government bonds suffer the largest proportional fall in price across all maturities.

**Figure 2. CVaR of Government Bonds in GPIF Portfolio by Scenario (%)**

	Net Zero 2050	Below 2°C	Divergent Net Zero	Delayed Transition	Nationally Determined Contributions
Japan	-3.9	-1.5	-6.6	-1.0	-1.4
France	-3.3	-1.1	-5.1	-0.5	-0.9
U.S.	-4.1	-1.9	-6.4	-0.8	-1.2
U.K.	-5.0	-2.1	-7.6	-1.2	-1.4
Germany	-3.3	-1.1	-5.1	-0.4	-1.0
Italy	-2.9	-1.0	-4.6	-0.3	-0.9
Canada	-5.0	-2.1	-7.7	-0.9	-1.6

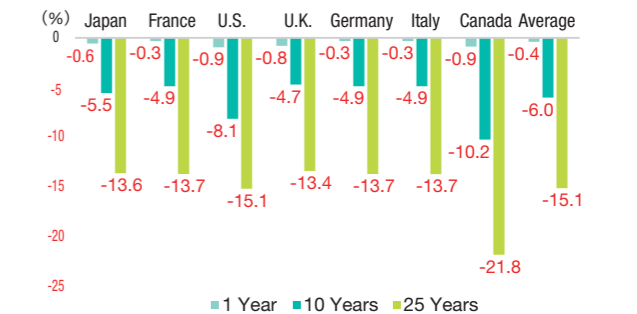
(Source) GPIF, Reproduced by permission of MSCI ESG Research LLC ©2023.

**Figure 3. Country-to-country Comparison of Yield Curve Shock (1-Year, 10-Year, and 25-Year Maturity)**



(Note) The average is a simple average of 53 countries, including the above seven countries. (Source) GPIF, Reproduced by permission of MSCI ESG Research LLC ©2023.

**Figure 4. Country-to-country Comparison of Rate of Decline in Government Bond Prices (1-Year, 10-Year, and 25-Year Maturity)**



(Note) The average is a simple average of 53 countries, including the above seven countries. (Source) GPIF, Reproduced by permission of MSCI ESG Research LLC ©2023.

<sup>3</sup> Durations used in this analysis are approximations. The CVaR of government bonds is calculated using the full revaluation approach.

# Analysis of Real Estate Portfolio Using Climate Value-at-Risk

**Impact of physical risks on real estate values (real estate CVaR)**



**-1.4%**  
**~-2.7%**

In this report, we used CVaR to analyze the physical and transition risks of domestic real estate, included in alternative assets. Our real estate CVaR results indicate that physical risks may potentially lower the asset values of domestic real estate in GPIF's portfolio by between 1.4% and 2.7%.

## Risk Analysis of the Real Estate Portfolio Using CVaR

In addition to so-called traditional asset classes such as equities and bonds, GPIF's portfolio contains alternative assets, such as infrastructure, private equity, and real estate.

In this report, we used CVaR to measure the effect of

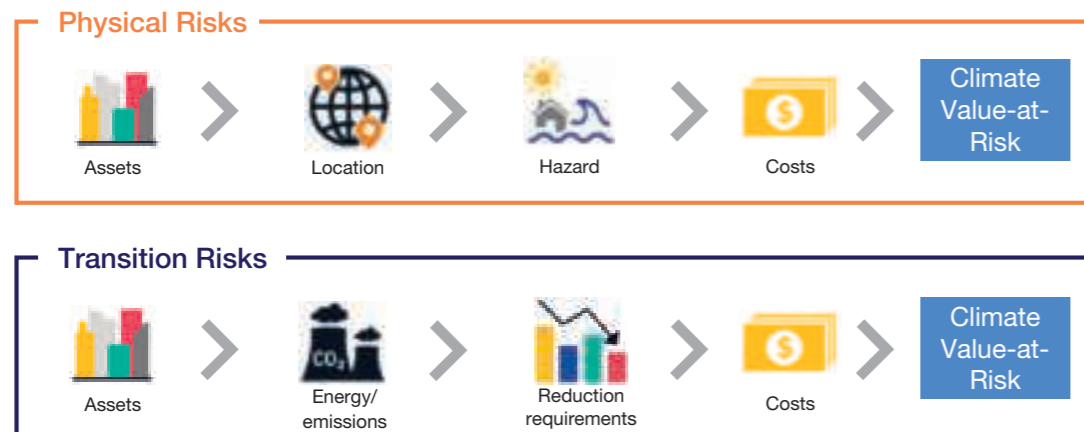
climate change (physical risks and transition risks) on real estate asset values in GPIF's Japanese domestic real estate portfolio, included in the alternative assets.

## Physical and Transition Risks from the CVaR Perspective

CVaR is used to analyze physical risks by identifying the asset types and locations of real estate holdings, estimating the impact of future climate change using climate data related to natural disasters, and evaluating the magnitude of the impact on real estate asset values under each climate scenario (the NGFS scenarios were used in this analysis) (Figure 1). We evaluate physical risks across six categories of natural disasters for our CVaR analysis: (1) coastal flooding, (2) extreme cold, (3) fluvial flooding, (4) extreme heat, (5) tropical cyclones, and (6) wildfire. We also presented a real estate CVaR analysis in the ESG Report 2020,

but this time we have added (6) wildfire as a new category. Aggregated physical risk is calculated by summing each of these physical risks. The magnitude of the impact of physical risks from natural disasters is classified using a seven-tier scale: "severe risk," "significant risk," "moderate risk," "negligible risk," "no identifiable risk," "negligible risk reduction" and "risk reduction." Our evaluation of the magnitude of the impact generally focuses on information on the property location and topography, although some consideration is given to local physical risk countermeasures. We carry out a separate evaluation for each climate scenario.

Figure 1. Illustration of the CVaR Analysis of Physical Risks and Transition Risks



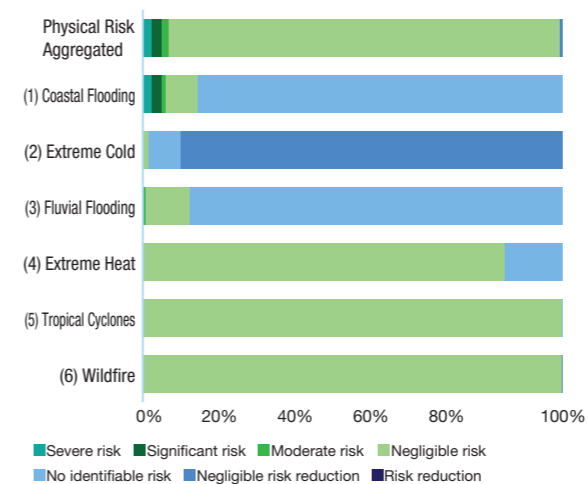
(Source) Reproduced by permission of MSCI ESG Research LLC ©2023.

In our analysis of transition risks, we used a model to evaluate the impact on asset values of potential costs brought about by the transition to a low-carbon economy, for each climate scenario (Figure 1). For details of the analysis process, please refer to the climate-related risks for the real estate portfolio in the "2023 Analysis of Climate Change-Related Risks in the GPIF's Portfolios," a report on MSCI's analysis for the preparation of this ESG Report.

The results of the analysis of the distribution of our domestic real estate portfolio by physical risk indicate that, for aggregated physical risk, the impact on asset value is "negligible risk" for a majority of properties. However, there are some properties where the risk is "severe risk," "significant risk," or "moderate risk" (Figure 2). Turning to specific natural disaster risks, the results show that, for (3) fluvial flooding, (4) extreme heat, (5) tropical cyclones, and (6) wildfire, the impact on asset values is "negligible risk," or "no identifiable risk" for most properties. There are a large number of properties for which (2) extreme cold is "negligible risk reduction." This is due to our assessment that this risk will be mitigated as the frequency of extreme cold weather events declines due to rising temperatures.

Next, Figure 3 shows the magnitude of the impact of physical risks on asset values (the percentage decline in asset values) for each of four NGFS scenarios ((1) Net Zero 2050, (2) Below 2°C, (3) Delayed Transition, and

Figure 2. Distribution of Domestic Real Estate Portfolio by Physical Risk



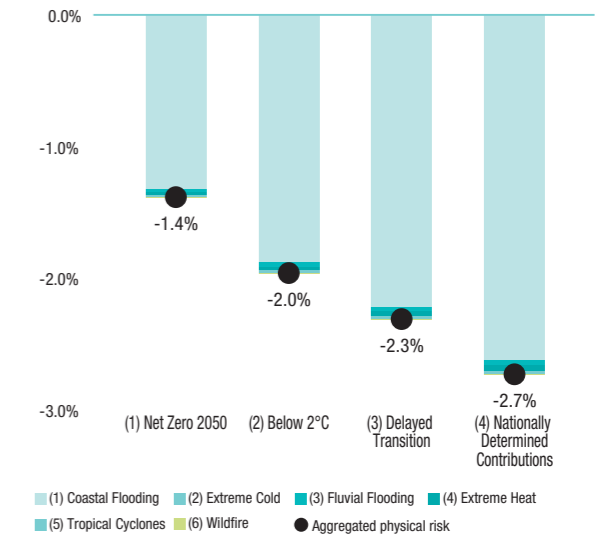
(Note) Calculated for asset values based on the Net Zero 2050 scenario (average). (Source) GPIF, Reproduced by permission of MSCI ESG Research LLC ©2023.

(4) Nationally Determined Contributions (NDCs)). The impact of physical risks (the impact on asset values) under scenario (1), Net Zero 2050, is -1.4%, while the impact under scenario (4), Nationally Determined Contributions (NDCs), which assumes a greater rise in temperatures, is -2.7% (Figure 3). These results indicate that physical risks may potentially lower the asset values of domestic real estate in GPIF's portfolio by between 1.4% and 2.7%.

The results of an analysis of transition risks for each NGFS scenario reveal values of -3.3% under (1) Net Zero 2050, -0.8% under (2) Below 2°C, -2.7% under (3) Delayed Transition, and -0.6% under (4) Nationally Determined Contributions (NDCs). A comparison of (1) and (4) shows that transition risks tend to be higher in scenarios with more aggressive reduction targets. It should be noted that, whereas the costs of transition risks are estimated for the period up to 2050, the costs of physical risks are estimated up to 2100, and the two cannot be compared directly.


In this way, we were able to use CVaR to estimate physical risks due to natural disasters and transition risks. However, we have been unable to reflect the status of natural disaster countermeasures at each real estate property in our current analysis model for physical risks. Moreover, our analysis has not taken into account the likelihood that some of the costs of transition risks will be passed on to property lessors. We think that further improvements are necessary in these areas.

Figure 3. Physical Risks (Percentage Decline in Asset Values) of Domestic Real Estate Portfolio by Scenario



(Source) GPIF, Reproduced by permission of MSCI ESG Research LLC ©2023.

# Analysis of Avoided Emissions Based on the Bottom-up Approach



**Avoided Emissions**  
(zero emissions vehicles')  
Equivalent to the carbon absorbed in one year by a forest  
**1.2 times**  
the area of Japan

We analyzed the zero emissions vehicles produced by the world's major automotive manufacturers for Avoided Emissions which arise from the use of products and services that contribute to reducing GHG emissions. We estimate that the total Avoided Emissions are equivalent to the amount of carbon absorbed in one year by a forest with an area of 45 million ha (1.2 times the area of Japan).

## What are Avoided Emissions?

With companies aiming for decarbonization through the progressive reduction of GHG emissions, there is a trend towards GHG reduction, not only for individual companies but throughout the value chain. At the same time, there is a trend towards quantifying the contribution made by products and services that help to reduce GHG emissions, and to seize the opportunity presented by their positive impact of emission reduction across society. This contribution to emissions reduction is referred to as "Avoided Emissions." Avoided Emissions are defined by the WRI<sup>2</sup>, a body that researches climate change and other issues, as "emission

reductions that occur outside of a product's life cycle or value chain, but as a result of the use of that product." It is thought that, in the future, Avoided Emissions will have a significant impact on companies' competitive strength and influence the corporate value of investee companies.

In this analysis, we used the analytical methodology developed by the Intercontinental Exchange Group (ICE) to calculate Avoided Emissions, delving deeper into companies in GPIF's portfolio across two industries (automotive and power generation) using a bottom-up approach.

## The Avoided Emissions Approach

To estimate Avoided Emissions, it is necessary to identify which industries have products and services that contribute to reducing GHG emissions. Although there are no doubt many products and services that contribute to reducing emissions, but for this analysis, we focused on two products and services where the methodology is easily understandable and companies disclose the information necessary to calculate Avoided Emissions: "zero emissions vehicles"<sup>3</sup> vs. "Internal Combustion Engine Vehicles (ICEV)," and "renewable energy" vs. "energy mix including fossil fuels and renewable energy at the time of evaluation." In the case of zero emissions vehicles, Avoided Emissions are equal to the result of quantifying the

GHG emissions avoided through the use of zero emissions vehicles replacing ICEV. We calculated Avoided Emissions as the difference between the estimated emissions throughout the lifecycle of zero emissions vehicles, from production through use to disposal, and the emissions throughout the lifecycle of ICEV, which we used as a baseline.

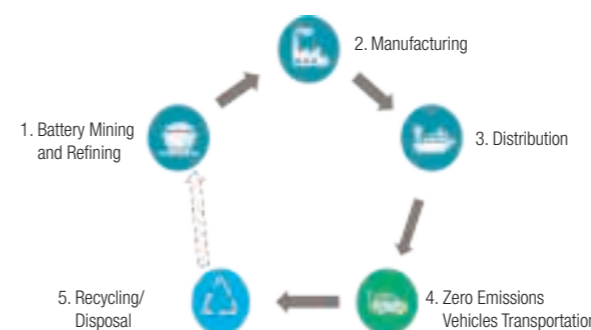
For details of the analysis process, please refer to "Approach and Methodology" in the "Avoided Emissions ~Analysis of GPIF Portfolio~, " a report on ICE's analysis for the preparation of this ESG Report. The analysis in the ICE report includes the mined minerals sector as well as zero emissions vehicles and power generation.

<sup>1</sup> Zero emissions vehicles are battery electric vehicles (BEV) that emit no exhaust gasses such as CO<sub>2</sub> during operation, and do not include hybrid electric vehicles (HEV) etc.  
<sup>2</sup> World Resources Institute  
<sup>3</sup> Hybrid electric vehicles (HEV) were included ICEV etc. for this analysis.

## Avoided Emissions from Zero Emission Vehicles

First, we will examine the Avoided Emissions attributable to zero emissions vehicles. For this analysis, we classify the lifecycle of the vehicle into five phases from manufacturing through usage to disposal and calculate the Avoided Emissions in each phase (Figure 1). This time, however, we did not analyze phase 3. Distribution and phase 5. Recycling/Disposal due to several reasons including a lack of data and the absence of an established methodology. Our analysis considered the 16 main automobile companies included in GPIF's portfolio in terms of market capitalization and other factors (four companies each from Japan, Europe, the United States, and China). We calculated Avoided Emissions using a bottom-up approach based mainly on data disclosed by these companies. The 16 companies selected account for approximately 90% of the total investment amount for the automotive sector in GPIF's equities portfolio.

Figure 1. Illustration of the Scope of Avoided Emissions from Zero Emissions Vehicles



(Source) Reproduced by permission of ICE.

For the analysis, we calculate emissions over the lifecycle of zero emissions vehicles for specific models (sizes) and sales regions. We calculate the total emissions attributable to zero emissions vehicles by multiplying the GHG emissions of individual vehicles by the total number of zero emissions vehicles sold in the region. Next, we

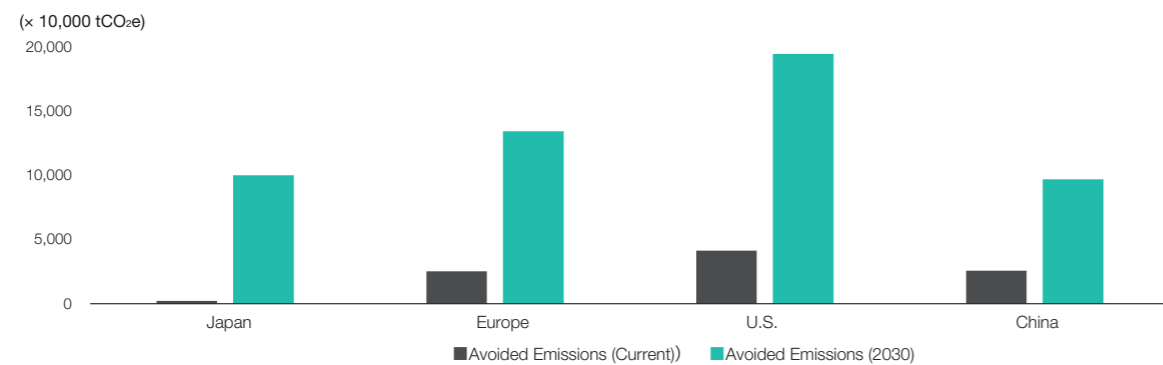
calculate emissions over the lifecycle of ICEV. manufactured in the same region (baseline emissions). The difference between baseline emissions and the emissions from zero emissions vehicles, multiplied by the total number of zero emissions vehicles, gives the Avoided Emissions for that region.

When estimating future Avoided Emissions, the estimated future number of vehicles sold (in 2030) by each company is aggregated by sales region using data and estimates disclosed by each company. Figure 2 shows the Avoided Emissions (tCO<sub>2</sub>e) by region based on the current and future number of vehicles sold. It should be noted that this data is aggregated based on the headquarters of each company analyzed. Therefore, for example, Avoided Emissions arising when a Japanese automotive manufacturer sells vehicles in Europe are counted as Avoided Emissions for Japan.

The results of the analysis<sup>4</sup> shown in Figure 2 (page 77) indicate that, while Avoided Emissions from Japanese automotive manufacturers are extremely small at present, total Avoided Emissions from Japanese companies will exceed those of their Chinese counterparts and reach closer to those of European automotive manufacturers by 2030. This is due to Japanese automotive manufacturers' plans to substantially increase the production of zero emissions vehicles by 2030. Figure 3 (page 77) shows the Avoided Emissions per vehicle, rather than in total. While the Avoided Emissions from each of Japan's zero emissions vehicles are still low compared to Europe and the United States, it is anticipated that this will rise to a similar level by 2030. We estimate that the current level of total Avoided Emissions from the 16 automotive manufacturers we considered is equivalent to the amount of carbon absorbed in one year by a forest with an area of 45 million ha (1.2 times the area of Japan).

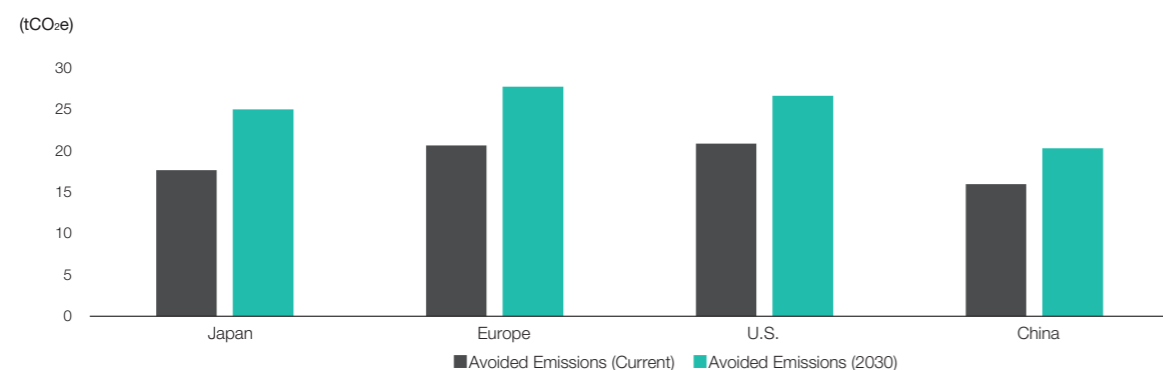
<sup>4</sup> Avoided Emissions are calculated without considering the relative weight of each holding in GPIF's portfolio.

**Figure 2. Comparison of Avoided Emissions from Zero Emissions Vehicles by Region (Based on Headquarters Location)**



(Note) Current: Estimates for 2022  
(Source) Reproduced by permission of ICE.

**Figure 3. Comparison of Avoided Emissions per Zero Emissions Vehicle by Region (Based on Headquarters Location)**



(Note) Current: Estimates for 2022  
(Source) Reproduced by permission of ICE.

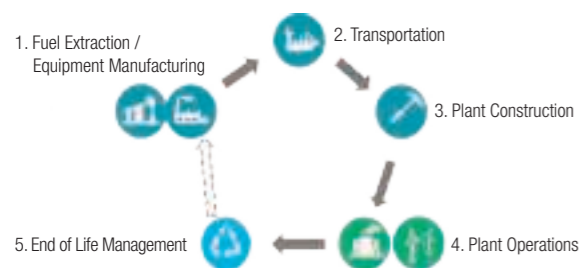
### Avoided Emissions from the Power Generation Business in the Utilities Sector

Next, we engaged in an analysis of the power generation business in the utilities sector. We considered 12 companies in four regions (three companies each from Japan, Europe, the United States, and China). The 12 companies selected account for approximately 30% of the total investment

amount for the utilities sector in GPIF's equities portfolio.

For this analysis, we classify the emissions into five phases from manufacturing through to disposal (Figure 4). Within this scope, we calculate the emissions across the entire lifecycle of renewable energy power generation for each company and compare these with baseline emissions. Baseline emissions are calculated based on the NGFS Current Policies scenario, which assumes that each country's energy mix is only affected by policies already implemented today. We calculate Avoided Emissions as the difference between the emissions estimated under each company's electric power plan for decarbonization and baseline emissions.

**Figure 4. Illustration of the Scope of Avoided Emissions from Utilities**



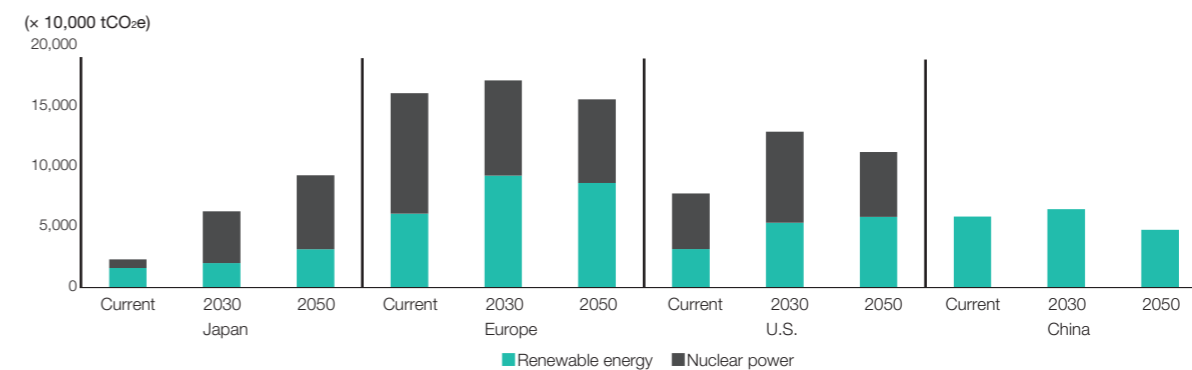
(Source) Reproduced by permission of ICE.

Figure 5 shows the results of the analysis of Avoided Emissions from each company engaged in the power generation business, aggregated by region. In Figure 5, we have summed the total Avoided Emissions (tCO<sub>2</sub>e) relating to renewable energy power generation today, in 2030, and in 2050. Renewable energy includes wind, solar, geothermal, biomass, and hydro power generation. Meanwhile, although nuclear power generation contributes to reducing emissions, with extremely low emissions during the operating phase, we have aggregated it separately due to various concerns of issues such as nuclear waste. Moreover, none of the Chinese companies analyzed are engaged in a business related to nuclear power generation, nor have they made any disclosures concerning future business plans involving nuclear power generation. We have therefore removed nuclear power generation from the analysis for China.<sup>5</sup>

Avoided Emissions are trending higher until 2050, with Avoided Emissions due to nuclear power especially high in 2050. The absolute amount of Avoided Emissions is highest in Europe, but it is necessary to consider differences in economic scale and population when making comparisons between countries and regions. Figure 6 presents the total Avoided Emissions per kilowatt hour of renewable energy (tCO<sub>2</sub>e/kWh) for each region. Because Japan currently uses more fossil fuels for power generation (that is, the baseline value is higher) than Europe or the United States, Japan's Avoided Emissions per kilowatt hour from the introduction of renewable energy are also higher than in Europe or the United States. The intensity of Avoided Emissions is expected to gradually decline as renewable energy occupies an increasingly large proportion of the baseline value. Currently, the estimated total Avoided Emissions from the 12 power generation companies considered are equivalent to the carbon absorbed in one year by a forest with an area of 150 million ha (4.0 times the area of Japan).

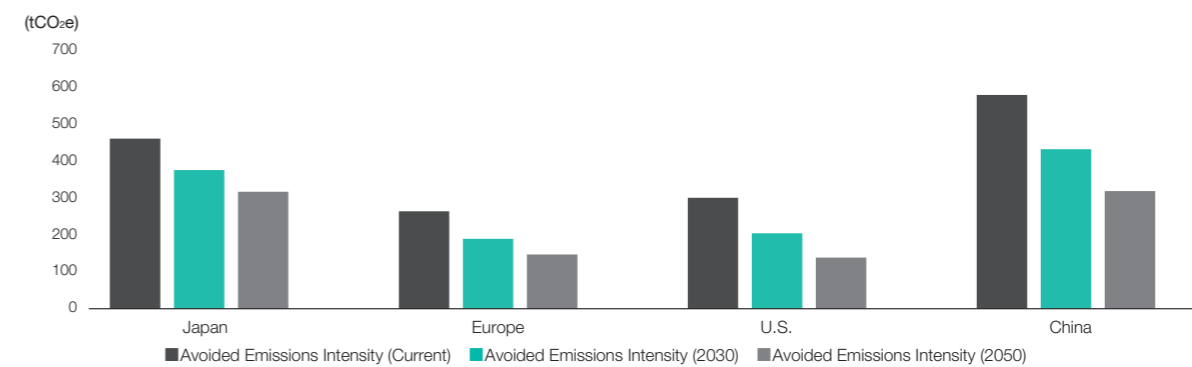
As shown in Figure 5, overall, Avoided Emissions are expected to increase towards 2050. In the case of Japan,

**Figure 5. Regional Comparison of Avoided Emissions from the Power Generation Business**



(Note) Current: Estimates for 2022  
(Source) Reproduced by permission of ICE.

**Figure 6. Avoided Emissions per Kilowatt Hour from the Power Generation Business (tCO<sub>2</sub>e/kWh)**



(Note 1) Avoided Emissions per kilowatt hour = Avoided Emissions intensity  
(Note 2) Current: Estimates for 2022  
(Source) Reproduced by permission of ICE.

<sup>5</sup> Some of the state-owned parent companies of the power generation companies considered in this analysis are engaged in the nuclear power generation business, which was excluded from this analysis.



# Measuring the Impact of Projects Funded Using ESG Bonds in GPIF's Portfolio

Contribution of ESG bond-funded projects to reducing GHG emissions over the latest year<sup>1</sup>



**8.29** million tCO<sub>2</sub>e

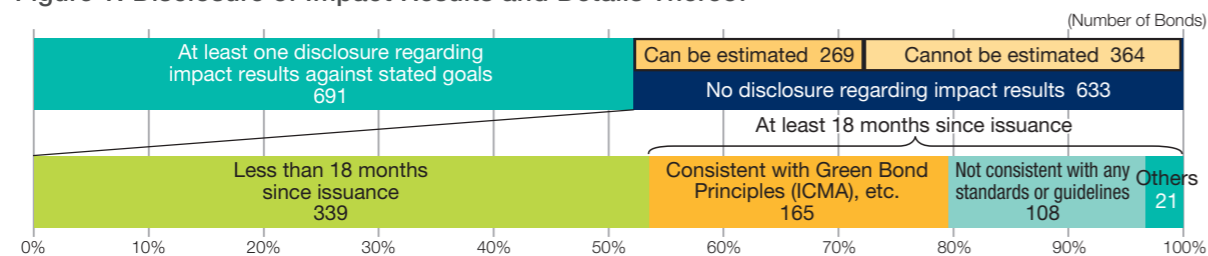
GPIF invests in ESG bonds issued by international organizations and private sector companies. This year, we collected information on the environmental and social impact and effects generated by the projects funded using the proceeds of ESG bonds, mainly from the disclosures of the issuers of ESG bonds in GPIF's portfolio.

## Status of Disclosure by Issuers

The Green Bond Principles (GBP), the Social Bond Principles (SBP), and the Sustainability Bond Guidelines (SBG) published by the International Capital Market Association (ICMA), as well as standards such as the EU Green Bond Standard (GBS) provide global guidelines to promote transparency and disclosure for the issuance of bonds that contribute to achieving social and/or environmental goals, thus supporting the integrity of the ESG bond market. Specifically, guidelines such as the Green Bond Principles encourage issuers to engage in accurate and transparent disclosure to investors and other stakeholders. Even after the bonds are issued, they require that issuers provide annual disclosure of the environmental and social impact and effects (impact results) of the project(s) in areas such as avoided emissions, as well as the amount of bond proceeds already allocated to the designated project(s). This disclosure is required until all the proceeds from the bonds have been allocated.

There are, however, very few examples of the actual aggregation and analysis of impact-related disclosure and impact results from ESG bonds. In this report, with the cooperation of ICE, we have analyzed the ESG bonds held by GPIF in terms of (1) the status of disclosure by issuers and (2) impact results. Figure 1 shows the status of disclosure for 1,324 ESG bonds<sup>2</sup> held by GPIF as of March 31, 2023. Of these 1,324 bonds, 691 bonds — approximately half — disclosed in post issuance reports at least one impact result of the project(s) funded from the proceeds of bond issuance. Of the remaining 633 bonds, approximately half had only recently been issued<sup>3</sup> (within the last 18 months), thus we can categorize these as bonds where we would expect disclosure in the future. Meanwhile, there were a certain number of bonds for which no disclosure had been made regarding impact results, despite being issued based on guidelines such as the Green Bond Principles and the lapse of a sufficient period of time (at least 18 months) since issuance.

Figure 1. Disclosure of Impact Results and Details Thereof



(Note) "Others" includes bonds consistent with the Climate Bonds Taxonomy, the EU Green Bond Standard, the LMA Green Loan Principles, or equivalent standards. (Source) Prepared by GPIF based on data from ICE.

<sup>1</sup> Compiled from the latest impact report or equivalent issuer disclosure. Of the 691 bonds for which information was disclosed, 2022 results were used for 41.7%, 2021 results were used for 45.3%, and results disclosed through reports and other information published up to 2020 were used for the remainder.

## Approach to Measuring the Impact of ESG Bonds

Here, we present the approach used to measure the impact of ESG bonds held in GPIF's portfolio. We begin by considering the impact results from investing US \$1,000 in each ESG bond. As described above, in approximately half of these bonds, there is at least one post-issuance disclosure regarding impact results against the stated goals of bond issuance in the impact reports or equivalent. Although the numbers are disclosed, it is necessary to make certain assumptions<sup>4</sup> concerning the disclosed data due to the differing scopes of impact results (disclosure for a single bond or multiple bonds) and the fact that impact results span several different fields, resulting in a lack of clarity concerning the amounts of investment contributing to each area of impact.

We undertook a more detailed analysis of bonds for which no disclosure of impact results has been made. We

classified these bonds based on three criteria: "Type of impact funded," "Type of issuer (international development bank, private sector company, etc.)," and "Region where issuer is located." We then allocated the average impact results of ESG bonds in each class to any bonds in that class for which no disclosure had been made (Figure 2). However, we excluded from our data any class containing less than 10 bonds with disclosures. Moreover, this time, we narrowed down our analysis to green bonds due to the number of samples required. Of the 633 bonds for which no disclosure of impact results had been made, there were 269 issues for which we were able to apply the average impact results using the method described above. This method enabled us to measure approximately 72.5% of bonds in terms of the number of bonds (Figure 1).

Figure 2. Criteria Used to Distinguish Similar Bonds for Estimation Purposes

Type of Impact funded	Type of Issuer	Region
(1) Energy efficiency	(1) Corporate	(1) EU
(2) Renewable energy	(2) Financial	(2) U.K.
	(3) Sovereign	(3) North America
	(4) Supranational	(4) Japan
	(5) Agency (SSA)	(5) APAC (excluding Japan)*
		(6) Asia*
		(7) Global (other)

(Note) \*Countries such as India and Iran are included in "Asia," while countries such as Australia and South Korea are included in "APAC (excluding Japan)." (Source) Reproduced by permission of ICE.

## Impact of ESG Bonds in GPIF's Portfolio

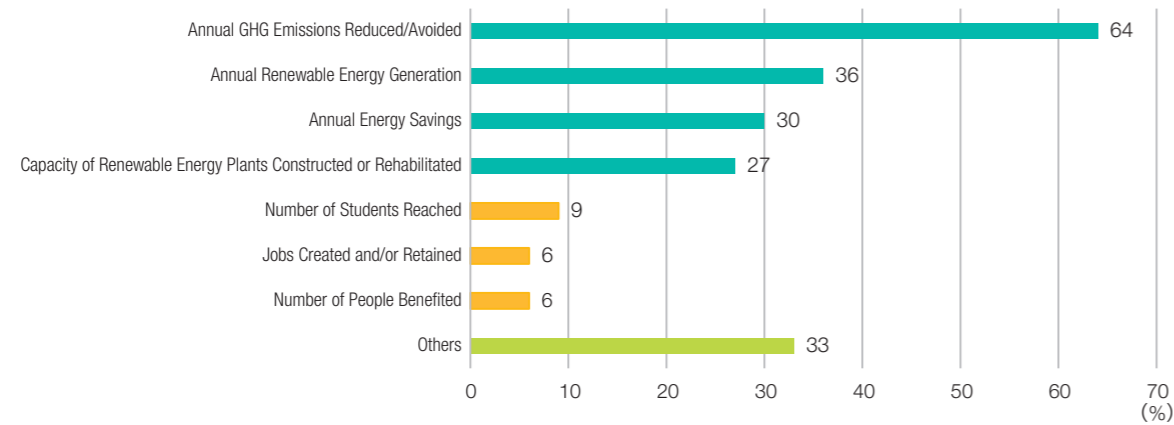
An examination of the goals of projects funded using the proceeds of ESG bonds held as of March 31, 2023 (1,324 bonds) reveals that these can be summarized in terms of seven impact metrics (Figure 3, page 81). "Annual GHG emissions reduced/avoided" is the most common goal,

followed by "Annual renewable energy generation." It can be said that one of the reasons why the most common impact metrics being environmental related is due to the fact that 61.5% of the ESG bonds held by GPIF are green bonds.

Figure 4 shows the impact results against seven stated impact metrics,<sup>5</sup> weighted by the value of GPIF's investment. Here, we present separate figures for the impact results generated in the latest year and the projected (cumulative) impact results if the bond is held to maturity.<sup>6</sup> These impact

results can be converted to monetary values under certain assumptions. For example, it is estimated that the equivalent of ¥100 billion would be needed for the avoided emissions over the past year (results + estimates) of 8,291,327 tCO<sub>2</sub>e when using carbon credits<sup>7</sup> (Figure 5).

Figure 3. Impact Metrics of ESG Bonds Target Projects



(Note) The dark green bars represent environment-related goals and the yellow bars represent social-related goals. (Source) Reproduced by permission of ICE.

Figure 4. Impact of Projects Funded Using ESG Bonds in GPIF's Portfolio (Latest/ Cumulative)

Impact Metric	Unit	Latest Year		Cumulative
		Results	Results + Estimates	Results
Annual GHG Emissions Reduced/Avoided	tCO <sub>2</sub> e	5,238,192	8,291,327	29,287,757
Annual Renewable Energy Generation	MWh	4,209,676	6,746,261	15,330,172
Annual Energy Savings	MWh	870,179	964,066	3,418,613
Capacity of Renewable Energy Plants Constructed or Rehabilitated	MWh	38,989,228	53,198,394	335,220,952
Number of Students Reached	Students	1,581,079	1,581,079	8,567,689
Jobs Created and/or Retained	Jobs	195,227	195,227	904,525
Number of People Benefited	People	17,481,390	17,481,390	76,944,833

(Note) Because estimates only include green bonds, there is no difference between "Results" and "Results + Estimates" for the latest year in "Number of Students Reached," "Jobs Created and/or Retained," and "Number of People Benefited." (Source) Prepared by GPIF based on data from ICE.

Figure 5. Formula for Calculating Monetary Value for 'Annual GHG Emissions Reduced/Avoided'

$$\text{Annual GHG Emissions Reduced/Avoided} \times \text{Price of carbon credits under the EU Emissions Trading System (EU-ETS)}$$

$$8,291,327 \text{ tCO}_2\text{e} \times \text{€}87.5^* (\text{=¥}13,783.26^{**}) / \text{tCO}_2\text{e}$$

(Notes) \*The price of carbon credits is as of June 30, 2023. \*\*The EUR/JPY exchange rate is as of June 23, 2023. (Source) Reproduced by permission of ICE.

5 For the methodology used to aggregate impact results, please refer to "6. Methodologies" in "Impact Bond Indicator - Analysis of GPIF Portfolio-".  
6 Maturity is taken to be the number of years to maturity for bonds maturing prior to 2044. For bonds maturing in 2044 or later (including perpetual bonds), maturity has been capped at 2043, and the impact has been forecast based on a 20-year holding period.  
7 Please refer to "9. Conclusions" in "Impact Bond Indicator - Analysis of GPIF Portfolio-" for other conversions of impact results into monetary values.

### Scale of Impact

To enable readers to gain a more direct understanding of the scale of the impact shown on the previous page, we have attempted to convert this impact into more familiar units and figures (Figure 6).

For example, the quantity of GHG Emissions Reduced/Avoided (8,291,327 tCO<sub>2</sub>e) is equivalent to the amount of carbon sequestered by a forest 18 times the size of Tokyo, indicating just how large the contribution is in terms of reducing GHG emissions. In terms of social impact, the 195,227 cases of Jobs Created and/or Retained translate to

the creation of enough employment to enable approximately 86% of all completely unemployed persons in Tokyo in FY2022 (226,000 persons) to return to work.

Recently, investors are becoming increasingly strict in their attitude to "sham" ESG investing, as evident in the spread of terms such as greenwashing and SDGs-washing. Going forward, ESG bond issuers will be required to appropriately disclose information including impact results, and it is possible that investors may also be required to disclose information based on this.

Figure 6. Scale of Impact

- The total Annual GHG Emissions Reduced/Avoided (8,291,327 tCO<sub>2</sub>e) is equivalent to the amount of carbon sequestered by a forest 18 times the size of Tokyo per year.\*
- The total Annual Energy Saved (964,066MWh) is equivalent to the (annual) energy consumption\*\* of approximately 230,000 Japanese households.
- The total Renewable Energy Generated (6,746,261MWh) is equivalent to the (annual) energy consumption\*\* of approximately 1,600,000 Japanese households.
- The total Capacity of Renewable Energy Plants Constructed or Rehabilitated (53,198,394MWh) is equivalent to the (annual) energy consumption\*\* of approximately 12,700,000 Japanese households.
- The total impact of People Benefited (17,481,390 persons) is equivalent to approximately 1.2 times the population of Tokyo.\*\*\*
- The total impact of Students Reached (1,581,079 persons) is equivalent to approximately 9% of the total number of students in Japan.\*\*\*\*
- The total Impact of Jobs Created and/or Retained (195,227 Jobs) is equivalent to approximately 86% of the total unemployment rate in Tokyo in FY2022.

(Note 1) A latest year (results + estimates) is used for impact results.  
(Note 2) \*The area of Tokyo is equivalent to approximately 0.0058 times the area of Japan.  
\*\*The (annual) energy consumption per Japanese household is based on the Results of Survey on the Actual Conditions of Carbon Dioxide Emissions from Residential Sector in FY2021 (Preliminary Figures) published by the Ministry of Environment.  
\*\*\*The population of Tokyo as of April 1, 2023.  
\*\*\*\*The number of students in Japan represents the number of students attending educational institutions under the jurisdiction of the Ministry of Education, Culture, Sports, Science and Technology from kindergarten to university graduate school as of May 1, 2021.  
\*\*\*\*\*The number of unemployed persons in Tokyo in FY2022.  
(Source) Reproduced by permission of ICE.

# Nature-Related Risks including Biodiversity and TNFD Trial Analysis

Proportion of companies that are highly dependent on nature<sup>1</sup>

# 65%

We analyzed nature-related risks including biodiversity in GPIF's portfolio, with reference to the TNFD framework. In our analysis this time, we not only considered how dependent our investee companies are on nature but also their impact on nature.

## Nature-Related Risks including Biodiversity

Nature-related risks including biodiversity are recognized as global issues for companies.<sup>2</sup> At the 15th Conference of Parties (COP15) of the UN Convention on Biological Diversity (CBD) held in Montreal, Canada, in 2022, the participants agreed to protect 30% of the world's land, marine and coastal areas, and inland waters by 2030. In view of this trend, there is an increasing consciousness of the need for companies to consider the impact of nature-related risks when making financial and business decisions. GPIF, with its extensive investments in domestic and foreign companies, is aware of the importance of deepening understanding of nature-related risks in the same way as for the climate-related risks with which it is already engaged.

However, nature-related risks entail a diverse range of natural capital, including biodiversity, and factors such as the different natural environments in the locations where each company conducts its business activities often make it difficult to accurately ascertain the associated risks and opportunities. At present, the activities of the Taskforce on Nature-related Financial Disclosure (TNFD), which is working towards the development and provision of a framework for

nature-related risk management and disclosure by organizations, are attracting interest from companies, investors, and others. The TNFD has included disclosure guidance that is in line with the TCFD recommendations, and aims for close coordination with the TCFD. GPIF has not declared its endorsement of the TNFD, but we are closely watching the approaches, guidelines, and associated analysis methods recommended by the TNFD.

Under these circumstances, S&P Global is working with the United Nations Environment Programme – World Conservation Monitoring Centre (UNEP-WCMC) to support disclosure and analysis in line with the TNFD framework by combining information including geographically and spatially linked biodiversity, nature risk data and detailed information on business activities. In this section, we present an outline of the TNFD framework and, utilizing the analytical support of S&P Global, we disclose the results of a trial analysis of GPIF's equities portfolio based on the methods recommended by the TNFD. This analysis is based on the information published up to the TNFD beta framework Beta v0.4, as of the time of writing.

<sup>1</sup> Calculated by dividing the number of companies with a dependency score of 0.6 or greater by the total number of investee companies for domestic equities and foreign equities. S&P Global classifies a dependency score of 0.6 or above as a high dependence on nature, with reference to the materiality evaluation framework in the ENCORE (Exploring Natural Capital Opportunities, Risks, and Exposure) knowledge base (Natural Capital Finance Alliance 2022), under which a score of 0.6 or above indicates high or very high dependence. For details, please refer to pages 11 and 18 of "Nature & Biodiversity Risk Portfolio Assessment," a report on S&P Global's analysis for the preparation of this report.  
<sup>2</sup> Cited as a global risk for the next decade in the World Economic Forum Global Risks Perception Survey (WEF, 2023).

## Overview of the TNFD Framework

The composition of the TNFD framework features "Core Concepts and Definitions," the "Risk & Opportunity Assessment Approach (LEAP)," and "Recommended Disclosures" (Figure 1).

Figure 1. Main Components of the TNFD Framework



(Source) Prepared by GPIF with reference to the TNFD Nature-related Risk and Opportunity Management and Disclosure Framework Beta v0.4 overview ©TNFD 2022-2023.

Of these components, here, we will present an overview of "Core Concepts and Definitions" and the "Risk & Opportunity Assessment Approach (LEAP)." First of all, Core Concepts and Definitions include an explanation of four concepts: (1) nature-related dependencies, (2) nature-related impacts, (3) risks, and (4) opportunities. Of these, (1) nature-related dependencies are defined as "aspects of ecosystem services that an organisation or other actor relies on to function," while (2) nature-related impacts are "changes in the state of nature, which may result in changes to the capacity of nature to provide social and economic functions."<sup>3</sup> Assessing

Figure 2. Overview of the LEAP Approach

Locate your interface with nature		Evaluate your dependencies and impacts		Assess your risks and opportunities		Prepare to respond to nature-related risks and opportunities and report	
L1	Business footprint	E1	Identification of environmental assets and ecosystem services	A1	Risk and opportunity identification	P1	Strategy and resource allocation
L2	Nature interface	E2	Identification of dependencies and impacts	A2	Existing risks mitigation and risk and opportunity management	P2	Performance management
L3	Prioritization	E3	Dependency analysis	A3	Additional risk mitigation and risk and opportunity management	P3	Reporting
L4	Sector identification	E4	Impact analysis	A4	Risk and opportunity materiality assessment	P4	Presentation
↓							Review and repeat

L1-L4 : Items referred to in our trial analysis

(Source) Prepared by GPIF with reference to the TNFD Nature-related Risk and Opportunity Management and Disclosure Framework Beta v0.4 overview ©TNFD 2022-2023.

<sup>3</sup> From the TNFD Nature-Related Risk and Opportunity Management and Disclosure Framework Beta v0.2 Annex 1.

<sup>4</sup> These include guiding questions recommended at each stage, for example, L2 "Which biomes and ecosystems do these activities interface with?" and E3 "What is the size and scale of our dependencies on nature in each priority location?"

these two concepts is vital for the evaluation of an organization's (3) risks and (4) opportunities.

We will now present an overview of the LEAP approach. The LEAP approach is composed of four stages: "Locate your interface with nature; Evaluate your dependencies and impacts; Assess your risks and opportunities; and Prepare to respond to nature-related risks and opportunities and report." Several guiding questions are indicated at each stage.<sup>4</sup> The TNFD also recommends the consideration of the scope of assessment before commencing the LEAP approach, as well as engagement with stakeholders. The approach is designed as an iterative process (Figure 2).

At GPIF, as a first attempt, we examined our portfolio's current degree of connection with the ecosystem and the extent to which it depends on, and affects, nature and biodiversity. In terms of the LEAP approach, the task of ascertaining where our investees' assets and business activities are and what ecosystems they have connections with corresponds to the guiding questions for "Locate." Likewise, the guiding questions for "Evaluate" apply in terms of ascertaining our investees' degree of dependence and impact on nature in their region. In this analysis, we therefore quantified the "dependencies" and "impacts" described above based on the two stages of "Locate" and "Evaluate" in the LEAP approach. In the following pages, we further examine the characteristics of these dependencies and impacts before disclosing the results of our analysis of GPIF's equities portfolio by ecosystem service and sector.

### Nature-Related Dependencies in GPIF's Portfolio

As described above, TNFD refers to the reliance of an organization or other actor on ecosystem services as "dependencies." Dependencies are said to include ecosystems' ability to regulate hazards, provide a suitable habitat for pollinators, and sequester carbon. We consider that an understanding of nature-related dependencies and their extent is useful from the perspective of evaluating risks to a company's business activities from changes in the state of biodiversity and the natural environment. Under the LEAP approach, it is recommended that analysts first "Locate" and "Evaluate" dependencies and impacts before proceeding to "Assess" risks and opportunities.

This time, we used the dependency scores provided by S&P Global to analyze the degree of nature-related dependency of GPIF's equities portfolio. Dependency scores are composed of two scores — a (1) reliance score and a (2) resilience score — to evaluate the dependency of each asset or business activity on 21 different ecosystem services (Figure 3). The (1) reliance score is calculated from the degree of

materiality of reliance on ecosystem services and the relevance of the ecosystem services at the business location. The (2) resilience score evaluates the level of disturbance an ecosystem can undergo while continuing to maintain its flow of ecosystem services. For example, if the relevant ecosystem services are important to a business' production processes then the degree of reliance will be high, but if the resilience of the ecosystem — its ability to continuously provide ecosystem services — is high, then this dependency risk is considered to be reduced. A dependency score of 0 indicates no dependency risk, while a score of 1 indicates very high dependency risk. For details of the calculation method and other information concerning dependency scores, please refer to pages 17 and 18 of "Nature & Biodiversity Risk Portfolio Assessment," a report on S&P Global's analysis for the preparation of this report.

Figure 3. The 21 Ecosystem Services

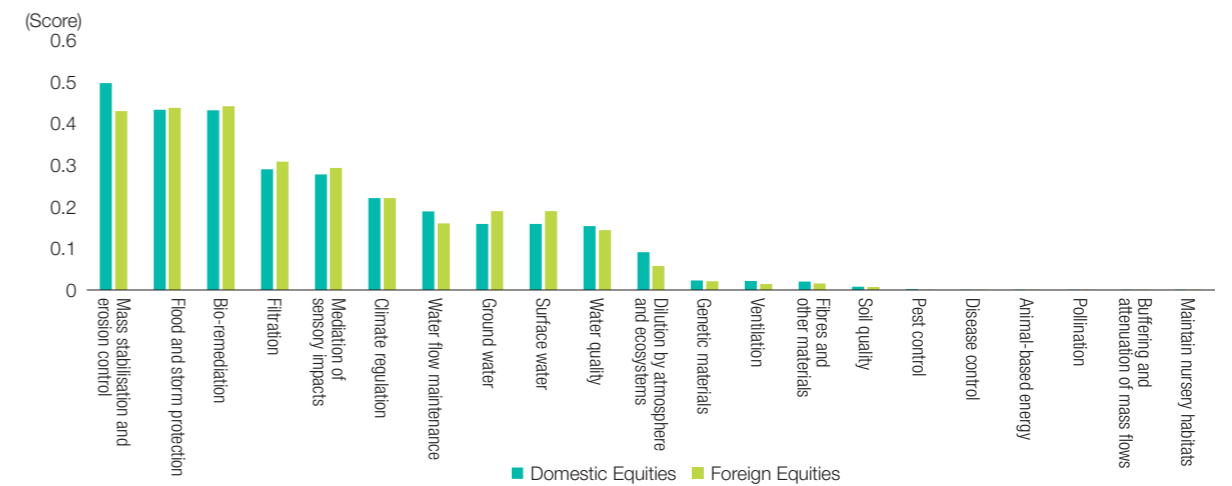
Provisioning services		
1	Animal-based energy	Employment of domestic and commercial animals such as oxen, horses, etc.
2	Fibres and other materials	Fibres and other materials from plants, etc., directly used or processed
3	Genetic materials	Deoxyribonucleic acid (DNA) and all biota including plants, etc.
4	Ground water	Water stored underground in aquifers and originating from rainfall, natural freshwater resources, etc.
5	Surface water	Freshwater resources from collected precipitation and water flow from natural sources
Regulatory & maintenance services		
6	Bio-remediation	A natural process whereby living organisms such as micro-organisms, plants, etc. degrade, reduce, and/or detoxify contaminants
7	Buffering and attenuation of mass flows	Buffering and attenuation of mass flows allows the transport and storage of sediment by rivers, seas, etc.
8	Climate regulation	Global and regional climate regulation provided through soils, oceans, vegetation, etc.
9	Dilution by atmosphere and ecosystems	Dilution of gases, fluids, etc. produced by human activity through water and atmosphere
10	Disease control	Important roles in the regulation of diseases for animals, plants, and humans
11	Filtration	Filtering, sequestering, etc. of pollutants by animals, plants, etc.
12	Flood and storm protection	Flood and storm buffering, attenuating, and similar effects of vegetation
13	Maintain nursery habitats	Maintain habitats that make a significantly high contribution to the reproduction of individuals from a particular species
14	Mass stabilisation and erosion control	Mass stabilisation and protection from erosion in terrestrial, coastal, and other ecosystems provided by vegetation cover
15	Mediation of sensory impacts	Vegetation limiting the impact of noise and light pollution on human health and the environment
16	Pest control	Pest control and invasive alien species management provided through the manufacture of natural biocides, predators, etc.
17	Pollination	Pollination services provided mainly by animals, water and wind
18	Soil quality	Weathering processes and decomposition and fixing processes that contribute to soil quality
19	Ventilation	Ventilation, vital for good indoor air quality, provided by natural or planted vegetation
20	Water flow maintenance	The system that enables circulation of water through the Earth's atmosphere, land, and oceans
21	Water quality	Favourable living conditions etc. for biota that contribute to the water quality of freshwaters and salt waters

(Source) Summarized by GPIF from S&P Global Sustainable1; S&P Global Market Intelligence. Natural Capital Finance Alliance (Global Canopy, UNEP FI, and UNEP-WCMC) (2022) ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. [On-line], Cambridge, UK: the Natural Capital Finance Alliance. Available at: <https://encore.naturalcapital.finance>. DOI: <https://doi.org/10.34892/dz3x-y059>.

Figure 4 shows the dependency score results for each ecosystem service in GPIF's equities portfolios. The results indicate relatively high dependency scores for "Mass stabilisation and erosion control," "Flood and storm protection," "Bio-remediation," "Filtration," and "Mediation of sensory impacts" for both domestic and foreign equities. "Mass stabilisation and erosion control" refers to the control of

topographical erosion by vegetation, "Flood and storm protection" refers to the attenuating effect of vegetation, "Bio-remediation" refers to the degrading or detoxification of contaminants by micro-organisms, plants, etc., "Filtration" refers to the filtration of contaminants by various plants and animals, and "Mediation of sensory impacts" refers to the control of noise and light pollution by vegetation.

Figure 4. Nature-Related Dependency Scores of GPIF's Equities Portfolios by Ecosystem Service

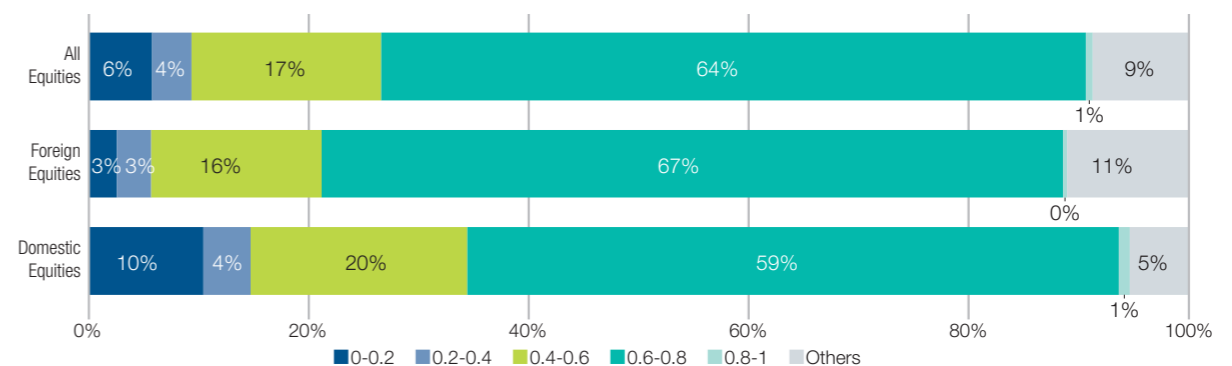


(Source) GPIF, S&P Global Sustainable1 (2023). Data as of 31st March 2023.

Next, in Figure 5, we present the distribution of dependency scores in GPIF's equities portfolios. We have split the dependency scores, from 0 to 1, into five levels, and aggregated the number of companies at each level as a proportion of the total number of investee companies in our domestic and foreign equities portfolios. The results indicate that, for both domestic and foreign equities, the largest number of companies had scores in the range from 0.6 to 0.8. S&P Global classifies a dependency score of 0.6 or above as a high dependence on nature, with reference to the materiality evaluation framework in the ENCORE (Exploring

Natural Capital Opportunities, Risks, and Exposure), under which a score of 0.6 or above indicates high or very high dependence. Approximately 65% of the companies in GPIF's equities portfolios have scores in this range (Figure 5). Scores closer to 1 indicate greater nature-related dependencies. Therefore, these results show that many companies, both domestic and foreign, are highly dependent on nature and biodiversity. Perhaps we might perceive from this that our daily business activities around the world, and beyond them, our very lives, are only made possible thanks to the many benefits we receive from nature and biodiversity.

Figure 5. Distribution of Dependency Scores in GPIF's Equities Portfolios



(Note) "Others" contains stocks for which no score was available at the time of the analysis, etc. (Source) GPIF, S&P Global Sustainable1 (2023). Data as of 31st March 2023

### Nature-Related Impacts of GPIF's Portfolio

Nature-related impacts are defined as changes in the state of nature, which may result in changes to the capacity of nature to provide social and economic functions. These changes may be positive or negative, and their impact may be direct, indirect or cumulative. In this context, it is important to begin by understanding the characteristics of the area of the company's business activities in terms of nature and ecosystems. Here, we attempt a trial analysis of companies' ecosystem footprint to ascertain the degree to which it is necessary to consider their nature-related impact in their areas of business activities.

The ecosystem footprint measures the direct impact of corporate activity on nature and biodiversity, converted into the equivalent area. It is calculated as follows, as shown graphically in Figure 6. First, we measure the "land use footprint" in hectares. This is the total area of land a company uses, apportioned based on the percentage investment. Next, we calculate the "ecosystem integrity footprint" by adjusting the "land use footprint" using scores based on the state of the natural environment and ecosystems on that land. Three scores are used for this adjustment: "Structure," which indicates the degree of physical change in the natural environment, "Composition," which indicates the degree of change in biodiversity, and "Function," which mainly indicates the degree of qualitative change in the natural environment. These three scores are each evaluated on a scale of 0 to 1, and the largest score is used to calculate the "ecosystem integrity footprint." A score closer to 1 indicates that greater degradation has occurred compared to the pristine state.

Lastly, we calculate the "ecosystem footprint" by tempering the "ecosystem integrity footprint" using scores based on materiality. There are two scores used here, evaluated on a scale of 0 to 1: "species materiality," based on the impact on endangered species in specific areas and "ecosystem contribution," which evaluates whether the

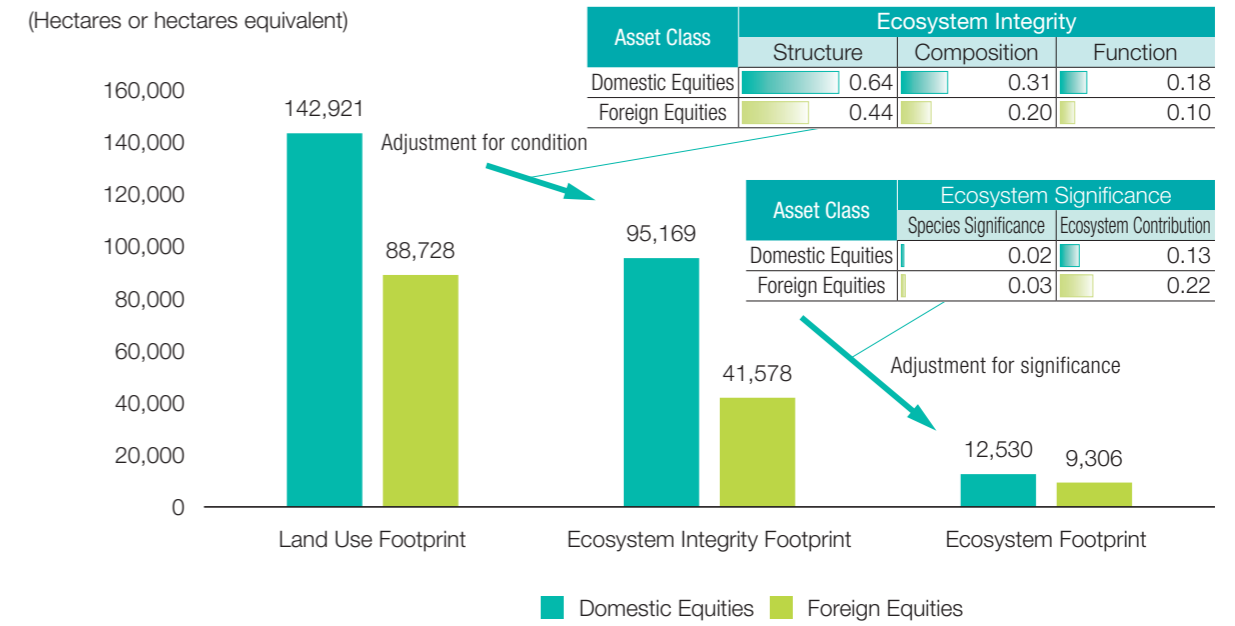
region is important in terms of the continued provision of ecosystem services. The largest score is used to calculate the "ecosystem footprint." A score closer to 1 indicates greater materiality. For details of the calculation method and other information concerning the ecosystem footprint, please refer to pages 7, 8, 15, and 16 of "Nature & Biodiversity Risk Portfolio Assessment," a report on S&P Global's analysis for the preparation of this report.

The ecosystem footprint of the equities held by GPIF is estimated to be equivalent to 21,836ha (approximately 218km<sup>2</sup>), or just under 10% of the land use footprint. We expect to see an expansion of the scope of this methodology and a refinement of the evaluation method in the future.<sup>5</sup> However, even in our analysis at present, it is possible that the areas of corporate activities for both domestic and foreign equities may contain important regions in terms of natural and biodiversity integrity.

In GPIF's equities portfolios, the land use footprint, ecosystem integrity footprint, and ecosystem footprint of domestic equities all exceed those of foreign equities. Next, we examined the land use footprint and other aspects of the equities portfolios for each sector. The results show that, for domestic equities, the values were relatively large in the industrials, consumer discretionary, utilities, and materials sectors (Figure 7). For foreign equities, all the values were relatively large in the utilities, real estate, materials, and financials sectors (Figure 8). The ratio of the ecosystem footprint to the land use footprint was relatively high in the utilities sector for domestic equities and the real estate sector for foreign equities. These results show that, despite some common sectors between the two asset groups, they display quite different tendencies.

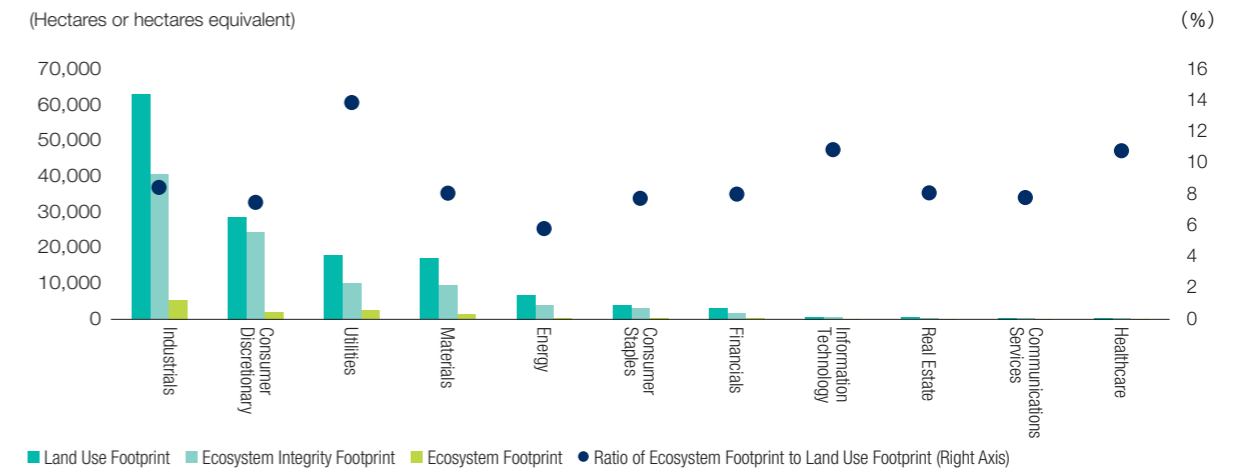
<sup>5</sup> For example, at present, the ecosystems considered do not include freshwater ecosystems or marine ecosystems, and no assessment is made of the capacity of individual ecosystems to provide different ecosystem services. There has been an explanation regarding this situation and future developments. For details, please refer to page 19 of "Nature & Biodiversity Risk Portfolio Assessment," a report on S&P Global's analysis for the preparation of this report.

Figure 6. Nature-Related Impact of Domestic Equities and Foreign Equities



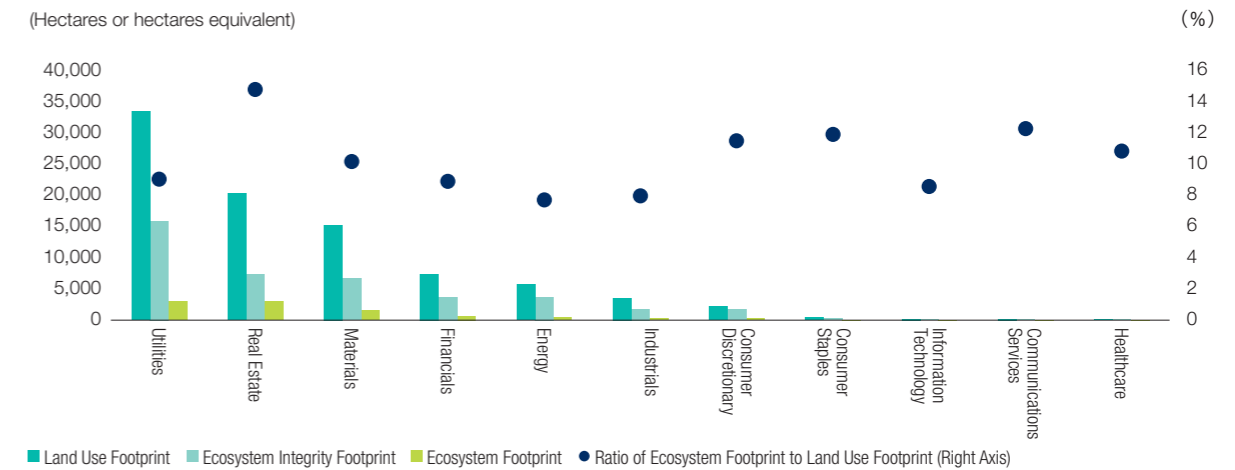
(Note) The scores for the ecosystem integrity and ecosystem significance are evaluated on a scale between 0 and 1, based on the weighted average for each asset. (Source) S&P Global Sustainable1 (2023). Data as of 31st March 2023.

Figure 7. Nature-Related Impact of Domestic Equities by Sector



(Source) GPIF, S&P Global Sustainable1 (2023). Data as of 31st March 2023.

Figure 8. Nature-Related Impact of Foreign Equities by Sector



(Source) GPIF, S&P Global Sustainable1 (2023). Data as of 31st March 2023.

# Editor's Note

Issues Identified by This Year's Report and Initiatives for Next Fiscal Year

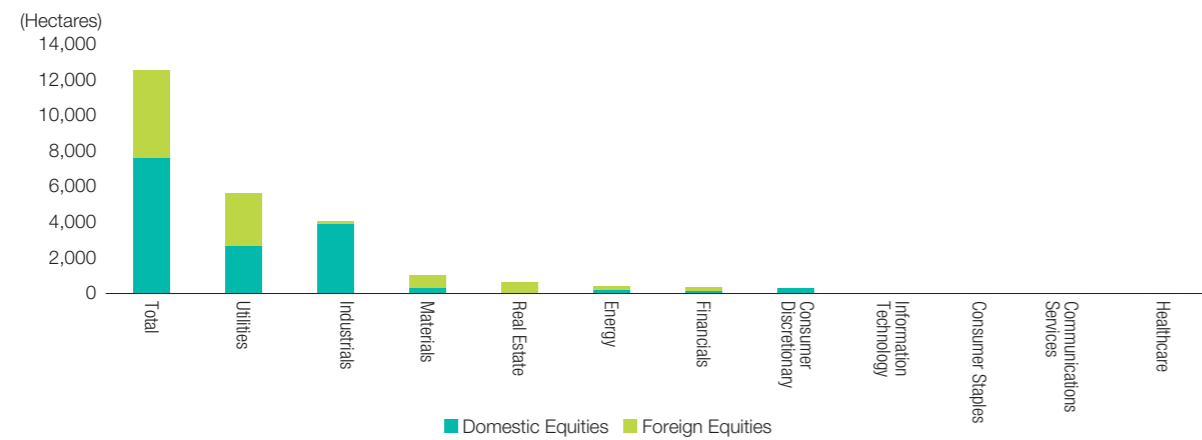
## Key Biodiversity Areas and Protected Areas

Some areas are designated Key Biodiversity Areas or Protected Areas from the perspective of sustaining and protecting biodiversity. A Key Biodiversity Area is an area that contributes "significantly to the global persistence of biodiversity in terrestrial, inland water and marine environments."<sup>6</sup> A Protected Area is a "clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."<sup>7</sup> Companies located in these areas may be required to shoulder additional costs or explanations, in some cases, from the perspective of sustaining and protecting biodiversity.

For this analysis, we present the results of our estimation of the degree to which the activity areas of companies in GPIF's equities portfolios overlap with Key Biodiversity Areas or Protected Areas (Figures 9 and 10). We estimate that the overlap with Key Biodiversity Areas is approximately 12,500ha and the overlap with Protected Areas is approximately 21,200ha. For both types of areas, the overlaps were relatively large with the utilities and industrials sectors.

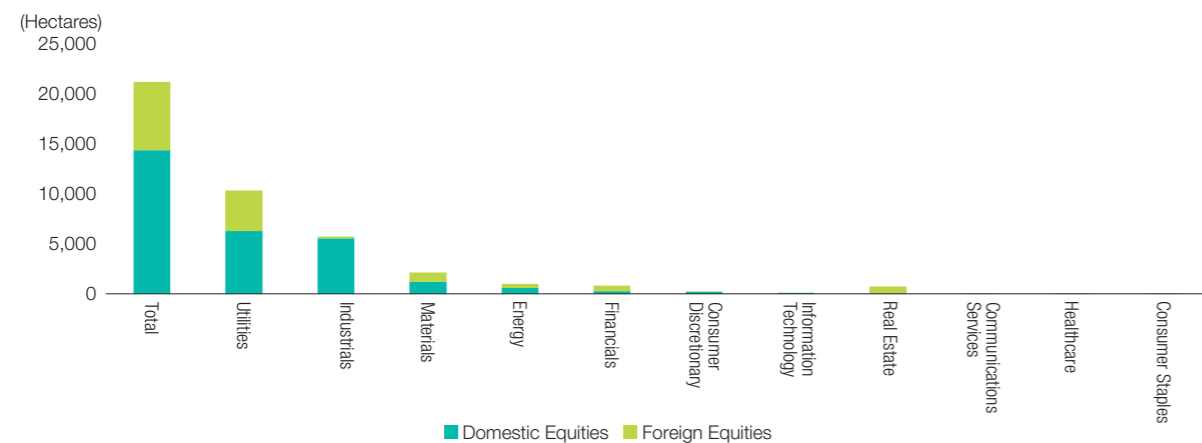
In this way, we are becoming able to gain a quantitative understanding of the possibility that corporate activities involve areas that are important to ecosystems.

Figure 9. Business Locations that Overlap with Key Biodiversity Areas



(Source) GPIF, S&P Global Sustainable1 (2023). Data as of 31st March 2023.

Figure 10. Business Locations that Overlap with Protected Areas



(Source) GPIF, S&P Global Sustainable1 (2023). Data as of 31st March 2023.

<sup>6</sup> International Union for Conservation of Nature (IUCN) "A Global Standard for the Identification of Key Biodiversity Areas."  
<sup>7</sup> IUCN "Dudley, N. (2008) Guidelines for Applying Protected Area Management Categories."

From this sixth issuance of ESG Report, we have decided not to compile the "Analysis of Climate Change-Related Risks and Opportunities in the GPIF Portfolio" a supplementary guide to the ESG Report (the "Supplementary Guide"). With regards to the detailed analysis previously presented in the Supplementary Guide, we have incorporated it into the body of this report, as detailed as possible, and, also have disclosed the final reports of the companies to which we commissioned the TCFD related analysis simultaneously with the publication of this report. In the past years, we had published the Supplementary Guide approximately one month after publishing the ESG Report, so that readers may have found it difficult to seek information such as the details of the analyses presented in the ESG Report or our analytical methodology. We suppose this change in approach should help the situation. We will continue to endeavor to provide clear, accessible and user-friendly disclosures.

We have three main purposes in preparing the ESG Report: (1) to report our ESG-related initiatives to pension beneficiaries and our other stakeholders, (2) to provide a reference regarding ESG-related initiatives for our asset managers and investee companies, and (3) to implement the PDCA cycle. While purpose (1) is similar to the aim of disclosures by corporations and asset managers, purposes (2) and (3) may be unique to GPIF.

We have consistently striven at the frontiers of purpose (2), aiming to provide a reference regarding ESG-related initiatives for our asset managers and investee companies, perhaps at the risk of overreaching ourselves. For this year's ESG Report, we engaged in a trial analysis of the risks associated with biodiversity and natural capital in anticipation of the TNFD's final recommendations, which are scheduled for release in September 2023. These risks entail a high degree of regionality and individuality, and we feel that there remain

significant questions concerning how investors managing portfolios should measure and monitor these risks.

Meanwhile, when measuring the impact of projects funded using the proceeds of the ESG bonds in GPIF portfolio, we implemented relatively sound and reliable methods of analysis, collecting information on the status of projects funded using ESG bonds and their environmental impact primarily from impact reports published by the bond issuers, and estimating in cases where information was not disclosed. We hope to further deepen our analysis with regard to issues such as the monetary value of impact, as well as the relationship of ESG bond disclosures and impact with the greenium.<sup>1</sup> Our analysis in this report revealed that, even among ESG bonds that are consistent with the ICMA Green Bond Principles and similar standards, there is a substantial number for which no disclosure has been made regarding impact. We hope to focus on this as one theme of engagement by our external asset managers.

Regarding purpose (3), to implement the PDCA cycle, we will proceed to undertake "Measuring the Effects of Stewardship Activities and ESG Investment Project" in earnest through FY2024. Under this project, we intend to do more than simply verify the effectiveness of stewardship activities and ESG investment in general. We will analyze whether the stewardship activities and ESG investment carried out by GPIF so far have actually produced the intended effects. Our stewardship activities and ESG investment so far have been aimed at improving the sustainability of markets, in particular, and we will focus on measuring the effects from this perspective. We hope to report on the progress of this project in next year's ESG Report.

SHIOMURA Kenji  
 Editor-in-Chief of ESG Report  
 (Managing Director of ESG & Stewardship Department)

<sup>1</sup> A portmanteau of "green" and "premium," the "greenium" refers to the phenomenon in which green bonds are valued more highly (with lower yields) than other bonds issued with the same terms.

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## Investment Principles

1

Our overarching goal is to contribute to the stability of the national pension system by securing the investment returns that it requires with minimal risk and from a long-term perspective, to the sole benefit of pension recipients.

2

Our primary investment strategy is diversification by asset class, region, and timeframe. While market prices may fluctuate in the short term, GPIF will take full advantage of our long-term investment horizon to achieve investment returns in a more stable and efficient manner, while simultaneously ensuring sufficient liquidity to pay pension benefits.

3

We formulate our overall policy asset mix and manage risks at the portfolio, asset class, and investment manager level. We utilize both passive and active management in order to achieve benchmark returns (i.e., average market returns) and seek untapped profitable investment opportunities.

4

We believe that sustainable growth of investee companies and the capital market as a whole are vital in enhancing long-term investment returns. In order to secure such returns for pension beneficiaries, therefore, we promote the incorporation of non-financial environmental, social, and governance (ESG) factors into the investment process in addition to financial factors.

5

In order to enhance long-term investment returns and fulfill our stewardship responsibilities, we shall advance various initiatives (including the consideration of ESG factors) that promote long-termism and the sustainable growth of investee companies and the capital market as a whole.