GPIF Homepage

GPIF YouTube channel

GPIF X

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For All Generations

2023 ESG REPORT

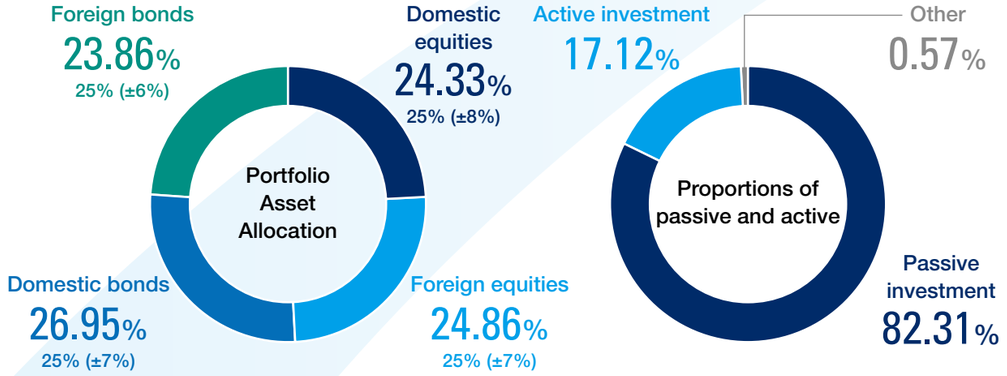
Government Pension Investment Fund

For All Generations

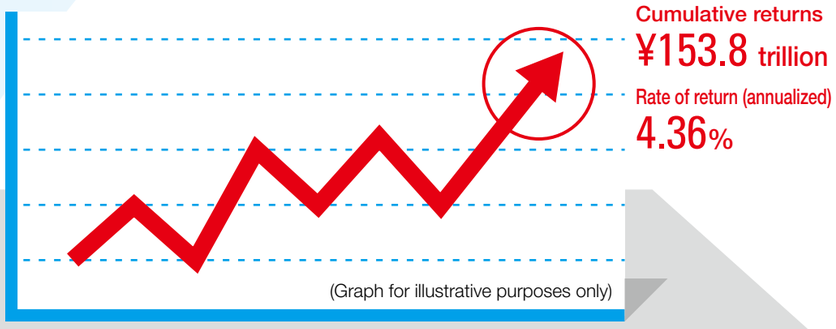
GPIF is committed to fulfilling our fiduciary duty to secure adequate retirement funds for both current and future beneficiaries.
GPIF promotes ESG based on the concept of securing long-term benefits for the pension beneficiaries by reducing negative environmental and social externalities in the capital market.

GPIF in Numbers

GPIF Portfolio (as of March 31, 2024)



Investment Performance Since Launch of Market Operations



Number of employees[1]	Employees 167		
Specialist personnel[2]	Securities analysts 62	MBA graduates, etc. 18	Ph.D. graduates, etc. 5
Lawyers 5	CPAs 2	Real estate appraisers 1	Tax accountants 1

Universal Owner

Asset size ¥245.98 trillion

Number of GPIF-owned Securities

Equities 5,686 stocks

Bonds 16,492 bonds

Investment time horizon 100 years

ESG Investment

ESG integration ¥245.98 trillion

Assets under management tracking ESG indexes Approx. ¥17.8 trillion

Investments in green bonds, etc. Approx. ¥1.6 trillion

Long-Term Investment Performance

Cumulative returns ¥153.8 trillion (FY2001 - FY2023)

Rate of Return 4.36% (annualized) (FY2001 - FY2023)

External Ratings

Assessment by PRI[3] ★★★★ (as of March 31, 2024)

Responsible Asset Allocator Initiative (RAAI) ranking[4] Leaders
The 30 Most Responsible Asset Allocators

1 Number of employees: As of April 1, 2024 (including regular, specialist, staff employed under a continuing employment scheme, seconded, temporary and contract workers)
2 Specialist personnel: As of April 1, 2024 (some are counted in more than one category)
3 Assessment by PRI: Four stars in all categories
4 New America, the American think tank, 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, every two years.

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 Consider ESG in its investments?

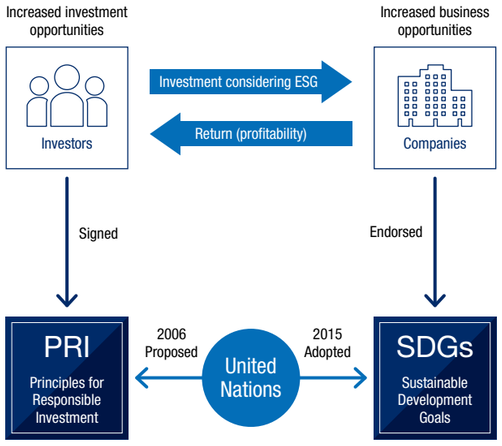
GPIF can be described as a “universal owner”; that is, an investor with a substantial assets under management that invests in securities spanning the global capital market. GPIF can also be characterized as a “cross-generational investor,” managing assets from a multi-generational perspective. Sustainable 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 that do not take into account their adverse effects 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 entire portfolio of the “universal owner” will be severely damaged. In other words, in order to ensure portfolio profitability, it is essential to reduce negative externalities and maintain a sustainable capital market and society. The concept of “universal ownership,” which is to actively reduce such negative externalities, lies at the core of GPIF’s investment considering ESG.

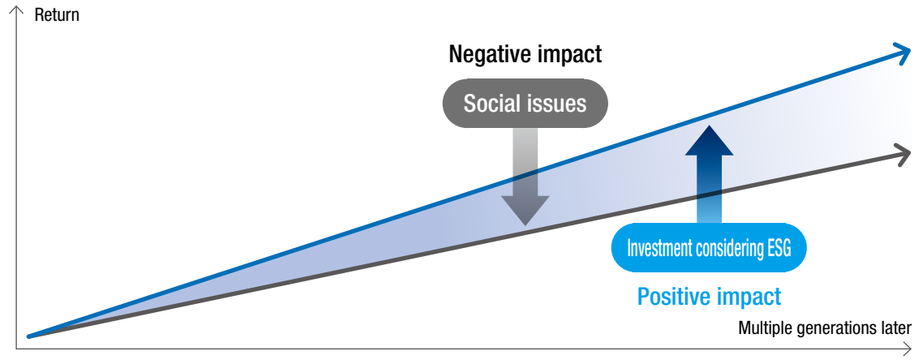
We have published a video explaining this content in simple terms on GPIF’s YouTube page (only available in Japanese.)

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 investment incorporating ESG factors 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 (investment incorporating ESG factors,) 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.

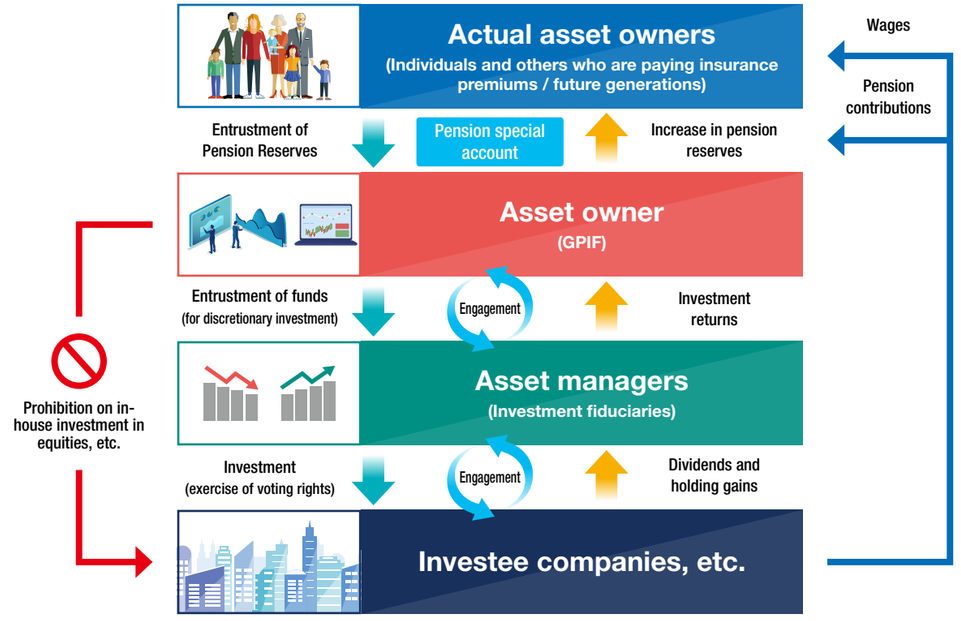


Minimize negative environmental and social externalities and enhance the long-term return of the portfolio across all asset classes



GPIF in the Investment Chain

A portion of the pension contributions paid 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

Q Fiscal 2024 is the final year of GPIF's five-year Medium-Term Plan (FY2020 – FY2024.) How do you feel about GPIF's ESG investment and stewardship activities to date?

The environment surrounding ESG has been changing. Anti-ESG movements are being reported in the U.S. ahead of their presidential election. And in Europe, a world leader of ESG promotion, far right parties that oppose to strict environmental regulations have gained seats in the European Parliament. Despite these circumstances, I feel that transition finance and other ESG-related efforts are steadily advancing in Japan without being overly influenced by global trends, as symbolized by the issuance of the world's first Japan Climate Transition Bonds. GPIF is also further promoting ESG investment and stewardship activities, for example holding the Global Asset Owners' Forum, which was canceled due to the COVID-19 pandemic, for the first time in nearly four and a half years. ESG index-based passive equity investment, which we started in fiscal 2017, has expanded to a total of ¥17.8 trillion in assets under management as of the end of fiscal 2023, due in part to the substantial rise in stock markets. We have adopted a total of nine indexes, seven and six of which have outperformed policy benchmarks and the parent indices, respectively, since they were launched. Based on the comments from companies that are promoting initiatives with consideration for inclusion into ESG indexes, my humble opinion is that the results are generally in line with expectations.

Q Expectations for the roles of GPIF and other asset owners are increasing, with the government discussing the formulation of Asset Owner Principles. How do you feel about these developments?

In order for asset owners like GPIF to achieve stable investment returns over the long run, it is important that each investee companies' corporate value increases sustainably, and that capital market as a whole grows sustainably and stably. Just as fishermen care for the ocean that gives them fish, it is natural to expect asset owners to work to achieve sustainable growth of the capital market as a whole. GPIF's Investment Principles states that we shall promote ESG investment and stewardship activities based on our belief that "sustainable growth of investee companies and the capital market as a whole are vital in enhancing long-term investment returns." To further promote these efforts, we intend to consider a wide range of issues in pursuit of fulfilling our fiduciary duty, including the ideal state of sustainable investment and collaboration with other asset owners.

Q In June 2023, the International Sustainability Standards Board (ISSB) released two sustainability standards, and the Sustainability Standards Board of Japan (SSBJ) is expected to finalize its standards for Japan by March 2025. How does GPIF view these developments?

Since selecting our first ESG index in 2017, we have viewed disparities in evaluations among ESG ratings agencies as an issue. We have suspected that one of the underlying reason for this may be the lack of uniform standards for disclosing ESG information. Heterogeneous data that has been disclosed on different standards cannot properly evaluate ESG. Additionally, many

companies being rated were probably confused about which information should be disclosed under which criteria. This is why we have a high hope for the development of ISSB and SSBJ standards.

The ISSB standards require companies to disclose material sustainability-related information to help investors make investment decisions, and are based on what is known as the single materiality approach. While disclosures can provide unexpected insights for a company, it can also increase the burdens on employees. If disclosures become a purpose and increase costs, there is no positive impact on corporate value. This is not what investors want. In pursuit of more cost-effective disclosures, I believe it is important for companies, investors, and the ISSB to continue to engage with each other. GPIF joined the ISSB Investor Advisory Group as an observer in May 2024. We would like to keep an eye on developments at the ISSB and SSBJ.

Q Regarding the Measuring the Effects of Stewardship Activities and ESG Investment Project, GPIF released the results conducted in the fiscal 2023 analysis, the "Verification of the Effects of Engagement." What is your assessment of the results?

As a universal owner, GPIF engages in various activities involving stewardship and ESG investment with the aim of promoting sustainable growth of the market as a whole. For example, in 2018, we adopted an engagement-enhanced passive investment fund to diversify and strengthen our approach to stewardship activities and achieve sustainable growth of the market as a whole through stewardship activities. As of now, we have adopted four such funds. Passive investment funds in particular must properly be evaluated of the benefits of engagement activities that they have done and set compensation considering these benefits accordingly, as they cannot enjoy those benefits in the form of improved investment performance. Therefore, it was a major challenge for GPIF, as well as many asset owners, to understand the status and measure the effects of engagement activities that cannot be seen from the outside.

I believe that with this verification of effects of engagement, we have made certain amount of results in resolving this issue. For details of the analysis based on records of engagement by our external asset managers for domestic equities, please refer to the ESG Report (page 50) or the text of this report. This verification of the effects of engagement indicated the possibility of a virtuous cycle created in which engagement activities by asset managers promote changes in corporate behavior, in turn creating various types of value, and making companies that understand the importance of engagement activities respond more proactively. Up until now, it may have been a world where "the person who speaks up wins," since the effects of engagement have always been difficult to measure quantitatively from outside. However, if causality can be scientifically clarified, the paradigm will change. Further refinement of the analysis could be used to evaluate the engagement activities of external asset managers in the future.

Q How do you view the sustainability of GPIF itself?

I was asked the same question in last year's interview. In response, I mentioned the analysis of the gender pay gap and the importance of understanding the current situation first and foremost. Now, one year later, most of our gender diversity metrics (page 18) disclosed in the current ESG Report have been deteriorated, which is extremely disappointing. This year, action must be taken. We will formulate an action plan including proactive recruitment, measures to prevent turnover, motivation boosting, human resource development, active promotion to management positions, and more for female employees. Based on this plan, we will work to improve the diversity of the GPIF workforce. I believe that improving the sustainability of the GPIF organization is vital for improving the sustainability of pension reserves.

(Interview conducted in June 2024)

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 focus on the new initiatives undertaken in fiscal 2023.

Fiscal 2023

Activity Highlights

In fiscal 2023, GPIF continued to promote ESG activities in new areas.
Here we present the highlights of our ESG activities during the year.

Partial Revision of ESG-Themed Domestic Equity Index

Regarding the MSCI Japan ESG Select Leaders Index, which GPIF adopted in 2017, we held many discussions with index provider MSCI about revising the index's inclusion criteria. As a result, we changed the benchmark to the MSCI Nihonkabu ESG Select Leaders Index, which reflects criteria expected to reduce the risk of tracking error from TOPIX, the policy benchmark, while retaining the basic characteristic of an ESG index: including stocks with high ESG ratings.

MSCI NIHONKABU
ESG SELECT LEADERS INDEX

Please refer to pages 24 to 26 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 924 companies during the 2023 calendar year. This equates to 40% of all of GPIF's investee companies, or 94% in terms of total market capitalization.

Please refer to pages 29 to 32 for details.

Survey of Listed Companies

GPIF conducts an annual survey of companies in order to obtain feedback on the stewardship activities of our external asset managers, and understand the status of their engagement as well as companies' ESG disclosure initiatives. In our ninth survey, conducted in fiscal 2023, we received responses from 717 TOPIX companies. The survey results revealed that most companies have been already discussing the TSE's request for "the Action to Implement Management That Is Conscious of Cost of Capital and Stock Price," and that many have planned to disclose information in accordance with the TNFD in the future.

Please refer to pages 29 to 32 for details.

Global Asset Owners' Forum

The Global Asset Owners' Forum was held for the first time in nearly four and a half years. The Forum was established as a venue for the continuous exchange of opinions among asset owners, with GPIF, the California Public Employees' Retirement System (CalPERS) and the California State Teachers' Retirement System (CalSTRS) serving as co-organizers. In fiscal 2023, the forum's members and the Japan Business Federation (Keidanren) and its corporate members engaged in dialogue on corporate governance, climate change, and other sustainability issues, as well as exercising voting rights.

Please refer to pages 29 to 32 for details.

Measuring the Effects of Stewardship Activities and ESG Investment Project

GPIF is conducting a project using statistical methods such as causal inference to examine the effects of its stewardship activities and ESG investments. The project consists of four themes, and in fiscal 2023, we began verifying two of them and published a report on the "Verification of the Effects of Engagement." Reports of the remaining three projects will be published as soon as the analysis is completed.

Please refer to pages 49 to 58 for details.

Initiatives Considering ESG in Domestic Infrastructure Investment

At GPIF, we evaluate alternative asset managers' ESG initiatives when selecting them, and continue to confirm their initiatives while investing. We also conduct our own due diligence of investment projects and monitor the ESG activities of the projects by utilizing ESG reports prepared by the selected asset managers.

Please refer to pages 33 to 35 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 on the initiatives 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 2023, the Board of Governors held 14 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	Agenda item	
81st	May 2023	Reported matter	ESG Report (Outline)
85th	September 2023	Reported matter	2022 ESG Report
93rd	March 2024	Reported matter	Stewardship Activities Report 2023

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

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 & Stewardship Department
Main Responsibilities: Promotion of ESG investment, stewardship responsibility, and analysis and evaluation of exercising voting rights, etc.
→ Selecting ESG indexes, evaluating the stewardship activities of external asset managers, and supporting ESG and stewardship related initiatives across GPIF.

Investment Department
Main Responsibilities: Formulating investment strategy, selecting and evaluating external asset managers for equity and fixed income, conducting operations related to more sophisticated investment, etc.
→ Assessing ESG integration as a part of the external asset manager evaluation process.

Private Market Investment Department
Main Responsibilities: Selecting and evaluating external asset managers for alternative assets, etc.
→ Integrating ESG into its selection and evaluation of external asset managers for alternative assets.

ESG Initiatives Within GPIF

Gender Pay Gap Within GPIF
(wage difference,
men=100%)

68%

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-Related Initiatives and Internal ESG Training

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." In January 2020, GPIF established the SDGs Promotion Group, a committee under the direct control of the President, in order to develop initiatives designed to bolster the organization's ESG-conscious internal values, and regularly conducts training sessions on SDGs for all employees since. As part of these initiatives, we invite outside experts to assist us in understanding the latest trends in ESG investment. In fiscal 2023, we also conducted career training for female employees for the first time. The two-day training course aimed to further develop women's self-understanding for career design, improve essential leadership knowledge, and more.

We will continue our efforts to sustain and expand our training programs for empowering women in the workforce.

Figure 1. FY2023 Internal ESG Training

October 2023	Title:	Empirical Research on the Effect of Engagement
	Lecturers:	SUZUKI Kazunori (Professor, Faculty of Commerce, Waseda University) Marco Becht (Professor, Université libre de Bruxelles) Julian Franks (Professor, London Business School)
December 2023	Title:	IFRS S1 and S2: Needs of Institutional Investors and Expectations for Firms
	Lecturers:	KOMORI Hiroshi (ISSB Board member, International Sustainability Standards Board)
February 2024	Title:	Women's Career Design Training
	Lecturers:	KAWASHIMA Haruko (CEO, Institute of Women's Leadership)

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

Women in the Workplace at GPIF

The advancement of women in the workplace is one of the crucial pillars of promoting diversity. Through disclosure based on The Act on Promotion of Women's Participation and Advancement in the Workplace, companies are obliged to confirm the status of women in their workplaces and analyze issues. 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) in Figure 2. These five metrics are also the quantitative evaluation metrics used in the MSCI Japan Empowering Women Index (WIN index,) which GPIF has adopted. As in the previous year, we also analyzed the differences in wages between men and women at GPIF (see (6) in Figure 2) and contributing factors thereof. (1) through (6) show that 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.

With regards to the gender pay gap, female employees' wages were 68.0% of male employees' in fiscal 2023 (see (6) in Figure 2.) We used GEM App, a gender wage gap diagnostic tool developed by UTokyo Economic Consulting Inc., to adjust these numbers for the various reasons behind the 32% 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 3.) Our comparison revealed that, in addition to the relatively high number of younger female employees at GPIF at present, differences in educational backgrounds between men and women are also a factor causing differences in wages.

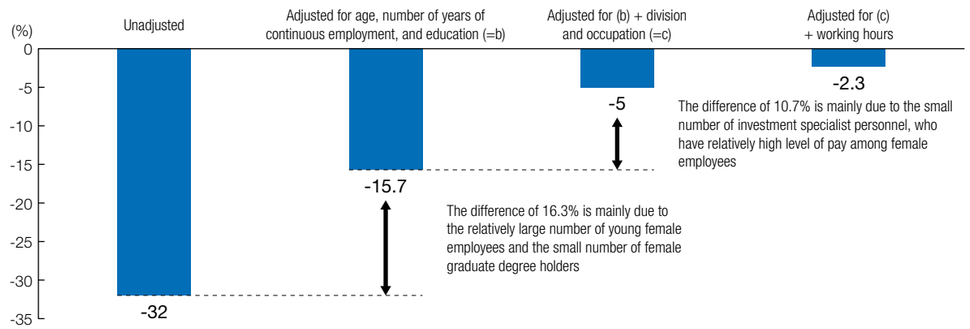
Moreover, with the revision of the Act on Childcare Leave, Caregiver Leave, and Other Measures for the Welfare of Workers Caring for Children or Other Family Members, companies with over 1,000 employees are required to disclose the childcare leave uptake rate among their male employees, starting in April 2023. Although GPIF is not obligated to disclose this information, our calculation revealed that 33.3% of eligible male employees took childcare leave in fiscal 2023. Creating a comfortable environments where everyone can work with a sense of purpose could lead to improved corporate performance and organizational sustainability. We will continue to work to make our workplace environments even more work-friendly.

Figure 2. Women in the Workplace at GPIF

	GPIF
(1) % Female New Hires	18.2
(2) % Women in the Workforce	25.3
(3) % Difference in Years Men and Women are Employed by the Company*	-54.4
(4) % Women in Senior Management	9.0
(5) % Women on Board**	16.7
(6) % Gender Pay Gap (Average)***	68.0
[Reference] % Childcare Leave Uptake Rate Among Male Workers****	33.3

(Note 1) The data represents FY2023 results for (1), (6) and childcare leave uptake rate among male workers, status as of April 1, 2024 for (2), (4) and (5,) and status as of March 31, 2024 for (3.)
(Note 2) The data for (1) includes staff members who transitioned from regular employees to specialist personnel (none in FY2023) 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 personnel, staff employed under a continuing employment scheme, and seconded staff. (6) was 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.
(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. (6) Total annual pay for Gender Pay Gap*** includes basic salary, overtime pay, bonuses, etc., and excludes travel allowances.
[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)

Figure 3. Analysis of Causes of the Gender Pay Gap



(Note) The definition of each adjustment category is shown below.
No adjustment: Gender pay gap among all 125 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.

Support for Climate- and Nature-Related Financial Disclosures

Disclosure consistent with TCFD recommendations

6th year

GPIF views climate change risks as difficult to eliminate completely merely through diversification and such risks are highly likely to manifest over the long term. Moreover, based on the final recommendations of the Taskforce on Nature-related Financial Disclosures (TNFD,) we made disclosures in this FY2023 ESG Report on a trial basis in line with this framework.

Climate- and Nature-Related Financial Disclosure Consistent with TCFD and TNFD Recommendations

For investors, climate change risks occur simultaneously across all companies and asset classes and cannot be completely eliminated through diversification. Moreover, it is highly likely that these risks will manifest at least in 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 Task Force on Climate-related Financial Disclosures (TCFD)[1] in December 2018 and began disclosing information in accordance with the TCFD recommendations in the 2018 ESG Report.

The TCFD was disbanded in October 2023, before the IFRS Sustainability Disclosure Standards (S1 and S2) went into effect in January 2024. As there is currently no disclosure framework for institutional investors in the IFRS Sustainability Disclosure Standards, we continue to make disclosures in accordance with the TCFD recommendations in our 2023 ESG Report. The IFRS Sustainability Disclosure Standards succeed the four thematic areas of the TCFD recommendations (governance, strategy, risk management, and metrics and targets) and require companies to disclose information that contributes to investment decisions to investors.

Given the difficulty of separating climate change-focused investments and activities from ESG activities in general, GPIF discloses not only climate change-related initiatives, but also ESG activities in general in line with the TCFD recommendations. In addition, following the release of v1.0 of the final recommendations of the Taskforce on Nature-related Financial Disclosures (TNFD,) we also made some disclosures on a trial basis in line with the TNFD.

Governance — Disclose the organization's governance around climate- and nature-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.
- 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- and nature-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 (pages 21 – 23.) We invest in ESG bonds by investing in domestic bonds in-house and through external asset managers (pages 27 – 28.) We also promote ESG integration in our alternative investments (pages 33 – 35.)
- In relation to the environment (E) in particular, we use indexes for equity investment that focus on each company's carbon efficiency (pages 27 – 28) and invest in ESG bonds including green bonds, transition bonds and the like (page 22.)
- In addition to measuring the carbon footprint of GPIF's portfolio (pages 65 – 68,) we evaluate physical and transition risks under various climate scenarios and estimate the impact on investment returns.

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

- GPIF has developed a system for monitoring the greenhouse gas (GHG) emissions (carbon footprint and carbon intensity) for our entire portfolio as well as for each fund to which we outsource the management.
- The Portfolio Risk Management Committee meets monthly to monitor risk management status of ESG indexes and other investments.
- As well as requiring asset managers to actively engage with companies on key ESG issues, GPIF engages with index providers to encourage improvement in the evaluation techniques used within the methodologies of the ESG indexes that GPIF adopts (pages 24 – 26.)
- We use the LEAP approach presented in the final recommendations of the TNFD to evaluate nature-related issues, including interface with nature, dependencies and impact on nature, and risks and opportunities of our portfolio holdings (pages 83 – 88.)

Metrics and targets — Disclose the metrics and targets used to assess and manage relevant climate- and nature-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 21 – 23 and 29 – 32.)
- GPIF measures 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 (pages 65 – 68.)
- Climate Value-at-Risk (CVaR) is a metric used to estimate climate change-related revenue opportunities in addition to transition and physical risks due to climate change (pages 69 – 70.)

1 The Financial Stability Board (FSB) established the TCFD in December 2015, the TCFD released its recommendations on how companies and others can better disclose information related to climate change risks and opportunities in June 2017.

ESG Index-Based Equity 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 2023, GPIF changed the benchmark from the MSCI Japan ESG Select Leaders Index to the MSCI Nihonkabu ESG Select Leaders Index.

Changed Benchmark to MSCI Nihonkabu ESG Select Leaders Index

GPIF has used ESG indexes as its 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 term, but also enhance the Japanese equity market through secondary effects such as the improvement of ESG ratings.

In fiscal 2023, we changed the benchmark to new index, MSCI Nihonkabu ESG Select Leaders Index (the "New Index",) proposed by MSCI, the index provider, as the result of repeated discussions with MSCI regarding the issue of the large tracking error of the MSCI Japan ESG Select Leaders Index to TOPIX (see pages 24 – 25.)

How the New Index differs from the Former Index

(1) Parent index was changed to an index that excludes REITs, which is not included in TOPIX, GPIF's policy benchmark

(2) Inclusion criteria was changed to the top 50% of ESG-rated stocks within the industry

The change of the benchmark to the New Index is expected to reduce the risks (tracking error) against policy benchmark TOPIX, while retaining the basic characteristic of an ESG index: including stocks with high ESG ratings. We will continue to take these measures as necessary while monitoring the performances and risks.

GPIF's Passive Equity Investment Based on ESG Indexes

At GPIF, we have progressively expanded our ESG index-based passive investment, since we adopted our first three domestic equity ESG indexes in fiscal 2017. In fiscal 2023, we changed the benchmark to MSCI Nihonkabu ESG Select Leaders Index, and as of the end of March 2024, GPIF's ESG index, as shown in the table on the right, remained unchanged from the previous year, totaling nine domestic and foreign indexes. The total asset size of passive investments tracking ESG indexes has reached ¥17.8 trillion. Please refer to "ESG Index Performance" on pages 41 – 42 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 Nihonkabu ESG Select Leaders Index
Concept and characteristics of index	• 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. • It is a comprehensive ESG index that selects stocks with high absolute ESG scores and adjusts industry weights to neutral at the industry level.	• Assessments are performed based on the same FTSE Russell's ESG rating as the FTSE Blossom Japan Index. For the companies with high carbon intensity (greenhouse gas emissions/sales,) management attitude toward climate-change risks and opportunities is also assessed. • The index selects stocks with relatively high ESG ratings within each industry, and adjusts industry weights to neutral.	• The MSCI Nihonkabu 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. • The index is comprised of stocks with relatively high ESG scores in each industry.
Index construction	Best-in-Class	Best-in-Class	Best-in-Class
Constituent universe (parent index)	FTSE JAPAN All Cap Index (1,434 stocks)	FTSE JAPAN All Cap Index (1,434 stocks)	MSCI Nihonkabu IMI (1,043 stocks)
Number of index constituents	311	632	516
Assets under management (Billion yen)	1,522.3	1,441.7	2,972.1

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	• 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. • The first index designed to cover a broad range of factors related to gender diversity.	• Domestic equities index that determines investment weighting based on assessment of companies' commitment to gender equality, using the Equileap Gender Equality Scorecard. • 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.	• Constructed by S&P Dow Jones Indices based on carbon data provided by Trucost, a pioneer in environmental assessment. • 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.
Index construction	Best-in-Class	Tilted	Tilted
Constituent universe (parent index)	MSCI Japan IMI Top 700 (697 stocks)	Morningstar Japan ex-REIT (963 stocks)	TOPIX (2,148 stocks)
Number of index constituents	369	963	1,845
Assets under management (Billion yen)	940.3	736.4	2,311.7

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	• 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. • 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.	• Foreign equities index that determines investment weighting based on assessment of companies' commitment to gender equality, using the Equileap Gender Equality Scorecard. • 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.	• Constructed by S&P Dow Jones Indices based on carbon data provided by Trucost, a pioneer in environmental assessment. • 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.
Index construction	Tilted	Tilted	Tilted
Constituent universe (parent index)	MSCI ACWI ex Japan ex China A ESG Universal with Special Taxes Index (2,104 stocks)	Morningstar Developed Markets Ex-Japan Large-Mid Cap (1,745 stocks)	S&P Global Ex-Japan LargeMidCap (3,156 stocks)
Number of index constituents	2,053	1,725	2,183
Assets under management (Billion yen)	2,346.3	684.9	4,876.9

(Note) Data is current as of March 31, 2024. In February 2024, changed from the MSCI Japan ESG Select Leaders Index to the MSCI Nihonkabu ESG Select Leaders Index.
(Source) Prepared by GPIF based on data from FactSet and individual index providers.

Column

Stocks Continuously Selected in ESG Indexes

Figure 1 shows a list of stocks continuously included in the six domestic equity ESG indexes for the three years from April 2021 to March 2024 (in order of securities code.)

Specifically, stocks marked with a star (☆) are those continuously included in the six ESG indexes for domestic equities since we began passive investment in each.

For indexes in operation for less than three years, the following periods were used for data collection period:

- FTSE Blossom Japan Sector Relative Index: Since March 2022
- Morningstar Japan ex-REIT Gender Diversity Tilt Index: Since March 2023
- The ESG Select Leaders Index is the MSCI Japan ESG Select Leaders Index through January 2024 and the MSCI Nihonkabu ESG Select Leaders Index from February 2024 onward.

Figure. Stocks Included in All Domestic Equity ESG Indexes Continuously for the Past Three Years

Securities Code	Stock Name	Industry	Securities Code	Stock Name	Industry
☆ 1802	OBAYASHI CORPORATION	Construction	☆ 6301	KOMATSU LTD.	Machinery
1803	SHIMIZU CORPORATION	Construction	☆ 6361	EBARA CORPORATION	Machinery
1925	DAIWA HOUSE INDUSTRY CO., LTD.	Construction	6367	DAIKIN INDUSTRIES, LTD.	Machinery
☆ 1928	Sekisui House, Ltd.	Construction	6383	DAIFUKU CO., LTD.	Machinery
2503	Kirin Holdings Company, Limited	Foods	☆ 6645	Omron Corporation	Electric Appliances
☆ 2802	Ajinomoto Co., Inc.	Foods	6841	YOKOGAWA ELECTRIC CORPORATION	Electric Appliances
☆ 2871	NICHIREI CORPORATION	Foods	6845	Azbil Corporation	Electric Appliances
☆ 3003	Hulic Co., Ltd.	Real Estate	6869	SYSMEX CORPORATION	Electric Appliances
☆ 3401	TEIJIN LIMITED	Textiles & Apparels	6981	Murata Manufacturing Co., Ltd.	Electric Appliances
3407	ASAHI KASEI CORPORATION	Chemicals	7731	NIKON CORPORATION	Precision Instruments
4005	SUMITOMO CHEMICAL COMPANY, LIMITED	Chemicals	8001	ITOCHU Corporation	Wholesale Trade
☆ 4183	Mitsui Chemicals, Inc.	Chemicals	☆ 8252	MARUIGROUP CO., LTD.	Retail Trade
4188	Mitsubishi Chemical Group Corporation	Chemicals	☆ 8267	AEON CO., LTD.	Retail Trade
☆ 4307	Nomura Research Institute, Ltd.	Information & Communication	8308	Resona Holdings, Inc.	Banks
4452	Kao Corporation	Chemicals	☆ 8630	Sompo Holdings, Inc.	Insurance
☆ 4503	Astellas Pharma Inc.	Pharmaceutical	☆ 8725	MS&AD Insurance Group Holdings, Inc.	Insurance
4523	Eisai Co., Ltd.	Pharmaceutical	8801	Mitsui Fudosan Co., Ltd.	Real Estate
☆ 4661	ORIENTAL LAND CO., LTD.	Services	8802	Mitsubishi Estate Company, Limited	Real Estate
4665	DUSKIN CO., LTD.	Services	☆ 9101	Nippon Yusen Kabushiki Kaisha	Marine Transportation
☆ 4902	KONICA MINOLTA, INC.	Electric Appliances	☆ 9433	KDDI CORPORATION	Information & Communication
5020	ENEOS Holdings, Inc.	Oil & Coal Products	☆ 9531	TOKYO GAS CO., LTD.	Electric Power & Gas
☆ 5332	TOTO LTD.	Glass & Ceramics Products	☆ 9532	OSAKA GAS CO., LTD.	Electric Power & Gas
5334	Niterra Co., Ltd.	Glass & Ceramics Products	9719	SCSK Corporation	Information & Communication
6098	Recruit Holdings Co., Ltd.	Services			

(Note) Index constituents as of the end of each month during the period.
(Source) Prepared by GPIF based on data from FactSet.

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 domestic equities in 2017. In fiscal 2023, we held discussions with index providers and made efforts to revise our adopted ESG indexes.

Partial Revision of ESG-Themed Domestic Equity Indexes

Since we began ESG index-based passive investment in 2017, we have made repeated efforts to improve our adopted ESG indexes. In fiscal 2023, we held many discussions with index provider MSCI about the risk of large tracking error of the MSCI Japan ESG Select Leaders Index (the "Former Index") to TOPIX, our policy benchmark, given that the Former Index (1) includes REITs while TOPIX does not, and (2) is biased toward large-cap stocks[1]. In response, MSCI proposed a new index with improved inclusion criteria to the Former Index, and after verification, the benchmark was changed to the MSCI Nihonkabu ESG Select Leaders Index (the "New Index",) which reflects the proposed improvements.

Figure 1 compares the index construction methods of the Former and New Indexes. The major differences are that the New Index (1) excludes J-REITs, which are not included in TOPIX, our policy benchmark, and (2) changed inclusion criteria to include the top 50% of ESG-rated stocks within a given industry, rather than the previous criteria of including stocks with the highest ESG ratings through 50% of market capitalization in a given industry. We decided to revise our adopted index since the effects of these two changes should eliminate or mitigate the two issues mentioned above while retaining the basic characteristic of an ESG index: including stocks with relatively high ESG ratings.

Figure 1. Differences in Methodology Between the Former and New Indexes

	New Index (MSCI Nihonkabu ESG Select Leaders)	Former Index (MSCI Japan ESG Select Leaders)
Parent index	MSCI Nihonkabu IMI (Note)	MSCI Japan IMI
Eligibility criteria	ESG rating: BB or higher (currently B or higher) Controversy score: 3 or higher (currently 1 or higher)	
Stock ranking	Ranked by ESG rating, ESG score, and market capitalization	
Stock selection	Coverage of the top half of the ranking by number of stocks per sector	Coverage of 50% of parent index by market capitalization in ascending ranking order by sector
Weighting	Market capitalization	
Stock selection (As of March 31, 2024)	516	240

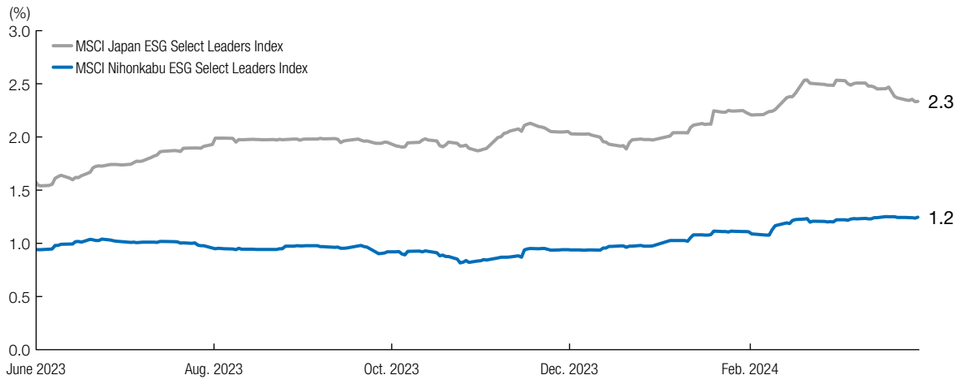
(Note) MSCI Nihonkabu IMI is MSCI Japan IMI excluding J-REITs.
(Source) Prepared by GPIF based on data from MSCI.

1 ESG scores contain a bias in which large-cap stocks with management resources for disclosures and other aspects are rated higher.

Effects of Index Revision

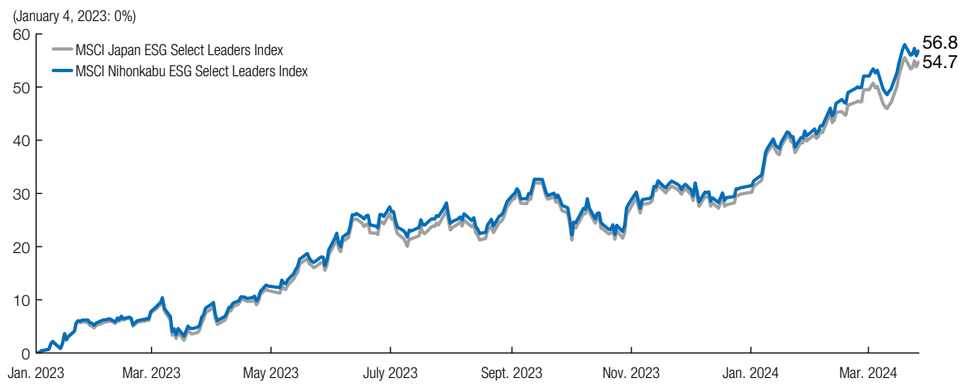
Due to the improved methodology, the New Index has more than double the number of constituents as the Former Index. Additionally, since the New Index excludes J-REITs, that are not included in our policy benchmark TOPIX, the risk of tracking error from TOPIX has roughly halved compared to the Former Index. Figure 2 compares the tracking errors of the Former and New Indexes against TOPIX. As of March 31, 2024, the tracking error of the Former Index was 2.3%, while that of the New Index was limited to 1.2%. Figure 3 compares the returns of the Former and New Indexes; there is no tendency for the returns to diverge significantly due to the change in methodology. The ESG ratings and scores used to determine which stocks to include in the index are the same for both the Former and New Indexes, demonstrating the expected risk control effects while also retaining the ESG elements of the New Index. Another notable improvement is that companies achieving the top 50% ESG ratings in their industry are now eligible, making it easier for them to consider their inclusion in the index.

Figure 2. Comparison of Tracking Error to TOPIX of Former and New Indexes (June 2023 to March 31, 2024)



(Note) Tracking error to TOPIX calculated on an annualized basis based on data from the last 90 business days
(Source) Prepared by GPIF based on data from MSCI, etc.

Figure 3. Comparison of Cumulative Returns of the Former and New Indexes (January 2023 to March 31, 2024)



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

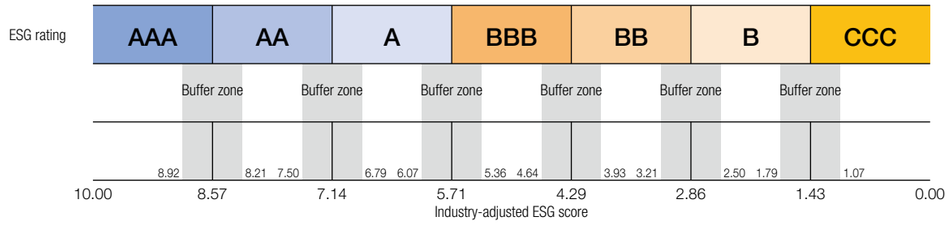
Engagement With Index Providers Regarding ESG Ratings

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 persistently engages with index providers and ESG rating agencies to enhance the sustainability of the market and improve our long-term investment performance. In fiscal 2023, there was no consultation[2] on methodological changes that directly affect our adopted ESG indexes. However, we received a consultation regarding changes to ESG ratings and were provided a detailed explanation from MSCI, and we held internal discussions.

The two proposals from the consultation were (1) to establish a buffer rule for ESG ratings and (2) to change the method of calculating ESG scores. The former proposal to introduce a buffer rule would ensure the stability of ESG ratings by creating buffer zones, since ESG ratings are being changed more frequently than before as the growing interest in ESG ratings by companies and the improvement of the quality of their disclosures. Figure 4 illustrates the proposed buffer rule, which stipulates that a company's rating will not be changed immediately if it exceeds a particular rating threshold but remains in the buffer zone.

Although GPIF considers the reasonableness of consultation proposals among other factors, our position is to respect the opinions of rating agencies as experts regarding technical changes resulting from regulatory changes or changing circumstances. However, since few proposals have been made that quantitatively analyze the impact on ESG indexes due to changes in methodology, we have asked ESG rating agencies to improve their responses.

Figure 4. Proposal to Establish a Buffer Rule for ESG Ratings



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

2 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.

ESG in Equity and Fixed Income Mandate

When GPIF evaluates our equity and fixed income managers, we examine their ESG integration and the like 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.

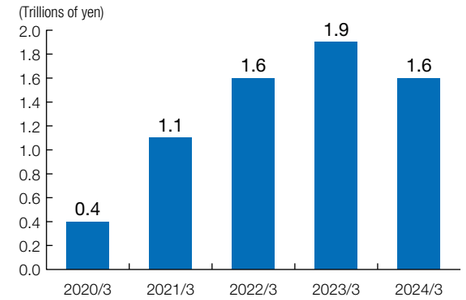
ESG Integration in Fixed Income Investments

GPIF provides its external asset managers with opportunities to integrate ESG into their fixed income investments and gain excess return, by building a platform in which they can invest in green, social and sustainability bonds issued by multilateral development banks and governmental financial institutions such as the World Bank Group. Initiated in April 2019 with the International Bank for Reconstruction and Development (IBRD) and the International Finance Corporation (IFC,) both members of the World Bank Group, this initiative has since expanded to include the world's leading multilateral development banks, such as the European Investment Bank (EIB) and the Asian Development Bank (ADB.) Since fiscal year 2019, GPIF has created the partnership with governmental financial institutions, and as of March 31, 2024 we have built investment platforms with ten multilateral development banks and six governmental financial institutions. As of the end of March 2024, we have invested around ¥1.6 trillion[1] into green bonds, social bonds, sustainability bonds through these platforms, and this includes roughly ¥100 billion investment into Japan Climate Transition Bonds (GX Economy Transition Bonds issued by the Japanese government) (Figure 1.) Green bonds account for 72.1% of the total, followed by social bonds (15.0%,) sustainability bonds (10.6%) and transition bonds (2.2%) (Figure 2.)

Investment in ESG bonds decreased by ¥0.3 trillion from fiscal 2022. This was due to the effects of measures implemented in the foreign bond portfolio to refine risk management and improve return relative to risks. Specifically, in our Passive Foreign Bonds portfolio benchmarked to the FTSE World Government Bond Index (ex Japan and China, yen-based,) we reduced the exposure to off-benchmark bond (non-government bond) investment, that was capped at 10% of assets under management since fiscal 2019. This initiative reduced the ESG bond position held in the Passive Foreign Bonds portfolio.

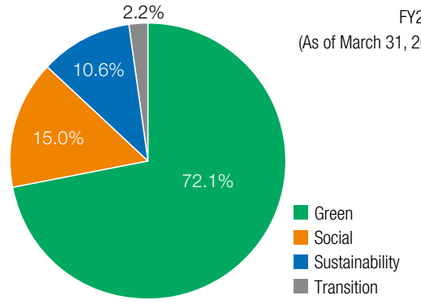
In Chapter 3 "Green Bond Greenium Analysis," we measured the difference in yield (greenium) between conventional bonds and green bonds issued in the past three years (2021 to 2023.) And we analyzed the relationship between greenium and (1) third-party certification, (2) disclosure of use of proceeds and (3) the impact created by projects for which the funds are used (see pages 71 – 74.)

Figure 1. GPIF's Investment in ESG Bonds



(Source) GPIF

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



(Source) GPIF

Investing in Japan Climate Transition Bonds: Engagement With External Rating Agencies

In February 2024, the Japanese government issued a total of ¥1.6 trillion in five- and ten-year Japan Climate Transition Bonds (GX Economy Transition Bonds.) The bonds were issued in accordance with the GX Promotion Act, and the proceeds are earmarked for projects aiming to achieve the Japanese government's international commitments consistent with the Paris Agreement, namely carbon neutrality by 2050 and a 46% reduction of GHG emissions by fiscal 2030 (compared to fiscal 2013.)

In the course of investing in Japan Climate Transition Bonds, GPIF engaged with the Japanese government (Ministry of Economy, Trade and Industry (METI)) as well as DNV BUSINESS ASSURANCE JAPAN K.K. and Japan Credit Rating Agency, Ltd. (JCR,) the external evaluation agencies for these bonds, and confirmed consistency with global standards such as Climate Transition Finance Handbook, Green Bond Principles, and the like (Figure 3.)

Figure 3. Main Confirmation Items in Engagement With External Rating Agencies

Item Confirmed	Response
(1) Compliance with international standards (ICMA's Climate Transition Finance Handbook, Green Bond Principles)	Consistent with the requirements of the Climate Transition Finance Handbook and Green Bond Principles
(2) Details of commitment to post-issuance reporting (e.g. impact reporting)	Will publish use of proceeds reporting (summarizing the use of proceeds to GX budget projects) annually and impact reporting within two years (and annually thereafter) after issuance
(3) Feedback from investors interviewed	Regarding fuel ammonia projects, which could be criticized as greenwashing, financial arrangements were already made for the ¥2 trillion Green Innovation (GI) Fund launched in 2021; therefore, funds from the Japan Climate Transition Bonds issued in fiscal 2023 will not be used for this project (the GI Fund)

(Source) GPIF

1 Calculated by GPIF, in compliance with International Capital Market Association (ICMA) principles, etc.

Stewardship Activities and ESG Promotion

Percentage of companies that discuss ESG or sustainability agendas at board meetings

93.2%

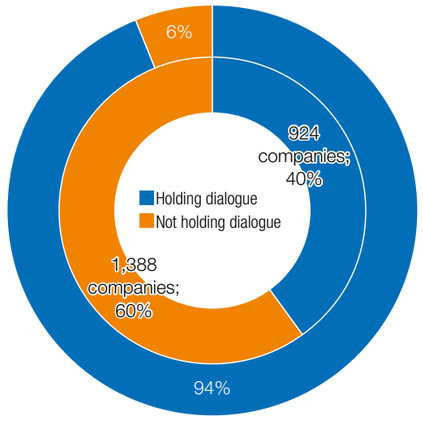
In an annual survey conducted by GPIF, we asked companies whether they discuss ESG or sustainability issues at board meetings, and 93.2% of respondents indicated that they had done so, at an average of 3.6 meetings per year.

Status of Engagement Through Our Asset Managers

GPIF entrusts its equity 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 (engagement) with investee companies. Here, we will introduce the status of dialogue by our external asset managers for domestic equities during 2023 calendar year and GPIF's activity to understand the status of dialogue by our active equity managers.

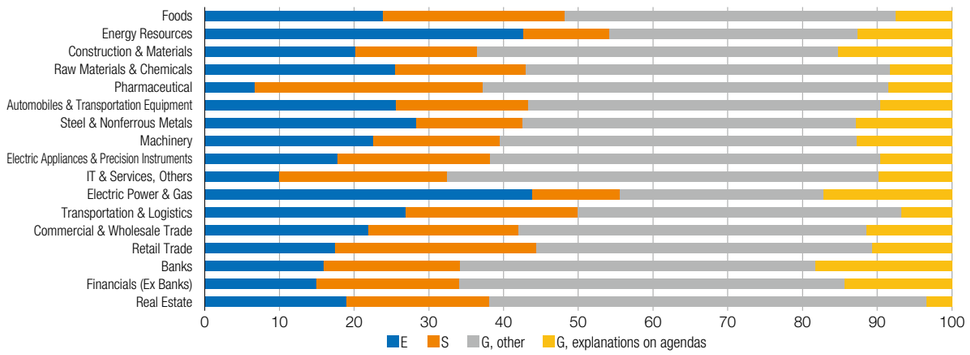
As shown in Figure 1, our external asset managers for domestic equities engaged with 924 companies from January to December 2023. This equates to 40% of all of GPIF's investee companies, or 94% in terms of total market capitalization.

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



(Note) The percentages in the above graphs were calculated using the number of investee companies (domestic equity) and market capitalization as of March 31, 2023 as the denominator.

Figure 2. Percentage of ESG Dialogue Topics by Industry



(Note) Industries are based on the TOPIX-17 Series. "G, other" includes a broad range of topics, including capital efficiency, financial strategies and cross-shareholdings.

Figure 2 shows the topics of dialogues in each industry. Overall, most of the dialogues are on G (Governance) that includes a broad range of topics such as capital efficiency. However, topics of ESG dialogue differ by industries. For example, in Energy Resources and Electric Power & Gas, topics related to E (Environmental) are more common, while in Pharmaceutical, S (Social) is discussed more often than in other industries. This suggests that our external asset managers are considering the materiality of their investee companies in their engagements.

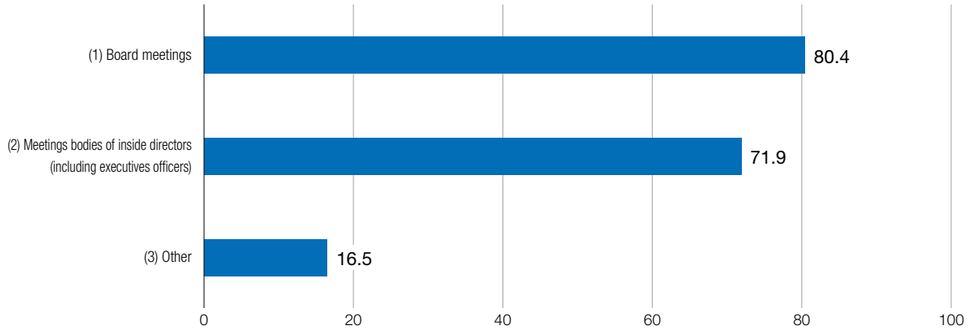
GPIF is in the process of ascertaining how dialogue with investee companies is utilized in the active equity funds in terms of earning excess returns. The purpose of the dialogue can be gathering information[1] to express opinions about management improvements to investee companies, or both. The topics of dialogue vary widely, including corporate performance, business strategy and ESG. In some cases, the process of the dialogue is left to the discretion of the analyst or portfolio manager, while in others, the progress of the dialogue is monitored, managed and shared across the asset management company. We will continue to conduct objective research and analysis, based on the understanding that the purpose of dialogue by active equity funds depends on the investment style.

Survey of Listed Companies

GPIF conducts an annual survey of companies in order to obtain their feedback on the stewardship activities of our external asset managers and to monitor the content and progress of such activities. We also use the survey to gather their opinions on our ESG indexes and understand companies' ESG disclosure. In our ninth survey, conducted in fiscal 2023, we surveyed companies in the TOPIX and received responses from 717 companies, representing 73.2% of total market capitalization.

In this survey, we asked questions related to the TSE's request for "the Action to Implement Management That Is Conscious of Cost of Capital and Stock Price." Since nearly a year had passed since the request was made, almost all companies have discussed the request internally, and roughly 80% have discussed it at their board meetings. However, we found that many companies have issues to consider such measures, and the details of these issues vary. The survey also revealed the companies' many expectations for investors regarding this matter. GPIF continues to encourage its external asset managers to engage in dialogue with investee companies based on their issues and investors' expectations.

Figure 3. Percentage of Meeting Body that Held Discussions on TSE Request



(Note) Multiple responses were allowed. Includes future plans.

1 Information gathering is commonly regarded as not being a part of engagement (constructive dialogue.)

In past surveys, we have asked about the status of compliance with the Task Force on Climate-related Financial Disclosures (TCFD); in this survey, we added a new question on the status of compliance with the Taskforce on Nature-related Financial Disclosures (TNFD.) While the number of companies making disclosures in line with the TNFD was limited compared to the TCFD, in part because not much time has passed since the final recommendations of the TNFD were announced last September. Many companies plan to disclose in line with the TNFD in the future, so that the number of companies making disclosures is expected to increase. Giving the growing importance of disclosing non-financial information, 93.2% of companies indicated that they had discussions on ESG or sustainability agendas at board meetings, an average of 3.6 times a year.

Figure 4. Status of Disclosures in Line With the TNFD

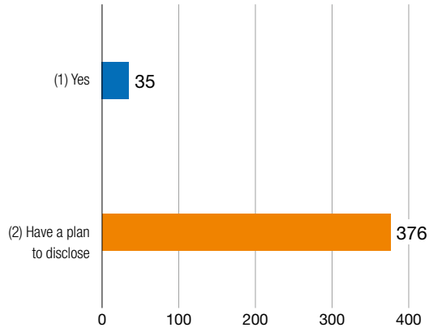
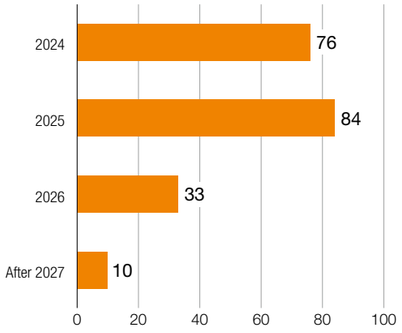


Figure 5. Timing of Planned Disclosures in Line With the TNFD by Companies Indicating Such Plans



(Note) Some companies have not specified the timing.

Figure 6. Percentage of Companies that Discuss ESG and Sustainability Agenda at Board Meetings

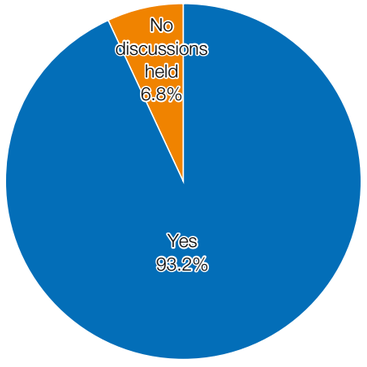
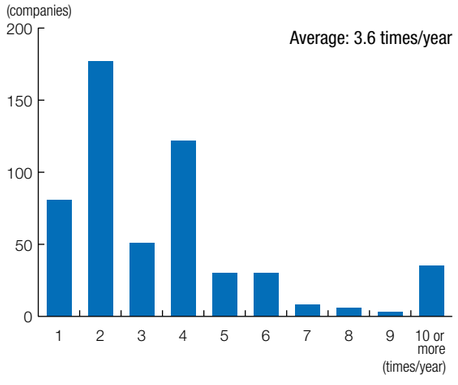


Figure 7. Frequency of Discussion About ESG and Sustainability Agenda at Board Meetings



Global Asset Owners' Forum

In July 2016, GPIF established the Global Asset Owners' Forum as a venue for continuous exchange of views with overseas public pension funds and others with the aim of leveraging each other's knowledge to fulfill their stewardship responsibilities. The first Global Asset Owners' Forum was held on November 14, 2016 with GPIF, the California Public Employees' Retirement System (CalPERS) and the California State Teachers' Retirement System (CalSTRS) as co-organizers, and has been held continuously since then.

In fiscal 2023, the Global Asset Owners' Forum was held for the first time in nearly four and a half years after suspension due to the COVID-19 pandemic. During Japan Weeks, when the Principles for Responsible Investment (PRI) annual conference was held in Tokyo, the Global Asset Owners' Forum members had a meeting with the Japan Business Federation (Keidanren) and its corporate members to discuss corporate governance, climate change and other sustainability issues as well as exercising voting rights.

Apart from the meeting, asset owners exchanged views on disclosures and other issues. The members discussed various topics, including expectations for Japanese companies such as timely disclosures and timely English translations, support for ISSB standards, and support for the Tokyo Stock Exchange's request on cost of capital, etc.

We will continue to engage in dialogue with overseas public pension funds and others on various occasions.

Figure 8. Organizations in Attendance at the Meeting with the Keidanren

Asset Owners	Country
Government Pension Investment Fund (GPIF)*	Japan
California Public Employees' Retirement System (CalPERS)*	U.S.
California State Teachers' Retirement System (CalSTRS)*	U.S.
APG Asset Management (APG)	The Netherlands
Norges Bank Investment Management (NBIM)	Norway
Health Employees Superannuation Trust Australia (HESTA)	Australia
Temasek	Singapore

(Note) Those marked with * are co-organizers.

ESG in Alternative Asset Management

Avoided emissions
Equivalent to
148,000 households

GPIF has been developing initiatives to appropriately integrate ESG in the selection and post-selection monitoring process of alternative asset managers. For domestic renewable energy projects, we also measure the avoided GHG emissions from renewable energy projects over the past several years.

ESG in Alternative Assets

The holding period for alternative assets (infrastructure, real estate, and private equity) is generally quite long, and the asset manager itself is often 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 process not only to identify the risks that may arise during the holding period but also to find opportunities for sustainable asset value growth and corporate value enhancement. This trend is particularly prominent among overseas asset managers.

Although we use the collective phrase "alternative asset management," ESG factors and its impacts differ, 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 the status of their investment.

(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 a variety of aspects, including due diligence questionnaires, interviews with their ESG teams and evaluations made by third-party consultants. Among other things, we review the manager's company-wide ESG policies, ESG integration in the investment process, their system for supervising and reporting to investors after investment execution.

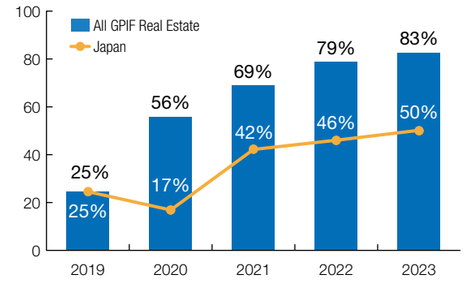
(2) Post-investment Monitoring

There is no standardized rating criteria for ESG factors that can be applied to all alternative assets. Therefore, each asset manager develops their 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 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 on 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 / Global Real Estate Sustainability Benchmark (GRESB)

In fiscal 2023, 83% 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 the previous December for each year.) This was an increase of 4%, or 1 fund, from the previous fiscal year. The participation rate has been gradually increasing since measurements began in fiscal 2019, and the increase in the number of participating funds in Japan in fiscal 2023 contributed to the increase in the overall participation rate in GPIF's real estate portfolio.

Figure 1. Trends in GRESB Participation Rate (All GPIF Real Estate / Japan)



(Note) Until last year, the figures were based on the weighted average as of the end of December of each year. However, since annual GRESB assessments are based on the results of the previous fiscal year (the results of fiscal 2022 in the case of the fiscal 2023 assessment,) starting this fiscal year, the figures are based on the weighted average as of the end of the previous December for each year.

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.

Carbon Footprint (GHG Emissions) Analysis of Private Equity

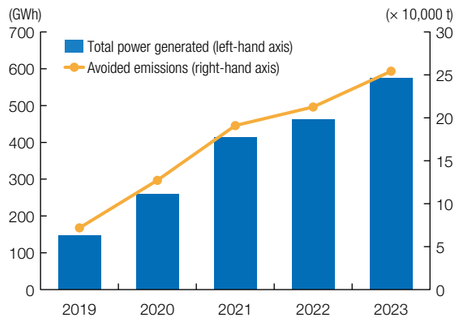
For this year's climate-related financial disclosure, we measured greenhouse gas (GHG) emissions by our private equity portfolio. Currently, a few private equity funds report the GHG emissions at their portfolio companies. Therefore, to measure the carbon footprint of our private equity portfolio, we somehow need to estimate their GHG emissions. In this analysis, we used the enterprise value (EV) of the portfolio companies to estimate their GHG emissions (sum of Scopes 1 through 3,) based on the fact that EV and GHG emissions have a certain degree of positive correlation in the case of listed companies. The estimated carbon footprint of the overall private equities was 2.32 million tons (the carbon footprint of GPIF's entire equities portfolio was 464.03 million tons.) Regarding the carbon footprint of private equities by sector, Industrials, which has a relatively large sector weight as well as high GHG emissions, was the largest. This result was affected by the sector composition, similar for our listed equities portfolio. (Please refer to page 68 for the results of this analysis.)

Analysis of Avoided Emissions from Domestic Renewable Energy Projects

We continue to conduct the 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 funds amounted to approximately 573 GWh in 2023, 24% increase from the previous year. The total power generated has increased since last year, mainly due to increased investment in solar power facilities from portfolio funds. The theoretical amount of avoided emissions by switching to renewable energy-fueled power generation in 2023 were approximately 250,000 t, increasing 20% from last year. This figure is calculated based on the amount of power

Figure 2. Total Power Generated and Avoided Emissions Through GPIF's Portfolio of Domestic Renewable Energy Projects



(Note) Total power generated and Avoided Emissions are calculated based on GPIF's holding percentage of end investees.

generated, using the Japan Photovoltaic Energy Association (JPEA) guidelines and other information such as the GHG emission factors published by power companies. This is equivalent to the annual GHG emissions from electricity usage of approximately 148,000 households (+27% YoY.)

Column

ESG Initiatives in the Domestic Infrastructure Sector

At GPIF, we evaluate alternative asset managers' ESG initiatives when selecting them, and continue to monitor their initiatives during the investment period. We also confirm ESG activities of investment projects or companies through our own site visits and the ESG reports prepared by our selected asset managers.

ESG Considerations at a Solar Power Generation Facility

With regards to an investment in a solar power generation facility located in Aomori Prefecture, efforts are proceeding in cooperation with the local community. In this area, the public and private sectors are working together to achieve carbon neutrality, and by promoting renewable energy, the community promotes to achieve net zero carbon dioxide emissions by fiscal 2050. This project is a farming-type facility, which makes effective use of land, where pasture grass is grown under the height-adjustable solar panels. The farming-type facility reports the amount of grass harvested to the municipal agricultural committee and takes steps to secure a certain amount of harvest.

ESG Considerations at an Onshore Wind Power Generation Facility

With regards to an investment in an onshore wind power generation facility located in Aomori Prefecture, it aims to promote initiatives that take wildlife in the region into the consideration while making the facility more relatable for local residents.

The blades of wind power generation facilities are often struck by migratory birds and bats. To prevent these strikes, this facility is positioned to avoid the paths of migratory birds visiting the surrounding wetlands. A joint study with experts is also underway to investigate the impact on bats. Additionally, since most of the project land is active farmland, we are not only working to revitalize agriculture and promote regional development through the project but also regularly hosting educational visits by primary and junior high school students to engage in community initiatives.

Initiatives and Collaboration With Other Institutions

GPIF collaborates with a wide range of domestic and global institutions. In fiscal 2023, we continued to participate in the general meetings and conferences to which we belong, as in fiscal 2022.

2015

Sept. 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, 2024, we received a four-star rating in all categories.

2019

Aug. Joined ICGN

International Corporate Governance Network (ICGN) is an international network established by 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.

Aug. 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.

2020

Nov. Joined JPX ESG Knowledge Hub

The JPX ESG Knowledge Hub, established by the Japan Exchange Group, Inc. (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.

2023

Feb. 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 listed companies and investors to have free and open discussion on approaches to the disclosure of non-financial information that contributes to enhancing corporate value over the long term. We believe that our participation will be useful for GPIF to promote stewardship activities.

Column

Continued to Participate in Climate Action 100+ Phase 2

Climate Action 100+ (CA100+) is an investor-led initiative launched in September 2017. Under the initiative, companies that have a significant impact on solving global environmental problems engage in constructive dialogue on issues such as improving governance on climate change, efforts to reduce greenhouse gas emissions, and enhancing disclosures; GPIF has participated as a supporter (not required to participate in engagement activities) since October 2018. Initially launched as a five-year initiative (2017 – 2022,) an announcement has been made that CA100+ will continue (Phase 2) from 2023 to 2030. GPIF continues to participate in Phase 2 as a supporter.

GPIF's Public Communication

Speech and panel discussions (FY2023)

36 times

At GPIF, we strive to provide straightforward information, and proactively disseminate information not only to experts, but also to a wide range of people in Japan through social networking media such as YouTube and X (formerly Twitter,) as well as through conferences and lectures.

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 publishing our annual ESG Report, which summarizes GPIF's ESG initiatives and their effects, we announce our selection of ESG indexes on our website, together with an outline of each index.

We are also strengthening information dissemination to a wide range of people through X (formerly Twitter.) In fiscal 2023, we posted a series on X titled "GPIF's ESG and Stewardship Activities" in general once a week.

We participated in a total of 36 conferences (including non-ESG-related agendas,) giving speeches and joining in panel discussions at events such as the GGX x TCFD Summit hosted by METI and the 2023 Global Corporate Governance Colloquium hosted by the European Corporate Governance Institute (ECGI) for academics conducting research in the field of governance. We also gave lectures at universities and contributed to professional journals. We aim to further strengthen our public communication in fiscal 2024.

Figure 1. Main Speeches, Panel Discussions, and Contributions on Topics Pertaining to ESG and Stewardship Activities in FY2023

Apr.	Speech at the 14th SAAJ International Seminar
	Speech at a University of Tokyo / Kyoto University ESG Series Seminar
May	Joining a panel discussion at Responsible Investor Japan
July	Speech at a webinar Symposium on ESG-S Indicator, hosted by JTUC Research Institute for Advancement of Living Standards and QUICK Corp.
Sept.	Fireside chat at "Addressing climate and ESG risks while delivering impact" hosted by Economist Impact
Oct.	Speech at ICGN Company & Investor Engagement Forum
	Speech at GGX x TCFD Summit
	Speech at Bloomberg Buy-Side Forum Tokyo 2023
	Speech at Annual ICMA & JSDA Sustainable Bond Conference
Nov.	Speech at the WICI Integrated Reporting Seminar
	Contributed an article to the November 2023 issue of Gekkan Shihon Shijo ("Expectations and Challenges of Analyzing Avoided (GHG) Emissions")
Dec.	Contributed an article to the December 2023 issue of Securities Analysts Journal ("Integrated Thinking in the Engagement and Disclosure")

(Note) Only lectures open to the media are listed.

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

Review of ESG Activities and Future Outlook

Based on the Investment Principle "sustainable growth of investee companies and the capital market as a whole are vital in enhancing long-term investment returns," GPIF promotes ESG-incorporating investment and various activities to fulfill its stewardship responsibility. We will continue to promote ESG activities in pursuit of securing long-term investment returns for our beneficiaries.

With the help of favorable market conditions in Japan and abroad, our assets under management for fiscal 2023 reached a record high of ¥45.4 trillion, and the cumulative returns since fiscal 2001 (when our self-management began) have grown to ¥153.8 trillion and assets under management to approximately ¥246 trillion. Additionally, the scale of our ESG index-based passive investment, which we started in fiscal 2017, has increased to approximately ¥17.8 trillion as of the end of fiscal 2023.

At GPIF, we believe that the benefits of investments which incorporates ESG factors are realized when they are sustained over the long term. However, due in part to sizeable fluctuations in ESG investment performance, we investigated the MSCI Japan ESG Select Leaders Index, which was adopted as our benchmark in 2017, and decided to change to the MSCI Nihonkabu ESG Select Leaders Index, with the aim of reducing unintended risks outside of ESG factors.

The investment amount in ESG bonds decreased from fiscal 2022 due to the emphasis on more targeted risk management. From a risk management perspective, we revised our off-benchmark bond purchase limit for the WGBI Passive Fund for foreign bonds (to allow the purchase of international institution bonds up to 10% of the balance,) which was established in 2019 for the purpose of improving portfolio returns. Although the balance of ESG bonds decreased because most issuers of ESG bonds are international institutions, this does not mean that GPIF has changed its stance on considering ESG investment.

GPIF monitors the stewardship activities of our external asset managers and requires them to engage in constructive dialogue (engagement) with investee companies.

In fiscal 2023, we launched a project using statistical methods such as causal inference to examine the effects of our stewardship activities and ESG investments. Of these, regarding engagement, in fiscal 2023, we implemented a project titled "Evaluation Project" and published a report on it. As a result, we were able to objectively demonstrate the effects of engagement by confirming improvements in indicators for corporate value and investment returns in dialogue on climate change and board structure self-evaluation.

In terms of topics of engagement, our survey of listed companies in fiscal 2023 regarding the TSE's request for "the Action to Implement Management That Is Conscious of Cost of Capital and Stock Price" revealed that while almost all respondents had discussed this request internally, many felt that there were issues to be addressed. We will continue to confirm the status of engagement on topics deemed important by our external asset managers.

We are also working to understand the status of how our external asset managers utilize engagement with investee companies in the active equity funds management process. This research would qualitatively investigates and analyzes how asset managers utilize engagement with investee companies (including for information-gathering purposes) to earn excess returns in active equities funds.

GPIF will pursue ESG investment and stewardship activities 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 and Stewardship Activities

At GPIF, we measure whether our ESG activities are producing the expected results, such as enhancing the sustainability of financial markets and improving risk-adjusted returns, in order to examine the long-term impact of our initiatives. We therefore continuously examines not only short-term investment performance, but also multi-faceted reviews including factor analysis of ESG index performance, as well as analysis ESG ratings from various aspects. In Chapter 2, we present our analysis of “Evaluation Project on the Effects of Engagement” conducted in fiscal 2023 as part of a new initiative: the Measuring the Effects of Stewardship Activities and ESG Investment Project.

ESG Index Performance

Cumulative excess return of ESG Passive Fund for Domestic Equity

¥124.2 billion

Most of the ESG index-based passive funds selected by GPIF have outperformed the parent index and policy benchmarks since they were launched; overall, the funds have secured excess returns. We will continue to review performance of ESG indexes from long-term perspectives.

ESG Index Performance Attribution Analysis

Figure 1[1] shows the performance of GPIF's selected ESG indexes since it was launched until March 2024, and during the previous year (from April 2023 to March 2024.) In fiscal 2023, although the return rates from ESG indexes for domestic equities exceeded both the parent indexes and market average (TOPIX for domestic equities, MSCI ACWI (excluding Japan) for foreign equities,) some ESG indexes for foreign equities underperformed both the parent indexes and market average. Since each launch, ESG indexes for both domestic and foreign equities have generally outperformed the parent index and market average.

Figure 2[2] shows the cumulative excess returns of ESG index-based passive funds for domestic and foreign equities selected by GPIF (ESG passive fund.) Cumulative excess returns compared to the parent index and market average are broken down into 'Benchmark Effect' and 'Fund Effect' for the period from June 2017, (when the funds were launched,) to March 2024 for domestic equities, and from September 2018 to March 2024 for foreign equities. The excess return of ESG passive fund is defined and calculated as the difference between the total amount of net assets of an ESG passive fund and the total amount of net assets calculated assuming that the funds is managed at the parent index and market average return. Since each ESG index has different parent index, we must calculate the composite parent index return, for which we use the average daily return of the parent indexes weighted by the total amount of net assets for ESG passive fund. The definition for 'Benchmark Effect' is the difference in return of ESG index on the one hand and the parent index and market average on the other, while 'Fund Effect' is the difference in return of ESG passive fund and ESG index.

As shown in Figure 2, the cumulative excess returns of ESG passive fund for domestic equities over the market average and parent index were ¥124.2 billion and ¥82.2 billion, respectively. The 'Benchmark Effect' increased in the 12 months after March 2023. The 'Fund Effect' turned negative in March 2020 due to fund allocation and other factors, and has trended slightly downward since then, in part because of transaction costs. The cumulative excess returns of ESG passive fund for foreign equities over the market average and parent index were ¥46.2 billion and ¥30.6 billion, respectively. The 'Benchmark Effect' has trended upward since October 2022. The 'Fund Effect' turned positive due to fund allocation upon its launch in September 2018 and other factors, but has trended slightly downward since then, in part because of transaction costs.

These results only cover investment outcomes over a limited period. We believe that the impact of portfolio ESG ratings on risk-adjusted returns requires to be further examined over the long term. GPIF will continue to examine the various aspects of the performance of ESG indexes from a long-term perspective, regardless of short-term investment results.

1 Figure 1 shows the investment performance of individual ESG indexes.
2 Figure 2 shows the return based on actual performance considering investment timings etc.

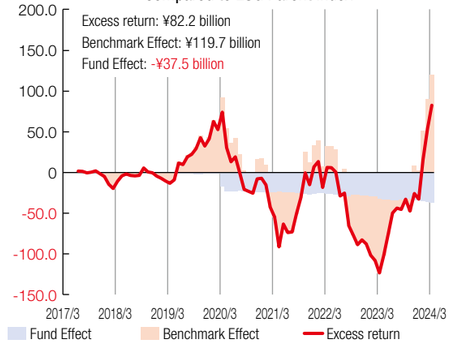
Figure 1. Returns of Nine ESG Indexes Selected by GPIF

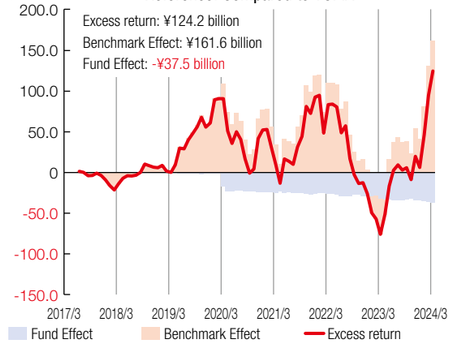
	The launch of each fund	The launch of each fund to March 2024 (annualized)			(Reference) April 2023 to March 2024		
		Rate of Return	Excess Return		Rate of Return	Excess Return	
		ESG Index	Parent Index	TOPIX	ESG Index	Parent Index	TOPIX
(1) FTSE Blossom	2017/6	12.91%	1.41%	1.70%	47.82%	6.71%	6.48%
(2) MSCI ESG Select Leaders*	2017/6	12.25%	0.76%	1.04%	44.88%	3.85%	3.54%
(3) MSCI WIN	2017/6	10.88%	-0.64%	-0.33%	44.91%	3.48%	3.57%
(4) S&P/JPX Carbon	2018/9	11.35%	-0.03%	-0.03%	41.92%	0.58%	0.58%
(5) FTSE BlossomSR	2022/3	27.51%	1.67%	1.43%	43.99%	2.88%	2.65%
(6) Morningstar GenDiJ	2023/3	47.94%	0.34%	1.45%	42.64%	0.30%	1.30%
		ESG Index	Parent Index	MSCI ACWI ex Japan	ESG Index	Parent Index	MSCI ACWI ex Japan
(7) S&P Global Carbon	2018/9	16.22%	0.13%	0.09%	40.40%	-0.46%	-0.23%
(8) MSCI ESG Universal	2020/11	22.52%	0.44%	0.46%	41.74%	0.95%	1.12%
(9) Morningstar GenDi	2020/12	22.72%	-0.46%	1.08%	40.39%	-2.32%	-0.24%

(Note 1) Index returns include dividends.
(Note 2) The parent indexes for (1) to (9) (constituent universe) are as follows:
(1) (5) FTSE Japan All Cap Index ((5) was FTSE Japan until December 2020)
(2) MSCI Nihonkabu IMI
(3) MSCI Japan IMI TOP 700
(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
* MSCI Japan ESG Select Leaders Index through February 7, 2024; MSCI Nihonkabu ESG Select Leaders Index on and after February 8, 2024
(Source) Prepared by GPIF based on data from FactSet.

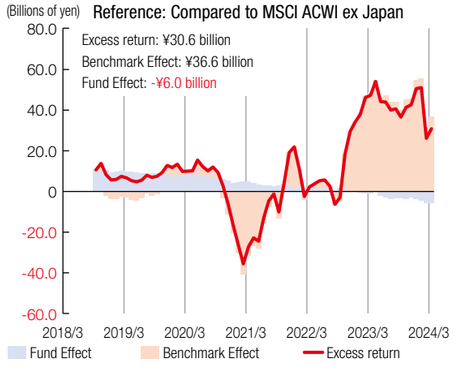
Figure 2. Cumulative Excess Return Trend of ESG Passive Fund for Domestic and Foreign Equities

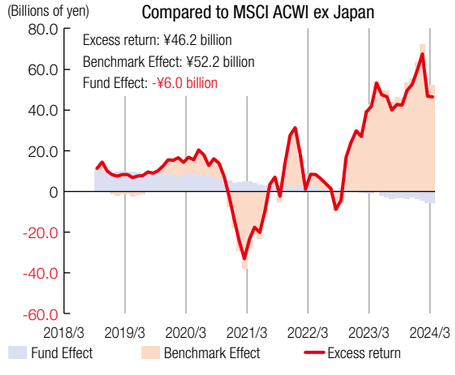
Domestic equities





Foreign equities





(Note 1) Parent index return is the average daily return of the parent indexes weighted by the total amount of net assets for ESG passive fund
(Note 2) The definition for 'Benchmark Effect' is the difference in return of ESG indexes on the one hand and TOPIX and MSCI ACWI ex Japan on the other, while 'Fund Effect' is the difference in return of ESG passive fund and ESG indexes.
(Source) Prepared by GPIF based on data from FactSet.

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

Correlation coefficient of ESG ratings (Japanese companies)

[0.54]

At GPIF, we aim to assess the effects of ESG investment from various perspectives. To this end, every year since our FY2017 ESG Report, we have measured and provided stationary observations of ESG ratings of our equity portfolio, the average and level of improvement of ESG ratings by country, and the correlation between ESG ratings of different providers.

Figures 1 and 2 show the trend in each ESG rating for GPIF's equity portfolios as of March 31 in 2017, the first year we adopted an ESG index for domestic equities, and the past five years (2020 to 2024,) as well as the ESG rating for market representative indexes as of March 31, 2024. In the FTSE evaluation for the most recent year, ESG rating for domestic equities and foreign equities both increased; notably, all of the E, S, and G scores rose for domestic equities. In contrast, MSCI's evaluation showed an increase in domestic equities and a slight decline in foreign equities over the past year. We also observed that both domestic and foreign equities saw their G scores increase while their E and S scores decreased, though not substantially.[1] 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, 2024. 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 (page 45) show the ESG rating rankings by country as of March 31 in 2017 and the past five years (2020 to 2024.) 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 European and North American countries such as France, the United Kingdom, the U.S. and Canada; most recently, Japanese companies' rankings are on the rise. Figures 5 and 6 (page 45) show the rate of improvement in each country over the last seven years and the most recent year. Japanese companies are among the biggest improvers over the past seven years based on the ratings provided by both FTSE and MSCI. Figures 7 and 8 (page 46) compare the distributions of ESG ratings for Japanese companies as of March 31, 2017 and March 31, 2024. 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.

Unlike financial analysis, ESG ratings deal with a variety of non-financial information, so that no established standard rating methodologies has been established as yet. For this reason, there is considerable variation among ESG ratings by rating agencies, which is shown in Figures 9 and 10 (page 46.) The scatter plot in Figure 9 shows the ESG scores of the two rating agencies for the same target companies as of March 31, 2024, with scores by FTSE on the vertical axis and those by MSCI on the horizontal axis. A certain 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 in 2017 and the past five years (2020 to 2024.) Although the correlation coefficients of Japanese companies are lower than that of foreign companies, the results indicate that the correlation between ESG scores is gradually increasing for Japanese companies, approaching the level of foreign companies.

Figure 1. FTSE ESG Ratings (2017 and Last Five Years)

	ESG	E	S	G	ESG	E	S	G
	GPIF (Domestic Equities)				GPIF (Foreign Equities)			
2017/3 (a)	2.43	0.86	0.77	0.80	3.03	0.88	0.95	1.20
2020/3 (b)	2.95	1.02	0.95	0.99	3.38	1.00	1.09	1.28
2021/3 (c)	2.96	1.02	0.98	0.97	3.34	0.99	1.07	1.28
2022/3 (d)	3.11	0.96	1.09	1.06	3.26	0.91	1.11	1.24
2023/3 (e)	3.29	1.09	1.11	1.09	3.42	1.06	1.12	1.25
2024/3 (f)	3.58	1.20	1.21	1.17	3.48	1.11	1.13	1.25
	TOPIX				MSCI ACWI ex Japan			
2024/3 (g)	3.55	1.19	1.19	1.16	3.47	1.10	1.13	1.24
Excess Score (f-g)	+0.03	+0.01	+0.02	+0.01	+0.01	+0.01	+0.00	+0.01
	Change in Score (GPIF Portfolio)				Change in Score (GPIF Portfolio)			
Past Seven Years (f-a)	+1.15	+0.34	+0.44	+0.37	+0.45	+0.23	+0.18	+0.05
Past One Year (f-e)	+0.29	+0.11	+0.10	+0.08	+0.06	+0.05	+0.01	+0.00

(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 (2017 and Last Five Years)

	ESG	E	S	G	Industry Adjustment	ESG	E	S	G	Industry Adjustment
	GPIF (Domestic Equities)					GPIF (Foreign Equities)				
2017/3 (a)	5.29	1.56	2.19	1.02	0.52	5.31	1.40	1.91	1.44	0.56
2020/3 (b)	5.79	1.36	2.38	1.34	0.71	6.01	1.21	2.18	1.79	0.84
2021/3 (c)	5.92	1.21	2.11	1.58	1.02	6.04	1.13	2.08	1.80	1.03
2022/3 (d)	6.37	1.22	2.18	1.79	1.18	6.47	1.17	2.19	1.87	1.24
2023/3 (e)	6.93	1.26	2.19	2.11	1.37	6.80	1.21	2.16	2.13	1.29
2024/3 (f)	7.07	1.26	2.17	2.14	1.51	6.78	1.19	2.13	2.16	1.30
	TOPIX					MSCI ACWI ex Japan				
2024/3 (g)	7.02	1.25	2.16	2.14	1.48	6.74	1.20	2.12	2.15	1.27
Excess Score (f-g)	+0.05	+0.01	+0.01	+0.00	+0.03	+0.04	-0.01	+0.01	+0.01	+0.03
	Change in Score (GPIF Portfolio)					Change in Score (GPIF Portfolio)				
Past Seven Years (f-a)	+1.78	-0.30	-0.02	+1.12	+0.99	+1.47	-0.21	+0.22	+0.72	+0.74
Past One Year (f-e)	+0.14	+0.00	-0.02	+0.03	+0.14	-0.02	-0.02	-0.03	+0.03	+0.01

(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 ©2024.

1 A slight decline in ESG scores does not necessarily mean that a company's ESG efforts are regressing, since this may be due to changes in ESG rating methodologies (rating rules) and other factors.

Figure 3. FTSE ESG Rating Ranking by Country (2017 and Last Five Years)

FTSE						
March 2017	March 2020	March 2021	March 2022	March 2023	March 2024	Latest Value
						3.77
						3.71
						3.40
						3.13
						3.07
						3.03
						3.02
						2.76
						1.83

Figure 4. MSCI ESG Rating Ranking by Country (2017 and Last Five Years)

MSCI						
March 2017	March 2020	March 2021	March 2022	March 2023	March 2024	Latest Value
						8.07
						7.45
						7.10
						7.05
						6.54
						5.59
						4.98
						4.43
						3.00

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

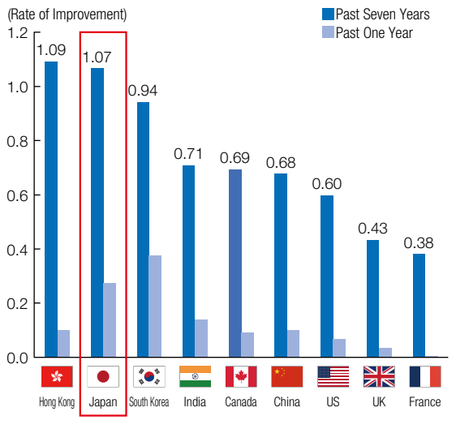
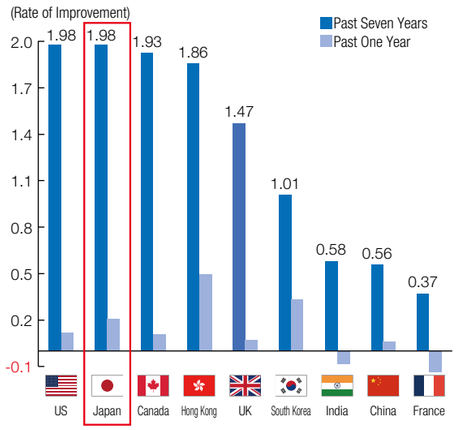


Figure 6. Rate of Improvement in MSCI ESG Ratings by Country



(Note 1) This figure shows the change over the seven years from the end of March 2017 to the end of March 2024 and over the most recent year.
(Note 2) ESG rating of constituents by country on Figures 3 to 6 is calculated as the arithmetic average.

Figure 7. FTSE ESG Rating Distribution for Japanese Companies

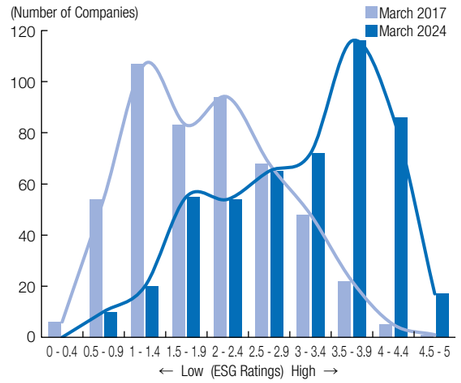
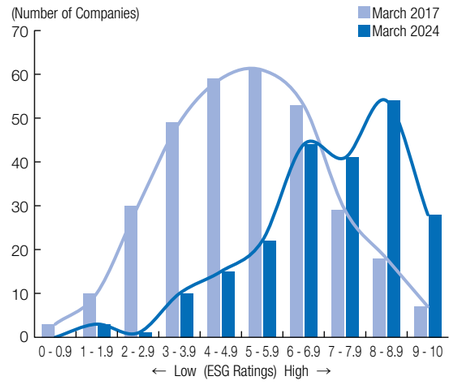
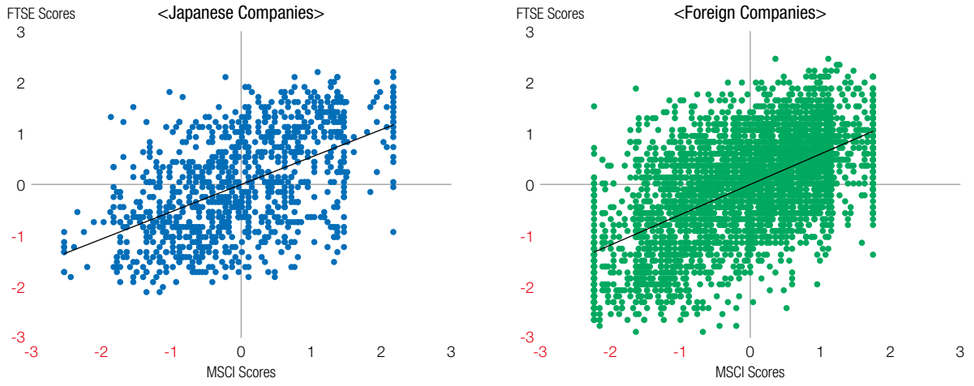


Figure 8. MSCI ESG Rating Distribution for Japanese Companies



(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 ©2024.

Figure 9. FTSE and MSCI ESG Score Correlation Figure (as of March 31, 2024)



(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 ©2024.

Figure 10. Trends in Correlation Coefficient of ESG Score Data from FTSE and MSCI (2017 and Last Five Years)

<Japanese Companies>

		ESG	E	S	G
Correlation Coefficient					
2017/3	(a)	0.37	0.47	0.11	0.04
2020/3	(b)	0.41	0.45	0.02	0.11
2021/3	(c)	0.46	0.48	0.09	0.14
2022/3	(d)	0.51	0.49	0.12	0.14
2023/3	(e)	0.53	0.45	0.07	0.15
2024/3	(f)	0.54	0.41	0.07	0.19
Change in Correlation Coefficient					
Past One Year	(f-e)	+0.00	-0.04	+0.01	+0.04
Past Seven Years	(f-a)	+0.16	-0.06	-0.04	+0.15

<Foreign Companies>

		ESG	E	S	G
Correlation Coefficient					
2017/3	(a)	0.48	0.37	0.20	0.26
2020/3	(b)	0.58	0.38	0.24	0.28
2021/3	(c)	0.57	0.38	0.25	0.34
2022/3	(d)	0.59	0.44	0.27	0.37
2023/3	(e)	0.63	0.35	0.26	0.42
2024/3	(f)	0.59	0.33	0.24	0.42
Change in Correlation Coefficient					
Past One Year	(f-e)	-0.03	-0.02	-0.03	-0.00
Past Seven Years	(f-a)	+0.11	-0.04	+0.04	+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 ©2024.

Column

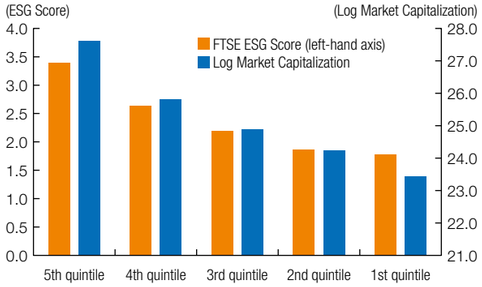
Analysis of ESG Factors

Since GPIF began ESG index-based passive investment in 2017, we continue to verify performance and make efforts to improve our adopted ESG indexes. Regarding corporate ESG ratings, larger companies tend to disclose more ESG information and have higher ESG scores. Consequently, ESG indexes tend to perform better during market phases when investors favor large-cap stocks. Therefore some argue that it is difficult to separate the effect of holding large-cap stocks from that of holding stocks with high ESG scores. Using FTSE Blossom Japan Index as an example, here we will introduce a method of analysis to separate the effect of holding large-cap stocks from that of holding stocks with high ESG scores in the context of ESG index performance.

Relationship Between ESG Scores and Large-Cap Stocks

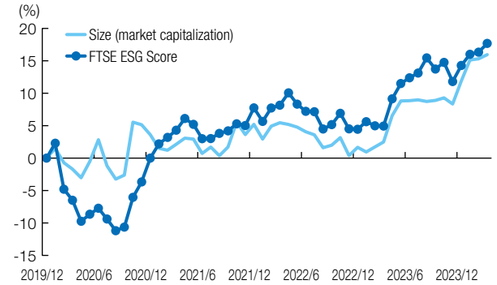
It is said that there is a high correlation between a company's size (market capitalization) and its ESG score. Figure 1 shows the average market capitalization and FTSE ESG score of the constituents of the FTSE Japan All Cap Index, the parent index of the FTSE Blossom Japan Index, divided into quintiles in descending order of market capitalization. It can be seen that the higher the market capitalization, the higher the ESG score. Next, examine the impact of market capitalization and ESG score on returns, using factor returns. Factor return is a measure of the difference in the average returns between the upper and lower quantiles of stock groups divided into multiple quantiles using different factors (e.g. market capitalization, ESG score.) Figure 2 shows the cumulative factor returns for market capitalization and FTSE ESG score for the constituents of the FTSE Japan All Cap Index. On a month-to-month basis, there are discrepancies, but on an average, they are highly correlated.

Figure 1. Relationship Between FTSE ESG Score and Market Capitalization (as of March 31, 2024)



(Note) Shows the average FTSE ESG score and market capitalization of each quintile of the constituents of the FTSE Japan All Cap Index
(Source) Prepared by GPIF based on data from FTSE and QUICK.

Figure 2. Factor Return for FTSE ESG Score and Market Capitalization (cumulative, December 31, 2019 to March 31, 2024)



(Note) Factor return is the difference between the FTSE ESG score and market capitalization of the first and fifth quintiles of the constituents of the FTSE Japan All Cap Index
(Source) Prepared by GPIF based on data from FTSE and QUICK.

Return Analysis With Size and ESG Factors Separated

As noted above, there is a strong correlation between, size and ESG factors, and it is not easy to understand how ESG factors contribute to returns when monitoring ESG index performance. Figure 3 shows the results of the return factor breakdown of the FTSE Blossom Japan Index by FTSE. The results of (1) in Figure 3 show that ESG factors contributed a substantial amount of 16.12% to the 19.45% excess return on the parent index of the FTSE Blossom Japan Index. However, the results of (2) show that size factor is also significantly positive and it is necessary to check the persuasiveness of the model and other aspects to make a comprehensive judgment in order to judge whether ESG factors had made a positive contribution. The use of these highly correlated factors causes multicollinearity[1], which is why the impact of size and ESG factors on returns cannot be measured simultaneously.

Figure 3. Return Factor Breakdown of the FTSE Blossom Japan Index by FTSE (December 31, 2015 to March 31, 2024)

(bps)

(1) ESG model	Industry	Value	Quality	Volatility	Momentum		ESG	Residual	Excess return
	-178	203	-158	-214	402		1,612	277	1,945
(2) Size model	Industry	Value	Quality	Volatility	Momentum	Size		Residual	Excess return
	-165	301	-92	-333	441	1,251		543	1,945
Difference ((1)-(2))	-13	-98	-66	119	-39	-1,251	1,612	-266	0

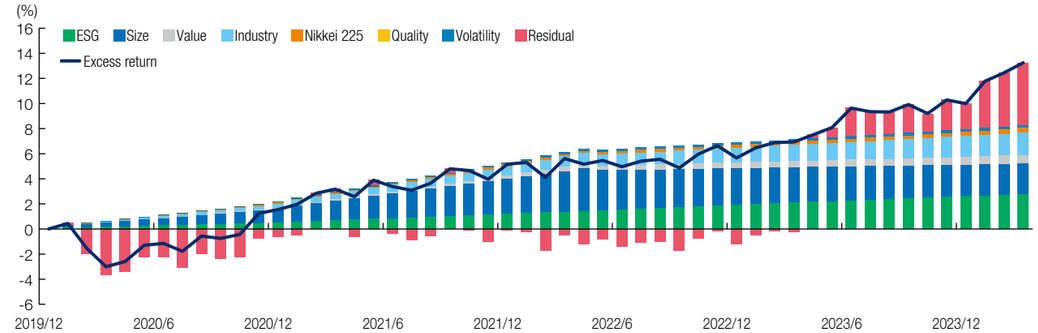
(Note 1) (1) ESG model breaks down returns to the six listed factors.
(Note 2) (2) Size model uses size factors instead of ESG to control the multicollinearity issue.
(Source) Prepared by GPIF based on data from FTSE.

Accordingly, after many discussions with FTSE, we conducted an analysis using two-stage OLS[2], a method in which contributions to the return are broken down after separating the amount of exposure of size and ESG within the stocks in question (Figure 4.) It should be noted that, in addition to differences in the analysis period, there are differences in the constituent factors; however, the ESG factors showed a consistently positive contribution to the return. We will continue discussions with index providers on analytical methods to improve our ESG investment efforts.

Figure 4. FTSE Blossom Japan Index Excess Return Factor Breakdown (December 31, 2019 to March 31, 2024)

(bps)

Industry	Nikkei 225	Value	Quality	Volatility	ESG	Size	Residual	Excess return
179	33	71	3	23	281	240	495	1,325



(Note 1) Excess return is the return compared to the parent index (FTSE Japan All Cap Index).
(Note 2) Calculations are based on monthly data, thus there is minor error compared to actual index returns.
(Source) Prepared by GPIF based on data from FTSE and QUICK.

[Reference] Factor Models

A factor model is a statistical model that expresses returns by multiple factors based on the assumption that the return of a risk asset is determined by factors common to that asset. Using equities as an example, typical factors include size (market capitalization,) value (the degree to which stocks are undervalued,) and quality (financial soundness.) A factor model breaks down returns and risks for selected factors that cause variation in returns across all equity assets. Typical factor models include the Fama–French model and the Barra model provided by MSCI as a risk monitoring tool.

1 The problem of reduced model accuracy and reliability of analytical results when strong correlations exist between variables
2 A method in which size and ESG exposures are estimated in advance, and the holdings of other factors are regressed by the model using actual data

Measuring the Effects of Stewardship Activities and ESG Investment Project

GPIF conducts evaluation project using statistical methods such as causal inference to examine the effects of its stewardship activities and ESG investment. The project has four themes, and each of them are implemented in collaboration with external consultants and academia. In fiscal 2023, we implemented "Evaluation Project on the Effects of Engagement" and published the report.

Measuring the Effects of Stewardship Activities and ESG Investment Project

Stewardship activities and ESG investment require a long period of time 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.

After an appropriate period had passed since the start of our stewardship and ESG investment initiatives and sufficient data has been accumulated, we collaborated with external consultants and academic researchers 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,) from fiscal 2023 to fiscal 2024.

In fiscal 2023, we implemented "Evaluation Project on the Effects of Engagement" and posted the report on our website. Please see the following pages for the summary of the analysis results.

We will publish the analysis results of remaining three projects as they are completed. 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	Evaluation of the Effects of Engagement [published]	Study on the causation between the engagement and improvement of ESG performance/corporate value
	Analysis 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
Evaluation of the effects of ESG investment	Study on ESG factors contributing to the improvement of corporate value and investment return	Study on causation between ESG factors and improvement in corporate value/investment return
	Evaluation of the effects of passive equity investment based on ESG indexes	Analysis of the effects of ESG investment on corporate behavior

(Note) The specific analysis content may change as a result of further consideration.

Topics

Evaluation Project on the Effects of Engagement

— Project Overview and Analysis —

As a result of this analysis, for example, engagements on "Climate Change" produced improvements in setting of decarbonization targets, directly linked to the theme of the dialogue, as well as corporate value indicators such as PBR. Additionally, engagement on "Board structure, Self-evaluation" resulted in an increase in the number of independent outside directors as well as improvement in market capitalization, Total Shareholder Return, and other investment return indicators, demonstrating that engagement is contributing to sustainable market growth.

1. Introduction

GPIF has made many ongoing efforts to promote constructive dialogue (engagement) between asset managers and investee companies, by adopting engagement-enhanced passive investment etc. As part of these efforts, since fiscal 2017, we have required our external asset managers for equities to submit records of their engagement with companies. To understand the status of engagement activities by external asset managers for domestic equities and evaluate its effects, we conducted the "Evaluation Project on the Effects of Engagement" based on their records of engagement, and published the results in May 2024.

The scope of the project's analysis was limited to the engagement activities of GPIF's external asset managers. However, given that many of them are major institutional investors that invest in domestic equities, analysis of the effects of their engagement can provide an overall picture of engagement activities in Japan. The outline of our analysis result of the project is as follows.[1]

Objective of the project and scope of analysis

The objective of the project is to identify how the engagement activities of asset managers lead to behavioral changes in the companies they engage with, resulting in improved ESG performance, corporate value, and ultimately, investment returns (Figure 1.) Engagement activities are generally conducted in a private setting between the asset managers and the company; usually, only those involved know the actual status of the engagement activities. However, our records of asset managers' engagement enable us to analyze the status and effects of engagement activities. We utilize and demonstrate statistical causal inference methods by using various indicators (i.e., financial and share price indicators, ESG scores, specific ESG factors such as GHG emissions reduction targets, the percentage of female board members) and regarding 26,792 engagements covering 48,077 themes in total, by 21 funds of GPIF's external asset managers entrusted with domestic equity investment (Figure 2) conducted from fiscal 2017 to fiscal 2022 (In fiscal 2022, until the end of December, same as below.) This analysis is the first of its kind in Japan in terms of the number of funds and engagements covered, since the verification of engagement effects by institutional investors had been limited to a small number.

1 This section summarizes the report on the "Evaluation Project of the Effects of Engagement", but omits the analysis of investment style (active, passive) and the analysis of market capitalization of target companies due to space limitations. (https://www.gpif.go.jp/en/investment/esg_stw_project/project_report-1.html)
Likewise, some charts and tables may be shown partially. Please refer to the report for complete analysis results, data definitions and sources.

Figure 1. Image of the Effects of Engagement

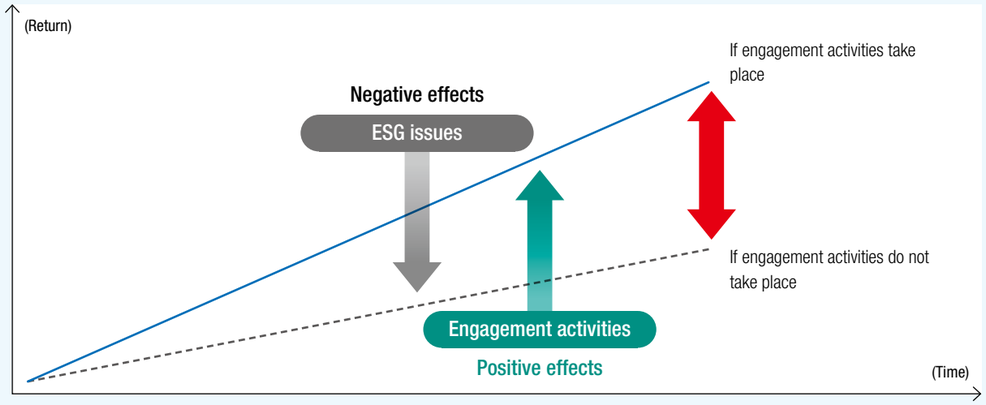


Figure 2. List of Funds (Asset Managers) Included in the Analysis

1	Asset Management One Co., Ltd. (Active 1)
2	Asset Management One Co., Ltd. (Active 2)
3	Asset Management One Co., Ltd. (Passive)
4	Eastspring Investments Limited*
5	Invesco Asset Management (Japan) Limited
6	Capital International K.K.
7	Goldman Sachs Asset Management Co., Ltd.*
8	Schroder Investment Management (Japan) Limited
9	Taiyo Pacific Partners LP○*
10	Dimensional Fund Advisors L.P.○*
11	Nikko Asset Management Co., Ltd*
12	Nomura Asset Management Co., Ltd.
13	FIL Investments (Japan) Limited
14	BlackRock Japan Co., Ltd.
15	Sumitomo Mitsui DS Asset Management Company, Limited
16	Sumitomo Mitsui Trust Asset Management Co., Ltd.
17	Mitsubishi UFJ Trust and Banking Corporation
18	Lazard Japan Asset Management K.K.
19	Russell Investments Japan Co., Ltd.
20	Resona Asset Management Co., Ltd.
21	JPMorgan Asset Management (Japan) Limited*

(Note 1) Circles (○) indicate funds that have been recommissioned; asterisks (*) Funds that have been already withdrawn as of March 31, 2023.
(Note 2) Engagement records are submitted company-by-company in some cases and fund-by-fund in others.
(Note 3) Listed in an alphabetical order.

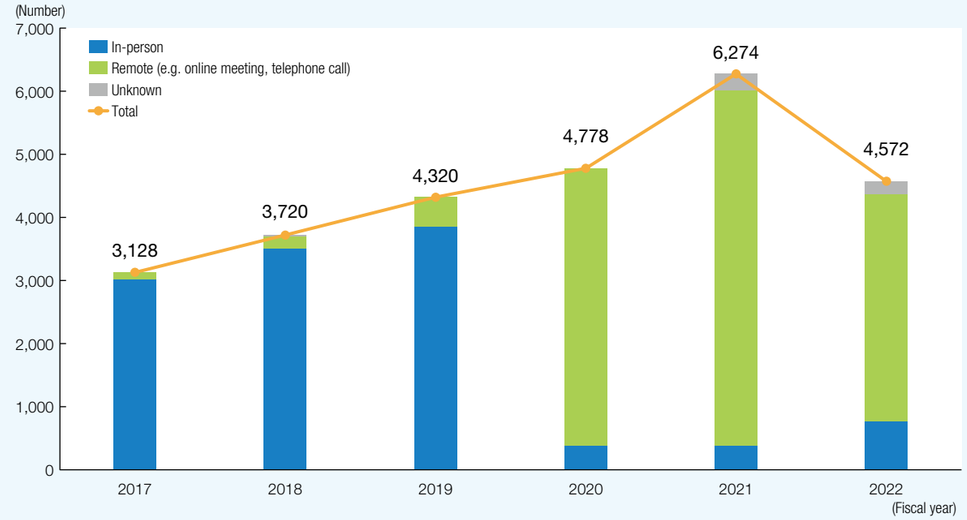
2. Descriptive Analysis of Engagements

In this section, we describe the status of engagement activities by organizing and analyzing engagement records of our external asset managers from various angles.

The number of engagements has trended upward each year since fiscal 2017. The data show that engagement activities continued throughout the COVID-19 pandemic by switching from in-person to online meetings (Figure 3.)

Next, we sorted engagements into 38 themes and checked the percentages for each fiscal year (Figure 4.) While the percentages of B1: Management & Business Strategies and G1: Board Structure, Self-evaluation were consistently high, E1: Climate Change, have increased in the past several years, while G5-1: Takeover Defenses has decreased since fewer companies deploy such steps.

Figure 3. Number of Dialogues



(Note 1) Number of Dialogues by GPIF's 21 external asset managers for domestic equity with Japanese companies
(Note 2) The data of Fiscal 2022 is through the end of December.

Figure 4. Changes in the Ratio of Respective Themes in All Dialogues (Selected Themes)

(Fiscal year, %)

Theme	2017	2018	2019	2020	2021	2022
B1: Management & Business Strategies	16.8	11.6	12.2	12.7	13.5	18.0
B2: Financial Strategies	6.2	6.1	3.6	4.3	4.5	6.7
B3: Shareholders' Meeting-related Matters	9.9	5.2	2.6	3.2	2.8	3.8
B4: Human Capital	1.6	2.8	2.0	1.4	3.1	3.9
E1: Climate Change	1.6	5.2	6.8	10.3	12.8	13.3
E7: Environmental Opportunities	0.6	0.8	1.0	1.8	2.0	1.7
G1: Board Structure & Self-evaluation	12.9	14.2	17.7	15.5	14.6	11.2
G3: Capital Efficiency	6.0	5.6	4.6	3.7	5.0	5.7
G4-1: Cross-shareholdings	1.4	2.5	3.8	4.7	2.8	2.7
G5-1: Takeover Defenses	4.1	3.3	2.6	1.4	0.9	0.8
G5-2: Remuneration	1.9	2.5	2.6	1.7	2.1	1.3
ES1: Supply Chain	0.8	1.2	1.3	2.2	2.5	1.7
SG1: Diversity	2.9	3.6	3.9	4.7	4.0	3.7
ESG1: Disclosure	11.2	5.1	4.9	4.4	7.2	7.7
ESG2: Misconduct	3.3	3.7	3.7	1.9	1.5	0.9

(Note 1) Selected major themes among the 38 dialogue themes. Thus, the totals do not add up to 100%.

The top themes of dialogue across all industries were “G1: Board Structure & Self-evaluation,” “B1: Management & Business Strategy,” and “E1: Climate Change” (Figure 5.) Specifically, in high-GHG emission sectors such as Energy Resources, Steel & Nonferrous Metals, and Electric Power & Gas, “E1: Climate Change” is ranked first, indicating engagements are conducted based on materiality (importance.)

Figure 5. Ratio of Engagement by Themes (by Industry)

	First	(%)	Second	(%)	Third	(%)
Foods	G1: Board Structure & Self-evaluation	12.4	B1: Management & Business Strategies	12.0	G5-3: Corporate Governance (Others)	8.1
Energy Resources	E1: Climate Change	33.5	B1: Management & Business Strategies	13.8	G1: Board Structure & Self-evaluation	11.7
Construction & Materials	G1: Board Structure & Self-evaluation	14.2	B1: Management & Business Strategies	11.9	G5-3: Corporate Governance (Others)	9.8
Raw Materials & Chemicals	G1: Board Structure & Self-evaluation	14.8	B1: Management & Business Strategies	12.5	E1: Climate Change	9.6
Pharmaceutical	B1: Management & Business Strategies	16.5	G1: Board Structure & Self-evaluation	11.6	G5-3: Corporate Governance (Others)	11.0
Automobiles & Transportation Equipment	G1: Board Structure & Self-evaluation	15.4	B1: Management & Business Strategies	13.1	E1: Climate Change	12.3
Steel & Non-ferrous Metals	E1: Climate Change	16.1	G1: Board Structure & Self-evaluation	15.4	B1: Management & Business Strategies	13.5
Machinery	G1: Board Structure & Self-evaluation	14.7	B1: Management & Business Strategies	11.9	G5-3: Corporate Governance (Others)	9.6
Electric Appliances & Precision Instruments	B1: Management & Business Strategies	16.4	G1: Board Structure & Self-evaluation	14.7	G5-3: Corporate Governance (Others)	10.6
IT, Services & Others	B1: Management & Business Strategies	15.6	G1: Board Structure & Self-evaluation	15.6	G5-3: Corporate Governance (Others)	10.0
Electric Power & Gas	E1: Climate Change	29.6	G1: Board Structure & Self-evaluation	15.1	B3: Shareholders’ Meeting-related Matters	10.5
Transportation & Logistics	G1: Board Structure & Self-evaluation	14.5	B1: Management & Business Strategies	14.5	E1: Climate Change	14.3
Commercial & Wholesale Trade	G1: Board Structure & Self-evaluation	14.4	E1: Climate Change	13.3	B1: Management & Business Strategies	13.3
Retail Trade	B1: Management & Business Strategies	14.3	G1: Board Structure & Self-evaluation	14.3	ESG1: Disclosure	7.6
Banks	B1: Management & Business Strategies	14.5	G1: Board Structure & Self-evaluation	12.9	G3: Capital Efficiency	10.0
Financials (Ex Banks)	G1: Board Structure & Self-evaluation	18.1	B1: Management & Business Strategies	15.2	E1: Climate Change	8.2
Real Estate	G1: Board Structure & Self-evaluation	16.8	B1: Management & Business Strategies	15.1	G5-3: Corporate Governance (Others)	7.8

(Note) Sectors from TOPIX-17 Series.

We also analyzed who participated from the companies in the engagement with asset managers (Figure 6.) The number of participations by chairman / CEO has been increasing each year, especially in engagements with active funds. Additionally, although participation of outside directors in the engagement remains low, it has been increasing regarding passive funds each year.

Next, we checked who participated from the companies in the engagement on each theme. The participation of chairman / CEO is high when the engagement theme is “B1: Management & Business Strategies,” and for outside directors, “G1: Board Structure & Self-evaluation” theme is high (Figure 7).

Figure 6. Percentage of Engagements by Highest-Level Participant on the Company Side

	(Fiscal year, %)	2017	2018	2019	2020	2021	2022	Entire period
Chairman / CEO	Passive	12.5	11.6	12.3	13.4	15.9	16.2	13.9
	Active	17.8	17.1	17.4	19.8	17.1	22.3	18.7
	Overall	13.6	12.7	13.4	15.4	16.2	17.9	15.1
Board member / Executive officer	Passive	32.8	35.3	39.2	36.0	36.8	36.1	36.2
	Active	41.5	41.4	40.1	32.8	37.7	34.3	37.2
	Overall	34.6	36.6	39.4	35.0	37.1	35.6	36.5
General manager	Passive	22.8	23.6	20.2	24.6	20.9	21.2	22.1
	Active	16.5	16.1	15.9	24.8	23.3	22.2	20.9
	Overall	21.4	22.0	19.2	24.6	21.6	21.5	21.8
A position lower than general manager	Passive	31.2	28.8	27.3	23.8	24.1	24.5	26.2
	Active	22.8	25.3	26.2	21.6	21.2	20.7	22.5
	Overall	29.4	28.0	27.1	23.1	23.3	23.4	25.3
Outside director	Passive	0.8	0.7	1.0	2.3	2.3	2.0	1.6
	Active	1.3	0.1	0.4	1.0	0.7	0.6	0.7
	Overall	0.9	0.6	0.9	1.9	1.8	1.6	1.4

Figure 7. Engagement Themes by Highest-Level Participant on the Company Side

(%)

Theme	Chairman / CEO	Board member / Executive officer	Outside director	General manager	A position lower than general manager
B1: Management & Business Strategies	22.4	14.2	17.2	11.5	11.2
B2: Financial Strategies	5.5	5.3	2.2	5.3	4.4
B3: Shareholders’ Meeting-related Matters	2.8	4.0	3.2	3.3	5.4
B4: Human Capital	3.7	2.6	2.6	2.4	1.8
E1: Climate Change	7.0	8.7	3.4	11.6	10.7
G1: Board Structure & Self-evaluation	12.9	15.5	23.9	14.6	13.1
G3: Capital Efficiency	6.4	5.1	1.8	4.2	4.9
G4-1: Cross-shareholdings	1.3	3.2	1.6	4.3	3.2
G5-1: Takeover Defenses	1.0	2.2	3.1	1.8	1.7
G5-2: Remuneration	1.4	2.1	4.0	2.0	1.9
G5-3: Corporate Governance (Others)	10.1	9.3	22.4	8.1	7.7
SG1: Diversity	3.2	3.8	2.9	3.9	4.3
ESG1: Disclosure	6.0	5.8	2.3	6.6	7.8
ESG 4: Others	3.8	3.8	3.5	5.5	6.5

(Note 1) Only major themes are listed. Thus, the totals for each column do not add up to 100%.

3. Analysis of the Characteristics of Engagement Target Companies

Next, we identify the characteristics of companies that asset managers select as engagement partners using Probit analysis. Specifically, we assign the probability of a company receiving an engagement as an explained variable, and various factors considered when selecting an engagement partner (e.g. company size, financial soundness, shareholder composition, ESG ratings)[2] as explanatory variables. Then, we conduct a regression analysis[3] to estimate partial regression coefficient β for each explanatory variable. This elucidates the impact of each explanatory variable on the probability of a company receiving an engagement, for example the characteristics of a company that is more likely to receive an engagement. When β is positive, there is a positive correlation between the variable and the probability of a company receiving an engagement; when β is negative, the correlation is negative.

Figure 8 shows the results of this analysis. Overall, companies are more likely to receive engagements when their size are larger (higher total assets,) their controlling company hold less equity, and their disclosures are proactive (i.e. prepare integrated reports.)

Next, regarding characteristics for each engagement theme, targets for "G4-1: Cross-shareholdings" include companies with high cross-shareholding ratios (specified investment equity securities divided by net assets) as well as those with low net profit margin on sales, total asset turnover or financial leverage—in other words, low ROE. Additionally, the companies that are more proactive with addressing issues have higher chance of engagement; examples are the companies that have set decarbonization targets for "E1: Climate Change," and companies that prepare integrated reports for "ESG1: Disclosure."

Figure 8. Characteristics of Companies Likely to Receive Engagements (Probit Analysis)

(Explanatory variable)	B1: Management & Business Strategies	B2: Financial Strategies	B3: Shareholders' Meeting-related Matters	E1: Climate Change	G1: Board Structure & Self-evaluation	G3: Capital Efficiency	G4-1: Cross-shareholdings	S1: Human Rights & Communities	SG1: Diversity	ESG1: Disclosure
Natural Logarithm of Market Cap	0.13***	0.03	0.05	0.09*	0.13***	-0.04	0.06	0.12	0.16***	0.24***
Natural Logarithm of Total Assets	0.17***	0.33***	0.21***	0.25***	0.25***	0.36***	0.25***	0.14***	0.13***	0.08***
Average Equity Return Over 3 Years	0.35	0.17	0.11	0.82*	0.32	0.19	1.09**	1.08	0.08	0.09
Ratio of Shares Held by Controlling Company	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
Cross-Shareholding Ratio	-0.18	0.06	0.12	-0.24	-0.09	0.53***	1.90***	0.21	-0.17	-0.67***
Percentage of Independent Outside Directors	0.87***	0.38**	1.27***	0.24	0.35**	0.55***	0.19	0.42	0.30*	0.54***
Presence of Takeover Defense	-0.06	-0.08	0.20***	-0.07	0.13***	-0.08	0.14**	-0.07	-0.04	0.10**
Total Payout Ratio	0.00	0.00	0.00	0.00	0.00**	0.00	0.00	0.00	0.00	0.00
Net Profit Margin on Sales	-0.01***	-0.01**	0.00	-0.01**	0.00	-0.01**	-0.02***	-0.01	0.00	0.00
Total Asset Turnover	-0.05	0.00	-0.03	0.03	-0.05	-0.17***	-0.22***	-0.24**	0.15***	0.05
Financial Leverage	0.00	0.00	0.00	-0.01**	0.00	0.00	-0.03***	-0.02	-0.01**	-0.01*
Cash & Deposits / Total Assets	0.34**	0.50***	0.37**	-0.27	0.43***	0.37**	-0.37	-0.31	-0.04	0.17
Total Debts / Total Assets	0.06	-1.29***	-0.07	-0.13	-0.11	-1.37***	-0.72***	-0.11	-0.42***	-0.15
Presence of GHG Emissions Reduction Targets	0.20***	0.13**	-0.05	0.11**	0.03	-0.04	0.11*	-0.04	0.05	-0.02
Carbon Intensity (Scopes 1 & 2)	0.00**	0.00**	0.00	0.00***	0.00*	0.00	0.00	0.00	0.00	0.00**
Presence of Released Integrated Reports	0.14***	0.10**	0.14***	0.33***	0.24***	0.03	0.21***	0.03	0.29***	0.19***

(Note 1) ESG score-related and TOPIX by size and industry variables are omitted from the table.
(Note 2) The asterisks (*) in the figure indicate significance; *** stands for a significance level of 1%, ** for 5% and * for 10%.

2 Natural logarithm of market cap, FTSE ESG score, FTSE Pillar score (for each of E, S and G,) natural logarithm of total assets, average equity return over 3 years, ratio of shares held by controlling company, cross-shareholding ratio, percentage of independent outside directors, presence of takeover defense, total payout ratio, net profit margin on sales, total asset turnover, financial leverage, cash & deposits/total assets, total debts/total assets, presence of GHG emissions reduction targets, carbon intensity (Scopes 1 & 2,) presence of released integrated reports, TOPIX category (1–100, 101–500, 501–1000, Other), industry (17 industries)
3 For the regression function, please refer to the main text of the report.

4. Causal Analysis on the Effects of Engagement

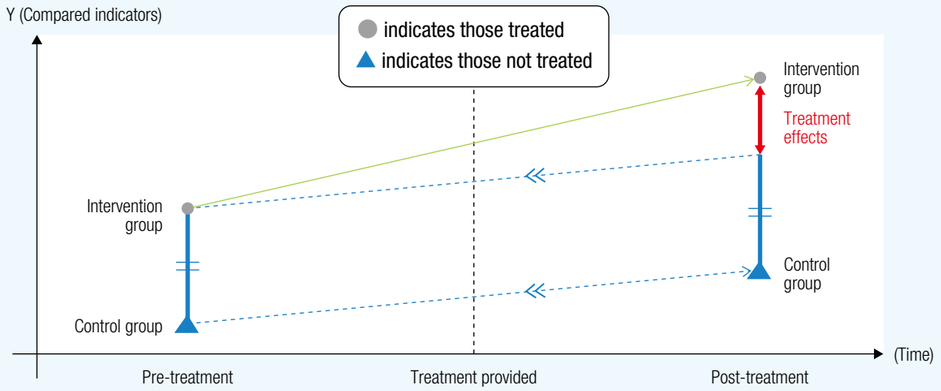
Methodology

We use the causal inference method PSM-DiD (propensity score matching-difference in differences) to analyze how the engagement activities of asset managers changed the behavior of the companies they engaged with, and how they changed each explained variable (KPI.)

PSM is a method of matching the characteristics of a group of companies that received engagements (the intervention group) with those that did not (the control group) using variables that affect the probability of receiving engagements, such as company size, financial soundness, profitability and shareholder composition.

The Difference-in-Differences (DiD) method extracts and measures only the effects of engagement (the treatment effects) by measuring the difference in change in KPIs before and after engagement for two groups of companies with similar characteristics except for whether or not they received engagements (Figure 9.)

Figure 9. Image of the Difference in Differences (DiD) Method



In order to analyze the impact of engagement on the explained variables: KPIs, we used the following regression function (Sun- Abraham estimator,) with the fixed effect for companies, which reflects the different characteristics of each company, and the fixed effect for fiscal years, which reflects shocks specific to the fiscal year. The base point of the analysis was set with the respective timing of first engagement.

$$Y_{it} = \alpha_i + \lambda_t + \sum_{k} \sum_{\ell \neq -1} \beta_{\ell,k} D_i\,[G_i=k]\,D_{it}[t-k=\ell] + \varepsilon_{it}$$

Y_{it} : Explained variable
α_i : Company fixed effects (baseline for each company)
λ_t : Fiscal year fixed effect (relevant fiscal year-specific shock)
$\beta_{\ell,k}$: Parameter to be estimated (difference between intervention and control groups ℓ years after intervention in fiscal year k)
$D_i[G_i=k]$: Dummy variable that takes the value of 1 when fiscal year k is the first year of intervention, and 0 otherwise
$D_{it}[t-k=\ell]$: Dummy variable that takes the value of 1 in the ℓth period since fiscal year k (when fiscal year k is the first year of intervention,) and 0 otherwise
ε_{it} : Error term (the sum of other effects not presented in the model)

Scope

When selecting engagement themes for causal analysis, we took into consideration that the volume of data should be sufficient, that appropriate KPIs could be set according to the themes and that there should be no bias in the target themes. We excluded engagement themes that included "Others" due to the difficulty of setting appropriate KPIs. We set ten themes in order of the number of engagements based on the assumption that at least one theme from each of B (Business,) E (Environmental,) S (Social) and G (Governance) should be included in the analysis. The explained variables to measure the effect of engagement were theme-specific KPIs related to the 10 engagement themes, as well as common KPIs[4] i themes (Figure 10.)

Additionally, we limited our analysis to the top 1,000 companies in TOPIX by market capitalization, from the perspective of securing a certain number of companies both engaged and not engaged and ensuring sufficient data for the KPIs.[5]

Figure 10. Ten Themes for Analysis and Theme-Specific KPIs

Theme	Theme-specific KPI
B1: Management & Business Strategies	Dividend payout ratio Total payout ratio Net cash ratio
B2: Financial Strategies	Dividend payout ratio Total payout ratio Net cash ratio
B3: Shareholders' Meeting-related Matters	FTSE Pillar score (G) % of independent outside directors # of independent outside directors
E1: Climate Change	FTSE Pillar score (E) Presence of GHG emissions reduction targets Carbon intensity (Scope 1) Carbon intensity (Scope 2) Carbon intensity (Scopes 1 & 2)
S1: Human Rights & Communities	FTSE Pillar score (S)
G1: Board Structure & Self-evaluation	FTSE Pillar score (G) % of independent outside directors
G1: Board Structure & Self-evaluation	# of independent outside directors % of female board members and statutory auditors % of female members in the Board of Directors
G3: Capital Efficiency	FTSE Pillar score (G) Dividend payout ratio Total payout ratio Net cash ratio
G4-1: Cross-shareholdings	FTSE Pillar score (G) Cross-shareholding ratio
SG1: Diversity	% of female board members and statutory auditors % of female employees in new hires % of female employees in the workforce Difference in average years of employment between male and female % of female managers in all management positions % of female members in the Board of Directors
ESG1: Disclosure	None

Assumptions and notes

The analysis in this report is based on data from fiscal 2017 onward, when we requested our external asset managers to submit detailed records of engagement. For this reason, it should be noted that, although we used the timing of the first engagement in fiscal 2017 or later as the base point, actual engagement may have taken place before fiscal 2016 and this impact is not take into account in the report. Additionally, cases in which PSM-DiD did not normalize pre-engagement KPI trends between the intervention and control groups (i.e. when prior trends remained) means that the characteristics of the two groups did not properly match despite the PSM, and these cases were excluded from the evaluation.

Results and commentary

Figure 11 is a summary of the results of the causal analysis conducted using the method described previously. Of the 102 cases with regression analysis, 76 were generally not statistically significant (p-value > 0.1,) and 11 were thus excluded from evaluation because of a prior trend. With a statistical significance level of 5% (p-value ≤ 0.05,) engagement had a positive impact on KPIs in 11 cases and a negative impact in 0 cases.

Looking at the six items with a significance level of 5% (p-value ≤ 0.05)[6] individually, regarding engagement on E1: Climate Change, indicators related to corporate value (e.g. PBR, Tobin's q) showed improvements, along with the setting of decarbonization targets, which is directly related to the theme. Additionally, in terms of engagement on "G1: Board Structure & Self-evaluation," indicators related to investment returns (e.g. PBR, natural logarithm of market cap, Total Shareholder Return) showed improvements along with in the number of independent outside directors. As a result, market capitalization of companies engaged in this theme increased by 6% compared to those that were not engaged. While this may seem small at first glance, the total market capitalization of the 256 companies that received engagements on this theme in fiscal 2017 was roughly ¥304 trillion (as of March 31, 2018,) accounting for 47% of the market capitalization of the TOPIX constituents at the time. Given that the market capitalization of engaged companies increased by an average of 6% over that of non-engaged companies, the impact is significant. It is also worth noting that engagement did not negatively impact KPIs in any cases.

Figure 11. Causal Analysis on the Effects of Engagement (Summary)

			Overall
W/o pre-trend	1% significance (0 < p-value ≤ 0.01)	Positive effect	5
		Negative effect	0
	5% significance (0.01 < p-value ≤ 0.05)	Positive effect	6
		Negative effect	0
	10% significance (0.05 < p-value ≤ 0.1)	Positive effect	4
		Negative effect	0
	No significance		76
With pre-trend			11
Total			102

Figure 12. Statistically Significant Engagement Themes and KPIs

Theme	KPI (Outcome)	Significance	Estimate
E1: Climate Change	Tobin's q	1%	0.07
	PBR	1%	0.11
	Presence of GHG emissions reduction targets	1%	0.08
	Carbon intensity (Scope 2)	1%	-5.29
G1: Board Structure & Self-evaluation	PBR	5%	0.11
	Natural logarithm of market cap	5%	0.06
	Total Shareholder Return	5%	3.80
	# of independent outside directors	5%	0.15
G3: Capital Efficiency	Total Shareholder Return	5%	3.68
G4-1: Cross-shareholdings	Cross-shareholding ratio	5%	-0.01
SG1: Diversity	Natural logarithm of market cap	1%	0.08

5. Summary of this Report

Records of past engagement by asset managers reveal that their engagement activities have become more active year by year, and that they tend to consider material issues of the target companies when they select the target company and the themes of engagement.

Additionally, "Causal Analysis on the Effects of Engagement" showed significant improvement of KPIs as a result of engagement. For example, engagement on "Climate Change" and "Board Structure, Self-evaluation" resulted in improvements in indicators related to corporate value and investment returns along with an increase in the setting of decarbonization targets and the number of independent outside directors. Notably, these ESG-themed engagements have led to improvements in indicators related to corporate value and return on investment, and their impact is in no way insignificant. As shown in the image in Figure 1, our analysis revealed that active engagement by asset managers likely made substantial contributions to overall market sustainability, corporate value and investment returns (i.e. improved market beta.)

We believe both asset owners and asset managers should continue their efforts to achieve more effective engagement activities.

4 There are a total of seven common KPIs: Tobin's q, PBR, natural logarithm of market cap, Total Shareholder Return, ROE, equity spread and FTSE ESG score
5 The report also includes analysis by company size (Large, Mid and Small.) See the section for the effects of engagement by company size.
6 Statistical significance of 1% (0 < p-value ≤ 0.01) and 5% (0.01 < p-value ≤ 0.05)

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. The process has involved a variety of new analyses; on this occasion, this included analysis of Scope 3 GHG emissions by category and the analysis of the relationship between green bond disclosures/impact and the greenium. It also covers trial analysis concerning natural risks and biodiversity, which are progressively becoming topics of debate in recent years.

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

In this Chapter 3 that discloses information in line with the TCFD recommendations, in addition to analysis of the carbon footprint and carbon intensity of the GPIF's portfolio, as in previous years, we also analyzed the GHG emissions reduction targets set by companies, green bond greeniums, Scope 3 GHG emissions[1] by category, and more. Moreover, as we did last year, we conducted 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 assigned MSCI, the Intercontinental Exchange Group (ICE) and FTSE to provide analytical support for our climate-related financial disclosures in line with TCFD recommendations, and conducted a multifaceted analysis leveraged the characteristics of each company's capabilities. In our analysis of the carbon footprint and carbon intensity of our entire portfolio, GPIF conducts evaluations based on the GHG emissions data provided by S&P Global (formerly Trucost,) which we have been using for some time.

Moreover, in the previous year, we conducted 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 MSCI. 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 limited options for managing these risks, and we have positioned our analysis in this report as a trial analysis mainly aimed at furthering our 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
Climate Value-at-Risk (CVaR) analysis	Equities / corporate bonds	MSCI
Green bond greenium analysis	Green bonds	ICE
Analysis of the status of GHG emissions reduction targets	Equities	MSCI
Analysis of Scope 3 GHG emissions by category	Equities	FTSE
Implied temperature rise analysis	Equities / corporate bonds	MSCI
TNFD trial analysis	Equities	MSCI

(Source) Prepared by GPIF based on various materials.

Highlights of Chapter 3

Our analysis in the 2023 ESG Report includes new and improved analysis, in addition to the analysis we have continued from previous years, such as the measurement of our carbon footprint. Here, we present two of the most noteworthy analyses.

The first is the green bond greenium analysis (page 71.) Last year, we analyzed ESG bonds for the first time to measure the impact created by projects financed by ESG bonds invested by GPIF. This time, we analyzed the green bond component of ESG bonds by expanding on last year's ESG Report to see whether third-party certification and disclosure of use of proceeds lead to greeniums[2], and whether the magnitude of the impact is related to greenium. Although it should be noted that the sample size was not large enough to determine statistical significance, the results indicate that third-party certification may have an influence on green bond prices. Additionally, disclosure of use of proceeds may have an influence on the price of green bonds denominated in dollars or euros (Figure 2.) However, we were unable to identify any trends in the relationship between greeniums and the level of impact.

The second noteworthy analysis is the analysis of Scope 3 GHG emissions by category (page 77.) This is a detailed analysis of the 15 categories of the GHG Protocol, the international standard for calculating and reporting GHG emissions, with respect to Scope 3 GHG emissions, for which it is considered for major listed companies in Japan soon to be required to disclose in compulsory. This analysis revealed that (1) despite some categories with high carbon intensity weightings differing by sector, the top two or three categories account for 70% to 90% of the total (Figure 3,) and (2) companies currently disclose Scope 3 data mostly for the upstream categories, and disclosure of GHG emissions from the highly weighted Category 11 (Use of sold products) has stalled. As the number of companies making Scope 3 disclosures for the first time or expanding the categories to be disclosed increases, it is likely to have a greater impact on changes in Scope 3 GHG emissions for the portfolio than changes in emissions from corporate activities. Therefore, when investors measure Scope 3 GHG emissions for their entire portfolio and monitor changes over time, they will need to combine both disclosed and estimated values for each category.

However, when disclosing Scope 3 emissions, given that disclosing figures in two or three important categories covers 70% to 90% of total Scope 3 GHG emissions for companies in any industry, companies should focus first and foremost on the most carbon intensive categories to make the disclosures more efficient and effective. In general, data vendors and investors tend to overestimate companies' Scope 3 GHG emissions, arriving at larger figures for emissions than the companies have. Therefore, it is important for companies to proactively disclose information to ensure that they are properly valued.

Figure 2. Relationship Between Third-Party Certification/Disclosures and Greeniums

Relationship between third-party certification and greeniums

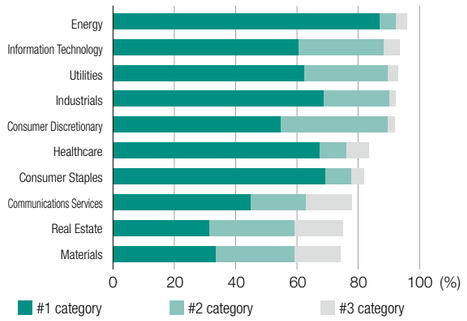
	Certified [a] (bps)	Not certified [b] (bps)	Greenium difference [a - b]
Dollar-denominated bonds	7.1	-4.6	11.6
Euro-denominated bonds	3.8	1.7	2.1
Yen-denominated bonds	0.6	-8.9	9.6

Relationship between disclosure of use of proceeds and greeniums

	Certified [a] (bps)	Not certified [b] (bps)	Greenium difference [a - b]
Dollar-denominated bonds	15.9	-9.3	25.2
Euro-denominated bonds	5.1	-4.1	9.2
Yen-denominated bonds	0.1	1.6	-1.5

(Source) Prepared by GPIF based on ICE data.

Figure 3. Carbon Intensity Weights in Top 3 Categories by Sector



(Note) Based on 2018 – 2022 carbon intensity disclosure data, the median value for each sector category was determined and weighted against the total.
(Source) Prepared by GPIF based on FTSE Russell GHG emissions data.

1 Scope 3 emissions are GHG emissions of the entire supply chain other than Scope 1 and Scope 2 emissions, which are an operator's own GHG emissions.
2 Greeniums are the premiums attached to green bonds. The term refers to the phenomenon in which green bonds are valued more highly (with lower yields) than ordinary bonds issued with the same conditions.

Analysis of Portfolio Greenhouse Gas Emissions — Characteristics of GPIF's Portfolio —

Industry sectors with high GHG emissions per unit of net sales

(Domestic equities)
Utilities
Materials
Energy

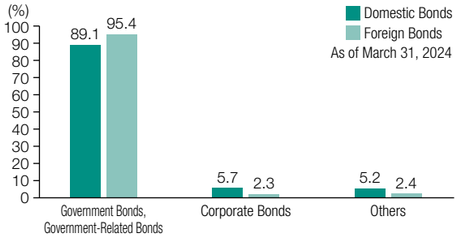
In Chapter 3, we measure the greenhouse gas emissions from the assets in GPIF's portfolio and conduct an analysis of the portfolio's climate change risks. As a preliminary step, this section presents the characteristics of GPIF's portfolio and our measurements of greenhouse gas emissions per million 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[1], as well as analyzing the physical risks[2] relating to the assets in GPIF's portfolio, using data as of March 31, 2024. The analysis mainly looks at four asset classes in GPIF's portfolio: domestic bonds, foreign bonds, domestic equities, and foreign equities. Additionally, this year we also attempted to analyze GHG emissions for our private equities portfolio among alternative assets.[3] 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, 2024, domestic bonds accounted for 26.95% of the total portfolio, foreign bonds for 23.86%, domestic equities for 24.33%, and foreign equities for 24.86%. The majority of bond holdings, both domestic and foreign, consist of government bonds and government-related bonds (Figure 1.)

Figure 1. Breakdown by Category in GPIF Bond Portfolio



(Note) "Others" includes securitized products.
(Source) GPIF

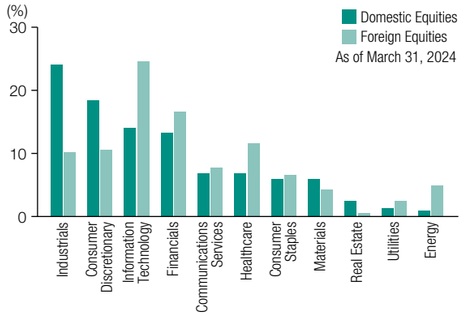
In GPIF's equities portfolio, there is a difference in the composition by sector between domestic equities and foreign equities. (Figure 2.) The domestic equities portfolio has a higher proportion invested in the relatively high-emitting industrials and consumer discretionary sectors, while the foreign 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. Regarding the calculation scope of GHG emissions, the analysis includes direct emissions by the company itself (Scope 1) and indirect emissions related to purchased electricity (Scope 2,) but does not include indirect emissions from procured products and services other than purchased electricity (Scope 3 upstream) or indirect emissions from the consumption and use of sold products and services (Scope 3 downstream) given the fact that we must mostly depend on model-based estimates because many companies do not disclose Scope 3 emissions (Figure 5.) For domestic equities, emissions are high in the utilities, materials and energy sectors. The same tendency can be observed in other asset classes as well. Since the utilities sector includes electric power companies, the materials sector includes chemicals and iron and steel manufacturers, and the energy sector includes oil and coal companies, these three sectors tend to emit higher GHG emissions than other sectors.

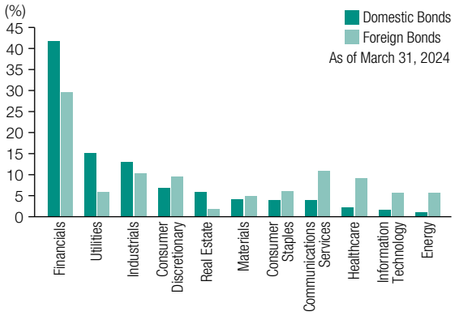
It is necessary to bear this sector characteristic in GHG emissions in mind when understanding the results of the analysis presented in the following sections. Around 90% of stock investments and 70% of bond investments by GPIF are passive investments, which means our investment is largely identical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

Figure 2. Breakdown of GPIF Equities Portfolio by Sector[4] Based on Total Market Value



(Source) GPIF

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



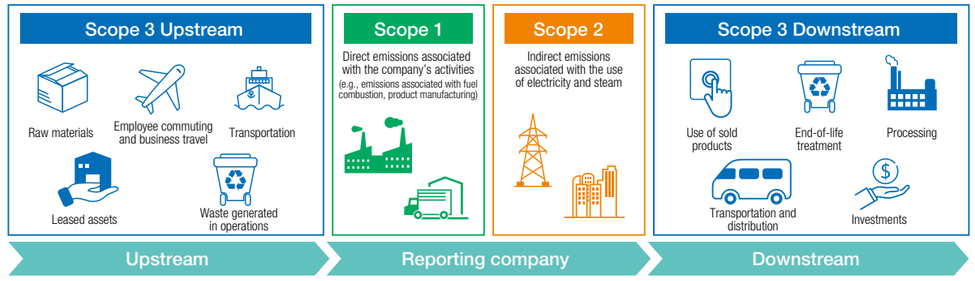
(Note) Only corporate bonds are analyzed. Bonds by unlisted companies are classified according to the sector of their parent company or equivalent.
(Source) GPIF

Figure 4. Greenhouse Gas Emissions per Million Yen of Sales (CO_2 Equivalent Tons)

	Utilities	Materials	Energy	Industrials	Consumer Staples	Information Technology	Consumer Discretionary	Healthcare	Communications Services	Real Estate	Financials
Domestic Equities	6.11	5.91	2.30	0.75	0.49	0.41	0.33	0.23	0.22	0.19	0.05
Foreign Equities	9.58	5.58	2.00	0.81	0.46	0.32	0.32	0.09	0.23	0.64	0.16
Domestic Corporate Bonds	13.68	6.42	2.68	1.27	0.39	0.66	0.30	0.32	0.25	0.29	0.08
Foreign Corporate Bonds	8.54	4.74	1.94	1.31	0.60	0.23	0.40	0.13	0.22	0.53	0.11

(Note 1) The calculation scope of greenhouse gas emissions includes Scopes 1 and 2. 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, 2024 (GHG emissions data is calculated from available data as of March 31, 2024.)
(Note 2) 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 2024

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.

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 1.46% 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.
4 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

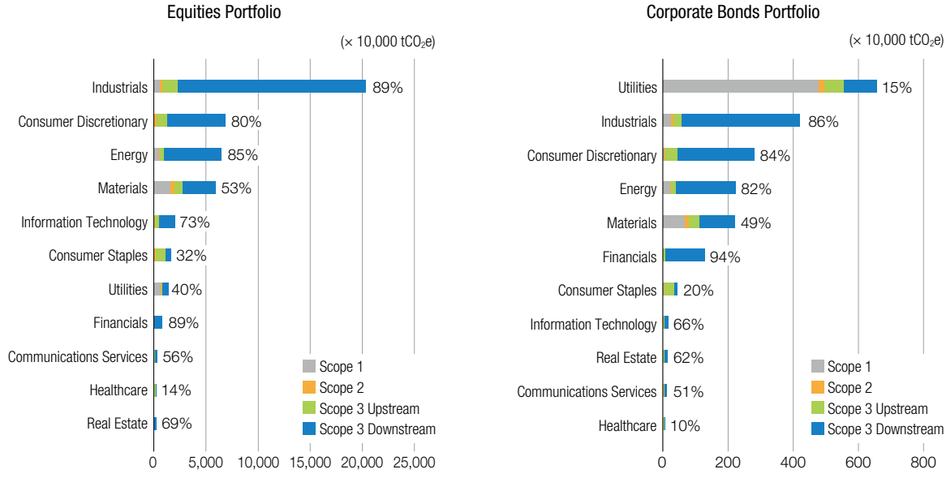
-3.8%

GPIF measures the greenhouse gas emissions (carbon footprint) of the companies held in our portfolio each year 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 greenhouse gas (GHG) emissions[1] for the equity and corporate bond portfolios at the end of FY2023 by sector and by scope. 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, energy, and materials 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. Additionally, for Scope 3, as in Figure 4 on page 64, trends from the past (Figure 3 on page 66, Figure 6 on page 67) are outside the scope.[2]

Figure 1. Greenhouse Gas Emissions by Scope



(Note 1) Available data as of March 31, 2024
(Note 2) 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 ©Trucost2024

Carbon Footprint (GHG Emissions) Analysis

Figure 2 shows the calculation of Scope 1 – 3 emissions for the equity and corporate bond portfolios as of the end of FY2023. 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 pages 63 – 64. 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. While domestic and foreign corporate bonds have increased over some periods since FY2016, both assets have trended downward in general, and are showing a decrease most recently as well. Foreign corporate bonds have declined especially significantly compared to other assets.

Figure 4 shows the main causes of the change in GHG emissions (Scope 1+2) from FY2022 to FY2023 by asset class. For example, for domestic equities, GHG emissions decreased by 1,250,000 t (-3.8%) YoY. We have analyzed the causes for this decrease 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 "compound factors," which represents other causes. Investee emissions were negative except for domestic corporate bonds, while portfolio weighting was negative for all assets, demonstrating that both were factors in decreasing GHG emissions, and that the recent major decrease in foreign corporate bonds was mainly due to portfolio weighting (see Figure 8 on page 68 for the carbon footprint and factor breakdown by sector for equity assets.)

Figure 2. Carbon Footprint by Scope

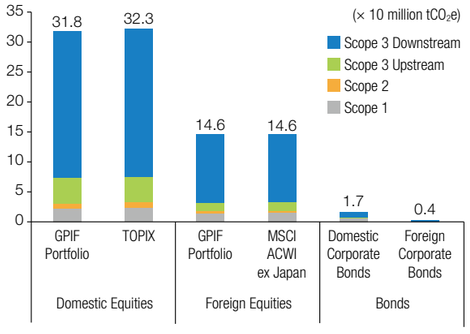
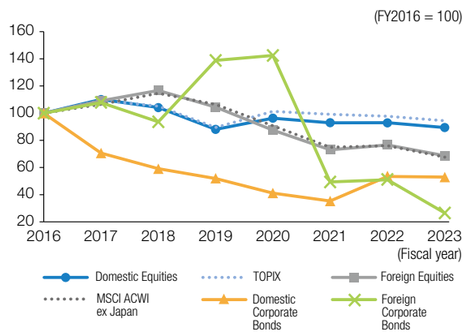


Figure 3. Carbon Footprint Trends



(Note) Available data as of March 31, 2024
(Note) 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 ©Trucost2024

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

(× 10,000 tCO2e)

	Domestic asset classes					Foreign asset classes				
	Emissions FY2023	Change in emissions due to				Emissions FY2023	Change in emissions due to			
			Investee emissions	Portfolio weighting	Compound factors			Investee emissions	Portfolio weighting	Compound factors
Equities	3,123	-125	-39	-117	+32	1,762	-202	-35	-175	+8
Corporate bonds	600	-5	+14	-15	-4	57	-53	-2	-52	+1

(Source) Prepared by GPIF based on data from S&P. S&P Global Sustainable1, S&P Trucost Limited ©Trucost2024

1 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.
2 For points to keep in mind when conducting aging analysis with respect to current status and Scope 3 emissions, please refer to "Current Status and Issues of Increasingly Prominent Scope 3 Disclosures" (page 77.)

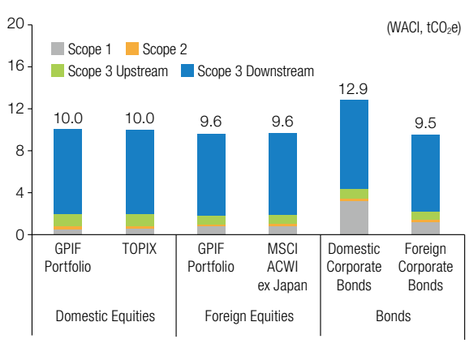
Carbon Intensity Analysis

Figure 5 measures Scope 1 – 3 carbon intensity for the equity and corporate bond portfolios at the end of FY2023. 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 a weighted average of GHG emissions per million yen of sales, according to the weight in the portfolio. By asset class, WACI was highest in the domestic corporate bond portfolio, with foreign corporate bonds 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. Although domestic corporate bonds increased substantially in FY2022, all other assets have trended downward in general since FY2016, and are showing a decrease most recently as well.

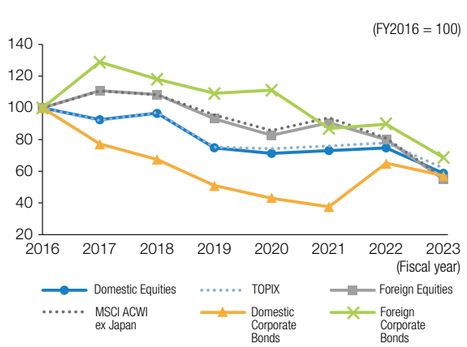
Figure 7 shows the main causes of the change in WACI (Scope 1+2) from FY2022 to FY2023 by asset class. We have analyzed the causes of this change in terms of "investee carbon intensity," which represents the change due to the carbon intensity (GHG emissions divided by net sales) of investee companies, "portfolio weighting," which represents the change due to the proportional weights of stocks and bonds in the portfolio, and "compound factors," which represents other causes. For all assets, investee carbon intensity account for a large share of the change in WACI, demonstrating that changes in GHG emissions per million yen of corporate sales are the main factor driving WACI downward (see Figure 9 on page 68 WACI and factor breakdown by sector for equity assets.)

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



(Note) Available data as of March 31, 2024

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



(Note) 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 ©Trucost2024

Figure 7. Analysis of Main Causes of Change in Carbon Intensity (By Asset Class)

(WACI, tCO_2e)

	Domestic asset classes					Foreign asset classes				
	WACI FY2023	Change in WACI due to	Investee carbon intensity	Portfolio weighting	Compound factors	WACI FY2023	Change in WACI due to	Investee carbon intensity	Portfolio weighting	Compound factors
Equities	0.80	-0.22	-0.19	-0.03	+0.00	1.00	-0.46	-0.39	-0.10	+0.03
Corporate bonds	3.46	-0.48	-0.52	+0.00	+0.03	1.43	-0.44	-0.46	+0.11	-0.09

(Source) Prepared by GPIF based on data from S&P. S&P Global Sustainable1, S&P Trucost Limited ©Trucost2024

Figure 8. Analysis of Main Causes of Change in Carbon Footprint (By Sector)

(× 10,000 tCO_2e)

	Emissions FY2023	Change in emissions due to	Investee emissions	Portfolio weighting	Compound factors	Emissions FY2023	Change in emissions due to	Investee emissions	Portfolio weighting	Compound factors
	Domestic Equities					Foreign Equities				
Energy	188	+52	+14	+29	+8	364	-24	-1	-22	-2
Materials	1,398	-260	-157	-99	-4	588	-100	-31	-70	+2
Industrials	697	+90	+58	+6	+26	133	-2	+6	-9	+1
Consumer Discretionary	212	-17	-8	-11	+3	55	+7	+5	+1	+1
Consumer Staples	135	-25	-17	-11	+2	69	-5	+3	-7	-1
Healthcare	36	-5	-1	-3	-1	16	-7	-5	-3	+1
Financials	8	-1	-0	-1	+0	23	-7	-2	-5	-0
Information Technology	117	+1	-0	+2	-0	55	-7	-1	-6	-0
Communications Services	30	-8	-4	-4	+1	19	-0	+3	-2	-1
Utilities	292	+52	-10	+65	-3	433	-56	-12	-50	+6
Real Estate	11	-4	-4	-1	+0	8	-0	+0	-1	+0

Figure 9. Analysis of Main Causes of Change in WACI (By Sector)

(WACI, $kgCO_2e$)

	WACI FY2023	Change in WACI due to	Investee carbon intensity	Portfolio weighting	Compound factors	WACI FY2023	Change in WACI due to	Investee carbon intensity	Portfolio weighting	Compound factors
	Domestic Equities					Foreign Equities				
Energy	23	-9	-11	+2	-0	126	-93	-84	-14	+5
Materials	287	-136	-116	-11	-10	237	-124	-84	-47	+8
Industrials	199	-30	-25	-11	+5	84	-36	-29	-9	+2
Consumer Discretionary	58	-7	-9	-0	+2	43	-18	-22	+8	-4
Consumer Staples	33	-16	-5	-11	+1	27	-15	-7	-9	+1
Healthcare	21	-6	-1	-5	+0	15	-8	-6	-3	+0
Financials	10	+3	-0	+3	+0	20	-10	-4	-6	+0
Information Technology	51	-6	-9	+4	-1	55	-11	-13	+1	+0
Communications Services	15	-5	-3	-3	+0	18	-1	-1	-0	-0
Utilities	101	-1	-9	+5	+3	361	-135	-137	-20	+22
Real Estate	6	-6	-2	-3	-0	15	-5	-3	-2	+1

(Source) Figures 8 & 9: Prepared by GPIF based on data from S&P. S&P Global Sustainable1, S&P Trucost Limited ©Trucost2024

Column Analysis of Private Equity Greenhouse Gas Emissions

In this analysis, we measured the GHG emissions by estimating the GHG emissions (sum of Scopes 1 through 3) of each private equity (PE) investee. For the estimation, we created a regression model for each sector in which GHG emissions are estimated from enterprise value (EV) (or sector median if EV is not present,) capitalizing on the fact that there is a certain positive correlation between EV and GHG emissions in listed companies (in this analysis, the constituents of MSCI ACWI IMI.) Figure 10 summarizes the estimated GHG emissions of each investee yielded by the sector-specific regression model, and the GHG emissions of the equity portfolio from Figure 1 on page 65 as a reference for comparison.

Figure. Estimated Private Equity Carbon Footprint

(× 10,000 tCO_2e)

	Private equity		(Reference) Equities portfolio	
	Constituent weight	Carbon footprint	Constituent weight	Carbon footprint
Energy	0.3%	3	2.9%	6,490
Materials	5.1%	24	5.1%	5,941
Industrials	15.9%	99	17.2%	20,327
Consumer Discretionary	10.5%	23	14.5%	6,873
Consumer Staples	6.6%	22	6.3%	1,689
Healthcare	14.6%	3	9.2%	249
Financials	7.8%	3	14.9%	819
Information Technology	33.8%	53	1.5%	2,060
Communications Services	4.0%	2	19.3%	302
Utilities	0.6%	1	7.3%	1,408
Real Estate	0.5%	0	1.9%	244
Total		232		46,403

(Note) Available data as of March 31, 2024
(Source) Prepared by GPIF based on data from S&P. S&P Global Sustainable1, S&P Trucost Limited ©Trucost2024

Financial Impact — CVaR Analysis —

Impact of climate change risks on GPIF's All equities portfolio

+1.4% to -9.3%

While addressing climate change risks imposes costs on companies, it is also expected to provide increased revenue opportunities as demand for environmental technologies grows. The impact of both on GPIF's all equities/portfolio indicates that prices could change from +1.4% to -9.3% under each scenario.

Analysis of Equities Portfolio Using Climate Value-at-Risk

This section uses Corporate CVaR[1] to analyze climate change risk to equities. CVaR is a metric for estimating the impact of climate change on corporate value in terms of policy risks (e.g. cost of reducing GHG emissions,) technology opportunities (e.g. revenue and profit from environmental technologies,) and physical risks and opportunities (damage from climate change) under various scenarios devised 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, and others. This report summarizes how GPIF's portfolio would be impacted under each of the NGFS scenarios.

Figure 1 shows the eight baseline scenarios. The eight baseline scenarios cover three major cases with temperature increases of +1.5°C, +2.0°C and +3.0°C, accounting for differences in factors such as the speed of policy introduction and technological change.

Figure 1. NGFS Climate Change Scenarios

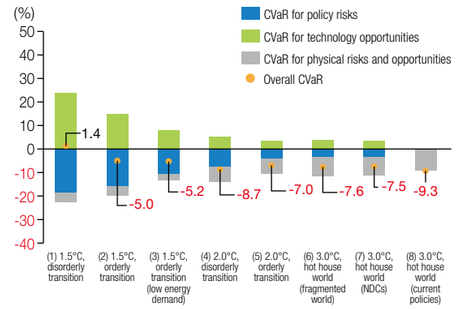
Baseline Scenario	Category	Scenario	Temperature Increase	Policy reaction	Technological Change
(1) 1.5°C, disorderly transition	Disorderly transition	Divergent Net Zero	+1.5°C	Immediate but divergent across sectors	Fast
(2) 1.5°C, orderly transition	Orderly transition	Net Zero 2050	+1.5°C	Immediate and smooth	Fast
(3) 1.5°C, orderly transition (Note)	Orderly transition	Low demand	+1.5°C	Immediate and smooth	Fast
(4) 2.0°C, disorderly transition	Disorderly transition	Delayed transition	+2.0°C	Delayed	Slow/Fast
(5) 2.0°C, orderly transition	Orderly transition	Below 2°C	+2.0°C	Immediate and smooth	Moderate
(6) 3.0°C, hot house world (fragmented world)	Transition delayed	Fragmented world	+3.0°C	Delayed and fragmented	Slow/ fragmented
(7) 3.0°C, hot house world (NDCs)	Hot house world	Nationally Determined Contributions (NDCs)	+3.0°C	NDCs	Slow
(8) 3.0°C, hot house world (current policies)	Hot house world	Current policies	+3.0°C	None (current policies)	Slow

(Note) Scenario assumes decline in energy demand due to reduced emissions, introduction of technology and behavioral changes
(Source) Prepared by GPIF based on data from MSCI.

In this section, we will examine the results of an analysis of CVaR by scenario for GPIF's equities portfolio as of March 31, 2024. The factors of CVaR by scenario in Figure 2 indicate that as we approach Net Zero 2050, policy risks grow more negative because corporate costs will increase due to the introduction of stricter environmental regulations, while physical risks and opportunities grow less negative because the physical impacts of climate change will be suppressed. Additionally, technology opportunities grow more positive due to increased revenue opportunities resulting from increased demand for environmental technologies to achieve net zero emissions. In sum, these three factors resulted in the only positive CVaR in the Divergent Net Zero scenario and the least negative CVaR in the Net Zero 2050 scenario.

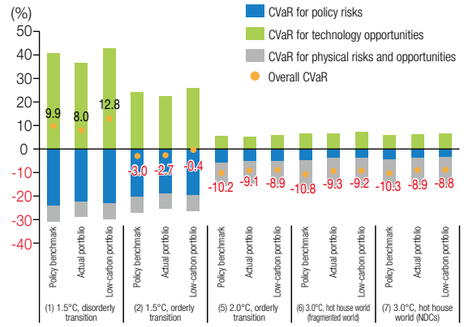
Next, Figure 3 presents the CVaR of three portfolios for domestic equities under the eight scenarios: (1) policy benchmark, (2) actual portfolio as of March 31, 2024 and (3) tilted portfolio (low-carbon portfolio,)[2] which accounts for carbon emissions. The results tend to be similar to those of the all equities portfolio discussed previously. As we approach Net Zero 2050, the increase in demand for environmental technologies offsets the negative impact of increased corporate costs on corporate value. Furthermore, when comparing the CVaR of the three portfolios, the tilted portfolio, which accounts for carbon emissions, was the best in all scenarios.

Figure 2. Impact on All Equities Portfolio



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

Figure 3. Impact on Domestic Equities Portfolio

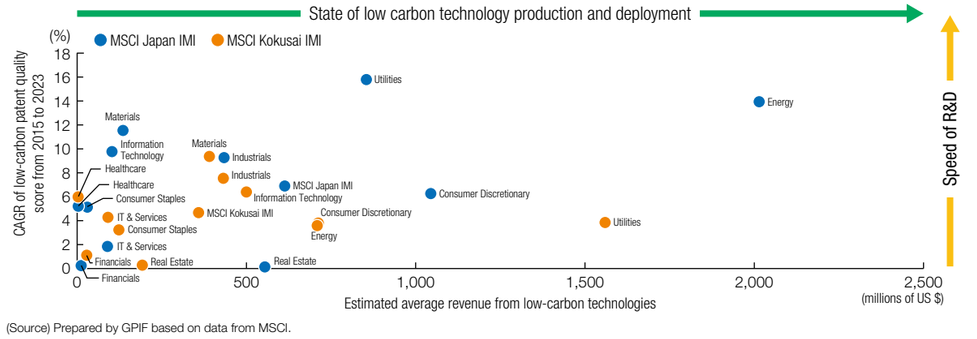


(Note) Omitted baseline scenarios (3) 1.5°C, orderly transition (low energy demand,) (4) 2.0°C, disorderly transition and (8) 3.0°C, hot house world (current policies.)
(Source) Prepared by GPIF based on data from MSCI.

Revenue Opportunities From Low-Carbon Technologies

As previous analyses have shown, the impact of climate change on corporate value demonstrates that cost increases due to policy and physical risks are offset by revenue from environmental technologies. Therefore, we turn our attention to the current status of revenues from low-carbon technologies. Figure 4 presents revenue from low-carbon technologies and the growth rate of low-carbon patents by industry for companies comprising the MSCI Japan IMI and MSCI Kokusai IMI indexes. In the domestic energy sector, the average patent growth rate is at a high level of 14%, and revenue from low-carbon technologies is the largest of all sectors at US $2 billion. As efforts toward a low-carbon society progress in the future, opportunities for earning revenue from low-carbon technologies should expand further.

Figure 4. Revenue from Low-Carbon Technologies and Patent Growth Rate by Sector



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

1 Climate Value-at-Risk (CVaR) is an analytical method of measuring how climate policy changes and disasters caused by climate change impact corporate value and security value. For details, please refer to the "2024 Analysis of Climate Change and Nature-Related Risks in the GPIF Portfolios," a report on MSCI's analysis for the preparation of this report.
2 Portfolio when invested in the S&P/JPX Carbon Efficient Index, one of the ESG indexes for domestic equities adopted by GPIF

Green Bond Greenium Analysis

Difference in greeniums between yen-denominated bonds with and without third-party certification

9.6 bps

We analyzed whether euro-, dollar-, and yen-denominated green bonds issued from 2021 to 2023 result in greeniums (green premiums) and the underlying factors thereof in terms of disclosures. The results showed that yen-denominated bonds with third-party certification at issue carried a greenium 9.6 bps higher than yen-denominated bonds with no certification.

What Are Greeniums?

A 2022 United Nations Development Programme paper[1] defines "greenium"[2] (a portmanteau of "green" and "premium") as "pricing benefits based on the logic that investors are willing to pay extra or accept lower yields in exchange for sustainable impact." When a green bond results in a greenium, the cost of financing the bond is reduced, allowing the issuing corporation to raise funds under more favorable conditions than ordinary bonds. Research on greeniums is ongoing against a backdrop of growing interest in sustainable investing. In the past several years, central banks, financial regulators, and other entities have joined financial and academic institutions in this research. Since studies use different analytical methods to identify greeniums and focus on different countries, markets (issue/circulation market) and time periods, it is not possible to reach a consensus on whether greeniums exist or the underlying factors thereof (Figure 1.) In this section, we go beyond the developmental analysis outlined in the "Measuring the Impact of Projects Funded Using ESG Bonds in GPIF's Portfolio" section of the 2022 ESG Report, focusing not only on whether greeniums exist, but also on how the following factors are related to greeniums: (1) whether third-party certification is obtained before issuance, (2) whether the use of the funds is disclosed, and (3) the amount of impact created by projects financed by the green bonds.

Figure 1. Leading Prior Studies on Greeniums

	Ehiers and Packer (2017)	Karpf and Mandel (2018)	Baker et al (2018)	Hachenberg and Schiereck (2018)
Market type	Issue	Circulation	Issue	Circulation
Scope	Euro & US	US Municapital	US Corporate & Municapital	Global
Method	Comparison	Blinder-Oaxaca decomposition	OLS	Matching
Time period	2014 – 2017	2010 – 2016	2010 – 2016	2015 – 2016
Greenium	-18 bps	+7.8 bps	-7.0 bps	-1.0 bps

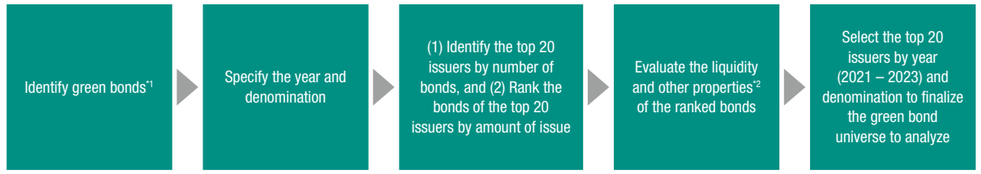
	Zerbib (2019)	Lanker and Watts (2020)	Flammer (2021)	Federal Reserve Board (2022)	European Securities and Markets Authority (2023)
Market type	Circulation	Circulation	Circulation	Issue	Circulation
Scope	Global	US Municapital	Global Corporate	Global	EEA & UK
Method	Matching	Matching	Matching	OLS	OLS
Time period	2013 – 2017	2013 – 2018	2010 – 2018	2014 – 2021	2021 – 2023
Greenium	-2.0 bps	+0.45 bps	-1.9 bps	-8.0 bps	No statistically significant difference

(Note) A negative greenium value means a greenium exists.
(Source) Prepared by GPIF based on "Verification of Greeniums in the Japanese Government Bond Market and Challenges for the Green Bond Market," Japan Securities Research Institute (page 47)

Approach to Greenium Analysis

In cooperation with ICE, we used the filtering method shown in Figure 2 to select 172 green bonds[3] (58 euro-denominated, 60 yen-denominated, 54 dollar-denominated) from those issued in each denomination between 2021 and 2023.

Figure 2. Procedure for Selecting Stocks to Analyze



*1 Bonds identified as green bonds in the ICE Sustainable Bond Universe; *2 Liquidity is evaluated based on the existence of market makers (companies tasked with providing liquidity for financial instruments) and daily price data on ICE Data Services.
(Source) Prepared by GPIF based on ICE data.

In this analysis, we used matching as the method of verifying greeniums. To identify differences in yields between ordinary and green bonds, we must pair and compare an ordinary bond and a green bond that have the same or similar properties such as issuer, denomination and time remaining to maturity. After referring to several prior studies and deciding to use the Z-spread[4] as the metric for verifying differences in yields, we set the matching conditions as described in Figure 3. Based on the assumption of an identical issuer and denomination, we used a nine-item scoring system with each item weighted equally. We performed this matching for 172 green bonds, pairing[5] 87 bonds (35 euro-denominated, 37 yen-denominated, 15 dollar-denominated) with ordinary bonds. The reason why there were fewer pairs of dollar-denominated bonds compared to yen- and euro-denominated bonds was that many dollar-denominated bonds did not meet the criteria for market maker presence (the liquidity metric.)[6]

Figure 3. Matching Conditions

Matching Condition	Rule	Score
Issuer	= (not accepted unless identical)	–
Denomination	= (not accepted unless identical)	–
Maturity date	X = Green bond maturity date - Ordinary bond maturity date X ≤ 6 months	1
	X > 6 months	0
Repayment order in capital composition	=	1
Repayment order	=	1
Callable bond	=	1
Puttable bond	=	1
Sinking bond	=	1
Convertible bond	=	1
Guarantee	=	1
Coupon type	=	1
	Total	9

(Source) Prepared by GPIF based on ICE data.

1 United Nations Development Programme, "Identifying the 'greenium'"
2 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.
3 Includes blue bonds and sustainability bonds.
4 A spread calculated so that the sum of the present value of the coupon and principal payments of the evaluated bonds, discounted at a rate equal to the spot rate estimated from the government bond yield curve at the time of each payment, plus a constant spread, equals the bond price.
5 Not always one-to-one matching; also includes some one-to-many matching.
6 For details, please refer to the "Analysis of Greeniums and Impact Assessment," a report on ICE's analysis for the preparation of this report.

Verifying Whether Greeniums Exist

Since the Z-spread is used to measure greeniums, we also checked whether we could obtain accurate daily values for the period from January 2021 to May 31, 2024, and verified the existence of greeniums for 79 bonds (32 euro-denominated, 36 yen-denominated, 11 dollar-denominated) out of the original 87. Then, we checked the accuracy of matching for these 79 bonds (Figure 4.) The difference in average coupon rates (green bonds minus ordinary bonds) was -0.01 percentage points and the difference in final yields (at issuance) was -0.02 percentage points, indicating that we were able to construct pairs of ordinary and green bonds with similar properties.

Figure 5 shows the results of verifying the existence of greeniums by denomination. Since the 79 bonds mentioned previously were not necessarily issued by the beginning of the period under analysis, the scope expands as the latter half of the analysis period approaches. Therefore, the certainty of the existence of greeniums is likely higher in the second half than in the first half. If we check the results of the analysis with this assumption understood, we see that greeniums fluctuate less the later in the period, and the average value gradually decreases and remains stable at the same time. We found the average greenium in the circulation market for the entire analysis period to be 3.40, 0.36, and -2.44 basis points for euro-, yen-, and dollar-denominated bonds, respectively.

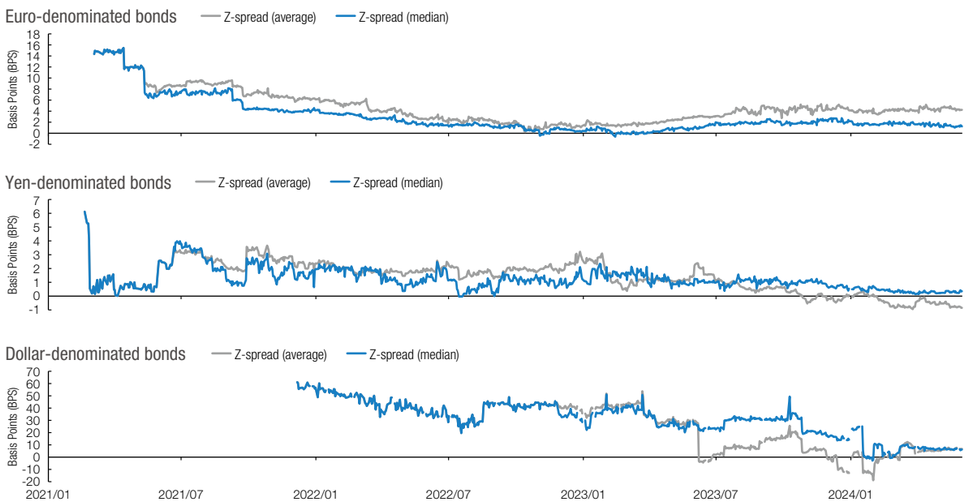
As mentioned in the introduction, it should be noted that the results vary depending on the method used to measure the greenium, the category of issuer targeted, and the time period.

Figure 4. Checking Matching Accuracy

Indicator	Type	Percentile					Average	Standard deviation	Number of bonds
		5%	25%	50%	75%	95%			
Coupon rate	Green bonds	0.00	0.15	0.70	2.06	4.63	1.36	1.53	79
	Ordinary bonds	0.00	0.33	0.85	2.05	3.82	1.37	1.28	73
Issue price	Green bonds	99.17	99.81	100.00	100.00	100.62	99.80	1.36	79
	Ordinary bonds	98.74	99.80	100.00	100.00	100.00	99.79	1.44	69
Final yield (at issuance)	Green bonds	0.02	0.29	0.97	2.07	4.63	1.43	1.50	79
	Ordinary bonds	0.19	0.48	0.98	2.05	3.88	1.45	1.23	69

(Note) The 79 green bonds were not always matched one-to-one with ordinary bonds, and were sometimes matched one-to-many; there were 73 ordinary bonds. Only bonds for which data exist for each indicator
(Source) Prepared by GPIF based on ICE data.

Figure 5. Greenium by Denomination (average and median)



(Note) When the line is above zero, a greenium exists.
(Source) Reproduced with permission from ICE.

Verifying the Factors Behind Greeniums

Finally, we analyzed the underlying factors of greeniums in terms of (1) whether third-party certification is obtained before issuance, (2) whether the use of the funds is disclosed, and (3) the amount of impact created by projects financed by the green bonds.[7] Figure 6 shows how many of the 79 bonds correspond to each of these three factors. We checked and calculated the greeniums attributable to each of the three factors and found that greeniums for euro- and dollar-denominated bonds with third-party certification before issuance and disclosure of use of funds were higher than those of bonds in all denominations without third-party certification or disclosure of use of funds. In contrast, although yen-denominated bonds demonstrated the same trend as the other denominations with third-party certification before issuance, the greeniums were higher when the use of funds was not disclosed than when it was (Figure 7.) Notably, our investigation of the third factor did not reveal any trend supporting the idea that the size of greeniums depends on the amount of impact created by the projects financed by the green bonds (Figure 8.)

In the past several years, there has been a worldwide crackdown on greenwashing, most prominently under the Sustainable Finance Disclosures Regulation (SFDR.) Green bonds and other ESG bonds are not exempt from scrutiny; investors will likely follow the trend of seeking more transparent financial instruments. Given these circumstances, the results of our analysis—which showed that investors value factors such as third-party certification, as well as control and reporting of the use of funds and tend to prefer green bonds with higher transparency—may incentivize issuers to implement additional measures when they issue ESG bonds. It should be noted that the number of bonds covered in our analysis is very small and has not yet been shown to be statistically significant. Additionally, using a different analytical approach would increase the scope of bonds to be analyzed, which could produce different results. We will continue our analysis of this topic.

Figure 6. Bonds Studied to Verify the Factors Behind Greeniums

	Bonds with verified greeniums	(1) Third-party certification obtained before issuance	(2) Use of funds disclosed	(3) Measurable amount of impact
Euro-denominated bonds	32	26	26	21
Yen-denominated bonds	36	34	29	28
Dollar-denominated bonds	11	2	3	3
Total	79	62	58	52

(Source) Reproduced with permission from ICE.

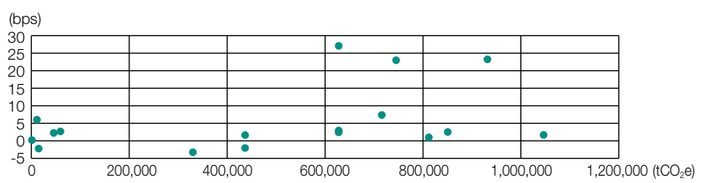
Figure 7. Verification of the Factors Behind Greeniums

	Third-party certification		
	Certified [a] (bps)	Not certified [b] (bps)	Greenium difference [a - b]
Euro-denominated bonds	3.8	1.7	2.1
Yen-denominated bonds	0.6	-8.9	9.6
Dollar-denominated bonds	7.1	-4.6	11.6

	Disclosure of use of funds		
	Disclosed [a] (bps)	Not disclosed [b] (bps)	Greenium difference [a - b]
Euro-denominated bonds	5.1	-4.1	9.2
Yen-denominated bonds	0.1	1.6	-1.5
Dollar-denominated bonds	15.9	-9.3	25.2

(Note) Average greenium during the period under analysis confirmed for each category.
(Source) Prepared by GPIF based on ICE data.

Figure 8. Verification of Avoided Emissions and the Amount of Greenium Impact (Ex: Euro-Denominated Bonds)



(Note) Avoided emissions (tCO_2e) and greenium (average greenium during the period under analysis)—the most widely available actual figures reported by the 21 euro-denominated bonds for which actual impact figures are available—are plotted on the x-axis and y-axis, respectively.
(Source) Prepared by GPIF based on ICE data.

7 Using the most recent impact figures disclosed by the issuers

Analysis of the Status of GHG Emissions Reduction Targets

Status of SBTi approved targets GHG emissions reduction targets

Japanese companies

18%

Continuing from last year, we ascertained the status of GHG emissions reduction targets set by Japanese and foreign companies. This year, we also newly checked the status of SBTi approved GHG emissions reduction targets. The results suggest that Japanese companies have relatively more room for improvement in setting science-based targets that are in line with the realities of emissions by scope.

Status of GHG Emissions Reduction Targets

In this section, we present the status of GHG emissions reduction targets set by Japanese companies[1] and foreign companies[2] (in developed markets.)[3] In compiling data for Figure 1, we examined (1) the percentages of value chain 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) "Sector Average of GHG Emissions by Scope" in Figure 1 indicates an overall trend toward a high percentage of Scope 3 emissions, but also different trends by sector, for example a high percentage of Scope 1 and 2 emissions for "Utilities" for both Japanese and foreign companies. In contrast, Panel (2) illustrates that companies are setting targets for Scope 1 and 2 emissions regardless of the percentage of GHG emissions by scope. Panel (3) shows that, as a result, sectors such as "Utilities," which have a large proportion of Scope 1 and 2 emissions, tend to have a high coverage rate, while other sectors tend to have a low coverage rate. From this, we infer that many companies have not set targets for Scope 3 emissions, in part because it is difficult to reduce them directly through their own efforts. [4]

One method for scientifically evaluating a company's stated GHG emission reduction targets is confirming whether it has obtained certification through the Science Based Targets Initiative (SBTi,) a joint initiative of the World Wide Fund for Nature (WWF,) CDP, World Resources Institute (WRI) and the UN Global Compact. To achieve the goal of limiting the increase in global average temperature to 1.5°C, SBTi supports and certifies companies in setting science-based targets for the extent to which and by when GHG emissions must be reduced.

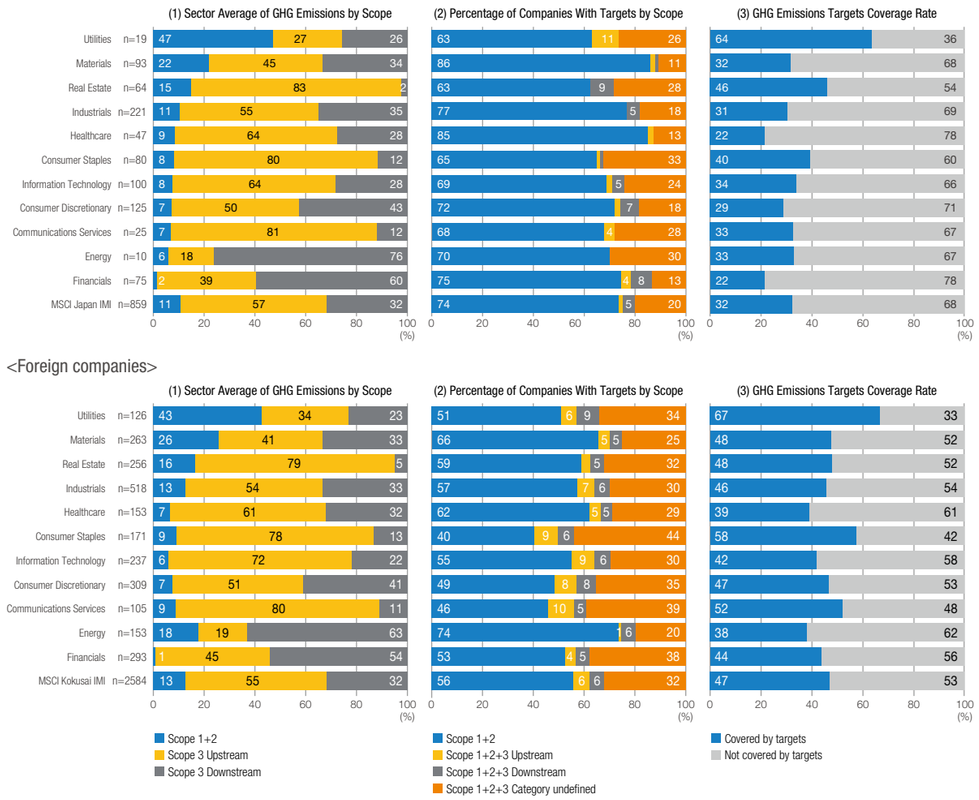
In addition to the status of GHG emissions reduction targets mentioned previously, this analysis also ascertains the status of SBTi-certified GHG emissions reduction targets. Figure 2 shows that a higher percentage of Japanese companies have set some kind of GHG emissions reduction target than foreign companies. Conversely, the percentage of GHG emissions reduction targets that are SBTi-certified is slightly lower for Japanese companies than for foreign companies. The analysis also confirmed that the percentage of SBTi-certified GHG emissions reduction targets is highly dependent on industry sector.

Based on the above data, apparent challenges for Japanese companies include (1) setting targets for Scope 3 emissions and (2) setting more SBTi-certified or otherwise science-based targets.

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.
3 For details, please refer to the "2024 Analysis of Climate Change and Nature-Related Risks in the GPIF Portfolios," a report on MSCI's analysis for the preparation of this report.
4 For more detailed analysis of Scope 3 emissions, please refer to pages 77 – 78.

Figure 1. Status of GHG Emissions Reduction Targets

<Japanese companies>



<Foreign companies>

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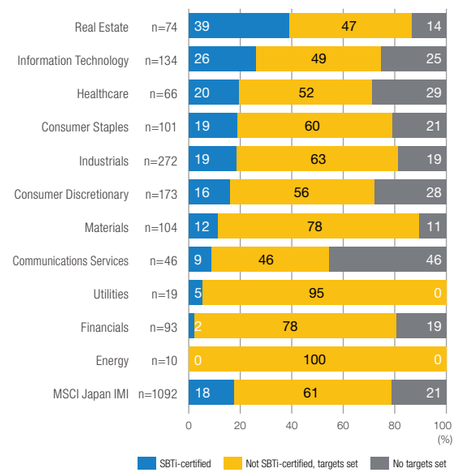
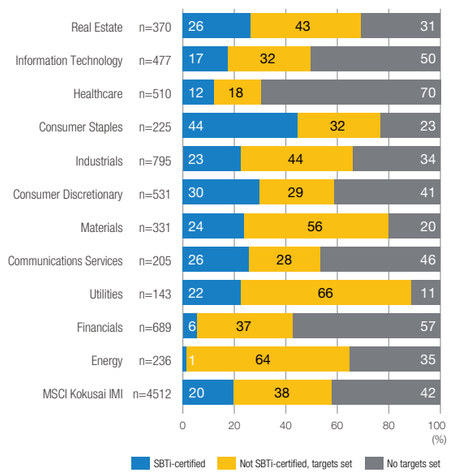
Figure 2. Status of SBTi-Certified GHG Emissions Reduction Targets

<Japanese companies>



<Foreign companies>



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Current Status and Agenda of Increasingly Prominent Scope 3 Disclosures

Japanese companies with Scope 3 disclosures (large-/mid-cap)

2022

65.2%

In anticipation of the full-scale introduction of the IFRS Sustainability Disclosure Standards, there is increasing focus on Scope 3 GHG emissions. Although many Japanese companies have begun to disclose information about Scope 3 emissions, there has been no progress toward disclosures for downstream categories of Scope 3 emissions, for example GHG emissions from the use of sold products.

Increasingly Common Disclosure of Scope 3 GHG Emissions

In March 2024, the Sustainability Standards Board of Japan (SSBJ) published an exposure draft of a domestic standard for sustainability disclosures based on the two Sustainability Disclosure Standards of the International Sustainability Standards Board (ISSB) ("General Requirements for Disclosure of Sustainability-related Financial Information (IFRS S1)" and "Climate-related Disclosures (IFRS S2)".) Comments will be solicited until the end of July 2024, and the standards are expected to be finalized by the end of March 2025. As considerations currently stand, disclosing sustainability information based on this standard would then become mandatory for listed companies in stages, depending on their size.

One of SSBJ's proposed climate-related standards that has drawn particular attention is the disclosure of Scope 3 GHG emissions. Scope 3 GHG emissions are "all indirect GHG emissions related to a company's business other than Scope 1 and 2 emissions, from the production of raw materials to the use and end-of-life treatment of sold products, business travel, employee commuting, and the like." They are classified into 15 categories under the GHG Protocol, including emissions both upstream and downstream of a company's business activities (Figure 1.)

Although Scope 3 GHG emissions are generated outside of a company's direct control, they are considered to be a significant climate change risk that could have a substantial impact on future business continuity. Companies with large downstream GHG emissions (emissions from the use of their products,) such as those in the energy industry, may experience a significant decrease in demand due to stricter regulations and taxation, or their products may become less competitive when low-carbon alternatives are introduced to the market. In contrast, companies with low-carbon technologies may enjoy competitive advantages, and some are calling for this phenomenon to be recognized as avoided emissions.[1]

Additionally, companies that rely on carbon-intensive raw materials and production equipment may face substantial future cost increases and pressure from customers to decarbonize their supply chains. Consequently, a growing number of investors are focusing on the Scope 3 GHG emissions of investee companies in assessing the climate change risk of their portfolios.

Figure 1. Scope 3 Categories Under the GHG Protocol

Scope 3 Upstream Category		Scope 3 Downstream Category	
1	Purchased goods and services	9	Downstream transportation and distribution
2	Capital Goods	10	Processing of sold products
3	Fuel- and energy-related activities	11	Use of sold products
4	Upstream transportation and distribution	12	End-of-life treatment of sold products
5	Waste generated in operations	13	Downstream leased assets
6	Business travel	14	Franchises
7	Employee commuting	15	Investments
8	Upstream leased assets		

(Source) Created by GPIF based on the Greenhouse Gas Protocol.

1 For more information about avoided emissions, please refer to "Analysis of Avoided Emissions Based on the Bottom-up Approach" on page 75 of the 2022 ESG Report.

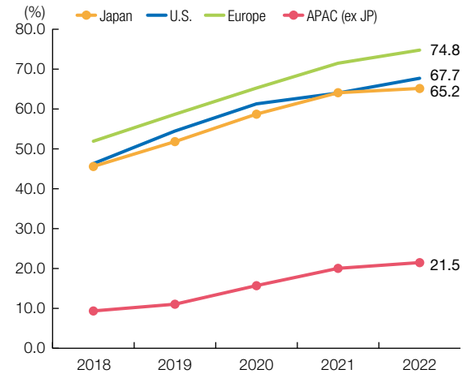
Domestic and International Trends in Scope 3 Disclosures

Here, we present domestic and international trends in Scope 3 disclosures among the constituents of the FTSE All World Index, which comprises more than 4,000 large- and mid-cap global equity stocks.[2] The percentage of companies disclosing at least one of the 15 Scope 3 categories is increasing every year, and the disclosure rate of Japanese companies is on par with that of U.S. companies, although it trails European companies, which are leading the world in sustainability disclosures (Figure 2.)

As for the average number of categories disclosed, although Japanese companies have trailed European companies in the past several years, they are at a high level globally (Figure 3.)

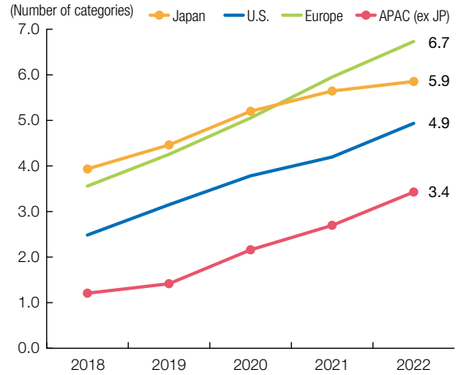
Next, we present the disclosure rates for each category for the constituents of the FTSE All World Index in 2022 (Figure 4.) In all countries and regions, disclosure rates are relatively high in the upstream categories (Categories 1 through 7,) while less progress has been made in general in the downstream categories, perhaps reflecting the difficulty of those disclosures. Japanese companies generally have a high disclosure rate, and even exceed the rate of U.S. and European companies in Categories 2 (Capital goods) and 12 (End-of-life treatment of sold products.)

Figure 2. Scope 3 Disclosure Rate by Country/Region (Percentage of Companies With Disclosures in Any Category)



(Note 1) Percentage of companies with disclosures in any category
(Note 2) Calculations include all constituents of the FTSE All World Index.
(Source) Prepared by GPIF based on FTSE Russell GHG emissions data.

Figure 3. Average Number of Scope 3 Disclosure Categories by Country/Region



(Note) Calculations include all constituents of the FTSE All World Index.
(Source) Prepared by GPIF based on FTSE Russell GHG emissions data.

Figure 4. Scope 3 Disclosures by Country/Region and Category (2022)

	Scope 3 Category														
	Upstream								Downstream						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Japan	61.3	60.6	60.4	53.5	60.0	60.2	60.9	11.2	27.3	11.2	37.6	45.4	20.2	4.5	11.0
U.S.	53.5	42.4	52.9	44.6	49.2	60.5	51.0	18.7	25.9	8.9	30.7	25.1	12.6	3.9	13.6
Europe	68.6	48.9	64.6	56.1	58.1	69.4	59.2	16.4	36.2	11.8	43.2	37.1	14.2	7.9	19.6
APAC (ex JP)	16.5	10.3	15.2	14.3	15.4	17.7	14.7	4.7	9.5	2.5	7.1	6.4	5.6	1.8	6.3
All World	38.0	28.6	36.1	32.5	35.0	40.0	34.9	9.4	19.5	6.8	21.3	19.7	10.1	3.5	10.6

(Note 1) Red indicates 50% or more, light blue indicates 20% – 50%.
(Note 2) Calculations include all constituents of the FTSE All World Index.
(Source) Prepared by GPIF based on FTSE Russell GHG emissions data.

2 For details, please refer to the "Analysis of Disclosures of Material Scope 3 Emissions," a report on FTSE's analysis for the preparation of this report.

Material Issues and Disclosures by Industry Sector

Based on data on Scope 3 GHG emissions provided by FTSE Russell (data disclosed by companies) for the constituents of the FTSE All World Index, we analyzed carbon intensity (tCO_2e/mUSD) in each category by industry sector (Figure 5.) First, we calculated the carbon intensity for each category based on each company's overall sales. We sorted the results by industry sector and category to obtain carbon intensity medians, which we then totaled for each sector to serve as the divisor for determining the percentage of each category.

The top two or three categories account for 70% to 90% of total carbon intensity for most industries, and the highest for most industries: Category 1 (Purchased goods and services) and 11 (Use of sold products.)

As observed in the analysis of the disclosure rate of Scope 3 GHG emissions in each category by industry sector and by country/region, the disclosure rate for upstream categoris is relatively high while downstream categories is relatively low (Figure 6.) As shown in Figure 5, category 11 is critical in terms of the material issue of GHG emissions in supply chains. However, given the difficulty of estimating GHG emissions from sold products, disclosure rates are low with the exception of the energy sector, where such estimations are considered to be relatively easy.

Figure 5. Carbon Intensity Weights by Scope 3 Category (2018 – 2022, %)

	Scope 3 Category														
	Upstream								Downstream						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Materials	25.6	1.7	3.7	2.1	0.2	0.0	0.1	0.0	1.7	15.1	33.7	11.2	0.0	–	4.8
Consumer Discretionary	35.1	2.3	0.7	2.1	0.1	0.1	0.4	0.1	1.5	0.4	54.6	1.2	0.2	0.8	0.5
Consumer Staples	69.2	2.8	1.6	4.2	0.3	0.1	0.3	0.2	3.6	3.5	8.7	2.2	0.5	0.8	2.0
Energy	3.5	0.2	0.5	0.6	0.0	0.0	0.0	0.0	0.4	5.1	87.1	0.8	0.0	0.1	1.7
Healthcare	67.6	7.4	2.4	5.2	0.5	1.3	1.6	0.7	2.4	1.3	8.5	0.6	0.2	–	0.4
Capital Goods	21.4	1.9	0.8	1.9	0.1	0.1	0.3	0.1	1.6	1.4	68.8	0.6	0.1	0.2	0.7
Real Estate	8.4	15.8	2.5	0.4	1.5	0.1	0.2	0.1	5.9	–	27.9	1.3	31.3	–	4.6
Information Technology	28.0	5.2	1.2	1.2	0.1	0.4	0.7	0.2	0.6	0.6	60.5	0.1	0.2	–	1.0
Communication Services	45.1	17.8	5.1	1.5	0.1	0.3	1.0	1.2	1.8	–	14.9	0.1	6.4	0.8	3.8
Utilities	3.0	3.3	27.5	0.2	0.1	0.0	0.0	0.0	0.2	0.6	62.2	0.1	0.0	–	2.8

(Note 1) We determined the median carbon intensity for each category for the constituents in each industry sector, and then calculated the weight for each category with the total for the entire category set to 100%.
(Note 2) Red indicates 50% or more, light blue indicates 20% – 50%, green indicates 10% – 20%.
(Source) Prepared by GPIF based on FTSE Russell GHG emissions data.

Figure 6. Disclosure Rate of GHG Emissions by Scope 3 Category (2022)

	Scope 3 Category														
	Upstream								Downstream						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Materials	41.0	29.5	39.3	39.5	35.0	38.7	35.8	7.4	29.8	18.6	13.2	19.2	6.3	0.9	17.2
Consumer Discretionary	39.1	30.6	34.9	35.1	37.0	41.7	37.7	8.7	18.2	3.5	24.0	25.0	10.8	9.4	10.4
Consumer Staples	40.4	29.9	36.7	40.1	37.7	39.5	32.7	10.2	31.5	9.3	22.5	31.2	9.0	6.2	11.1
Energy	22.9	11.5	19.7	21.7	17.8	21.7	15.9	4.5	17.8	11.5	31.2	8.9	1.9	3.8	8.3
Healthcare	32.2	29.2	31.0	30.7	34.0	37.1	31.3	8.8	17.6	4.6	14.0	23.4	6.7	0.3	8.2
Capital Goods	42.4	31.3	40.3	35.1	39.3	45.3	39.6	9.1	19.5	6.9	23.6	21.9	10.9	2.5	11.6
Real Estate	24.4	19.1	26.8	9.8	25.6	27.6	22.8	6.5	3.3	0.8	7.3	4.9	28.0	1.6	4.5
Information Technology	40.5	29.8	36.9	33.6	36.1	43.3	39.4	15.8	19.6	6.1	19.8	17.0	7.1	0.5	9.2
Communication Services	45.2	36.3	42.2	35.6	37.8	44.4	39.3	17.0	22.2	0.7	38.5	24.4	19.3	8.9	13.3
Utilities	38.0	26.3	45.4	26.3	33.2	44.9	36.6	6.3	8.3	4.4	29.8	2.4	4.4	0.5	9.3

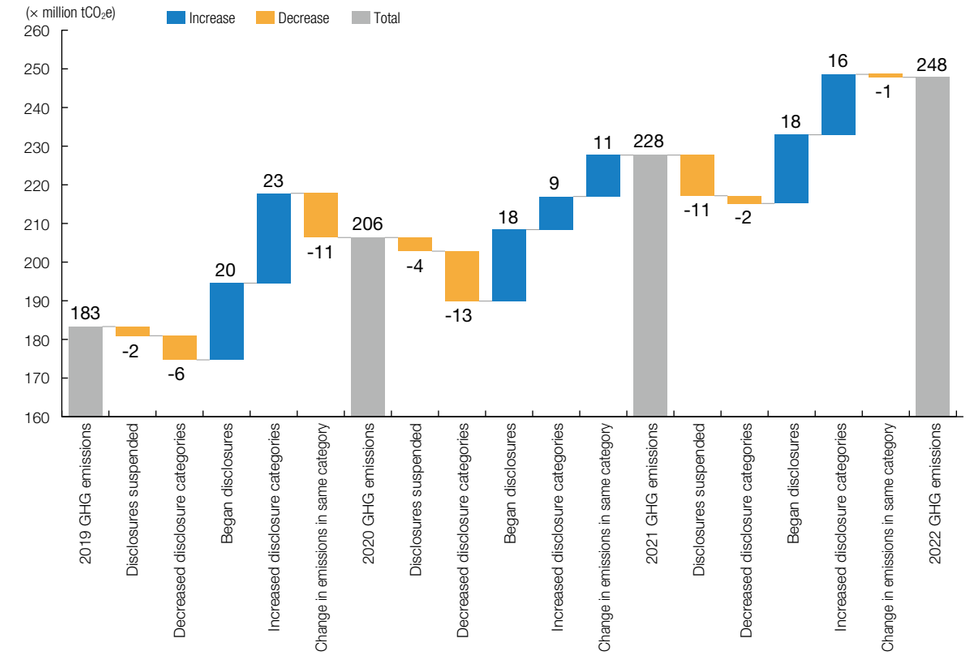
(Note) Red indicates categories with a GHG emissions disclosure rate of 30% or more in each category by industry sector.
(Source) Prepared by GPIF based on FTSE Russell GHG emissions data.

Important Points When Evaluating and Analyzing Scope 3 Emissions

While further disclosures of information about Scope 3 GHG emissions in the future will appeal to investors concerned about climate change risk, it will also make it more difficult to analyze portfolio emissions over time. Analysis of the main causes of calendar-year changes in Scope 3 GHG emissions of the constituents of the FTSE All World Index revealed that the changes are very dependent on factors other than the change in the company's GHG emissions (Figure 7.) Specifically, Scope 3 GHG emissions in GPIF's portfolio changed more as a result of companies making Scope 3 disclosures for the first time or expanding the categories to be disclosed than as a result of changes in Scope 3 GHG emissions from corporate activities. Going forward, this trend may intensify as new Scope 3 emissions data discloses.

Given these circumstances, for the time being, investors will analyze the Scope 3 GHG emissions of their portfolios by category by cobbling together disclosed values when available and estimated values when not. Alternatively, investors could focus on trends in changes in Scope 3 GHG emissions of the portfolio using only categories that were also disclosed in the previous year. Additionally, given that disclosing figures in two or three material categories covers 70% to 90% of total Scope 3 GHG emissions for companies in any industry, when disclosing Scope 3 emissions, companies should focus first and foremost on highly weighted categories to make the disclosures more efficient and effective. In general, data vendors and investors tend to overestimate companies' Scope 3 GHG emissions, arriving at larger figures for emissions than the companies have. Therefore, it is important for companies to proactively disclose information to ensure that they are properly valued.

Figure 7. Analysis of Main Causes of Changes in Scope 3 GHG Emissions in GPIF's Portfolio



(Note) Calculations include all constituents of the FTSE All World Index.
(Source) Prepared by GPIF based on FTSE Russell GHG emissions data.

Impact on the Environment and Climate — ITR Analysis —

Implied temperature rise of GPIF's portfolio

Domestic equities: **2.3**°C

Foreign equities: **2.6**°C

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 2.3°C for domestic equities and 2.6°C for foreign equities, indicating an overall rise exceeding 2°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 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[1] is used to calculate the carbon budget[2] 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[3] based on scientific findings, the projected 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 2.3°C for domestic equities, 2.2°C for domestic bonds, 2.6°C for foreign equities, and 2.5°C for foreign bonds (Figure 1.) Notably, domestic asset classes had a larger decline in implied temperature rise from the previous year than foreign asset classes. This was due to an increase in the percentage of companies in certain sectors (e.g. Utilities) that set ambitious GHG emissions reduction targets. In all asset classes, the forecast temperature rise exceeds 2°C, with a relatively 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, compared to foreign companies (Figure 2.)

Figure 1. Temperature Rise Potential in GPIF Portfolio

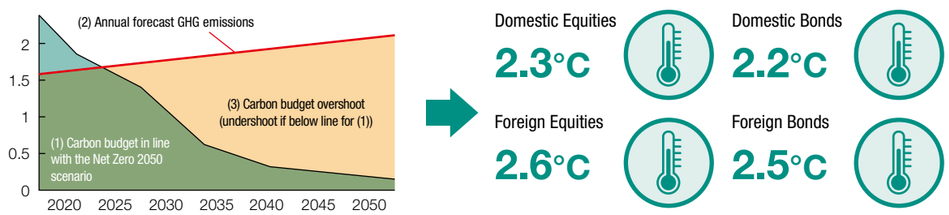


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Figure 2. Company Distribution of ITR Evaluation Across Four Asset Classes

Result	Temperature Range	Domestic Equities (1,227)	Foreign Equities (3,094)	Domestic Bonds (382)	Foreign Bonds (1,843)
Aligned with 1.5°C target	1.5°C or below	9.2%	16.7%	14.9%	21.1%
Aligned with 2°C target	Over 1.5°C and up to 2°C	30.4%	27.0%	25.9%	26.7%
Misaligned with 2°C target	Over 2°C and up to 3.2°C	41.5%	33.7%	39.3%	31.0%
Severely misaligned with 2°C target	Over 3.3°C and up to 9.9°C	17.1%	18.4%	17.8%	17.8%
	10°C	1.8%	4.3%	2.1%	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 pages 75 – 76. 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[4]. From these perspectives, we compared ITR accounting for assessment of the credibility of GHG emissions reduction targets set by companies on the one hand to ITR with stated targets taken at face value on the other. Out of Japanese companies that were aligned with 1.5°C when taking stated targets as face value, 79.8% were also aligned with 1.5°C even when target credibility was assessed. This value is slightly higher than the figure of 77.6% for foreign companies (Figure 3.) Compared to the previous year, credibility has declined overall for both Japanese and foreign companies. This is not due to lower credibility of the decarbonization targets, but rather primarily to a decrease in the value of carbon budgets allocated to companies. As the value of carbon budgets allocated to companies is expected to decrease in the future, more emphasis will be placed on the credibility and effectiveness of corporate GHG emissions reduction targets, and SBTi certification will draw even more attention.

Figure 3. ITR Analysis of Companies Considering Target 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 2.0°C target (over 1.5°C and up to 2.0°C)	Misaligned with 2.0°C target (over 2.0°C and up to 3.2°C)	Strongly misaligned with 2.0°C target (over 3.2°C)
Credibility not assessed	Japanese companies	Aligned with 1.5°C target, if stated target is taken at face value (168)	79.8%	16.7%	3.6%	0.0%
		Aligned with 2.0°C target, if stated target is taken at face value (400)	0.0%	91.3%	8.8%	0.0%
	Foreign companies	Aligned with 1.5°C target, if stated target is taken at face value (918)	77.6%	20.7%	1.6%	0.1%
		Aligned with 2.0°C target, if stated target is taken at face value (1,092)	0.0%	85.3%	14.5%	0.3%

(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, 2024, 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 ©2024. 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 the "2024 Analysis of Climate Change and Nature-Related Risks in the GPIF Portfolios," a report on MSCI's analysis for the preparation of this report.

Biodiversity — TNFD Analysis —

Percentage of companies that operate in sensitive areas

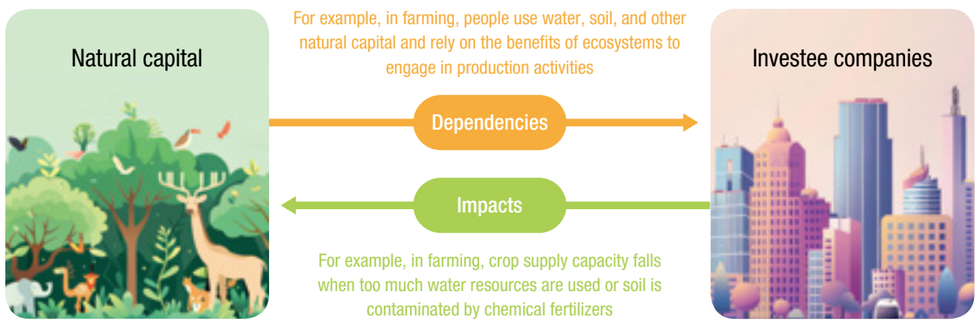
38%

We conducted a trial analysis of nature-related risks including biodiversity in GPIF's portfolio based on Version 1.0 of the TNFD Framework. It indicated that roughly 38% of the companies included in GPIF's equities portfolio is operating in biodiversity-sensitive areas.

Relationship Between GPIF's Investments and Natural Capital, Including Biodiversity

In 2020, the World Economic Forum reported[1] that US $44 trillion (roughly ¥7,000 trillion,[2] about half of global GDP) is moderately or highly dependent on natural capital[3] and ecosystem services[4] provided by nature, suggesting that the decline of these resources could have a severe impact on corporate operations and supply chain-based economic activities. At the same time, companies are positively or negatively impacting ecosystems and the provision of ecosystem services through their own business activities. Negative impacts in particular compromise the availability of ecosystem services on which companies depend, suggesting that dependencies and impacts affect each other and compound over time (Figure 1.)[5] As mentioned at the beginning of this report, GPIF is a "universal owner" that manages a broadly diversified portfolio spanning the entire world capital market, and is thus considered to be exposed to biodiversity and other nature-related risks through its investments. Based on this concept, we conducted the same analysis as last year to identify nature-related risks in our equities portfolio while referring to Version 1.0 of the TNFD Framework published by the Taskforce on Nature-related Financial Disclosures (TNFD) in September 2023.

Figure 1. Relationship Between GPIF and Natural Capital



(Source) GPIF

1 "Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy," World Economic Forum
2 US $1 = ¥159
3 Capital formed by nature (e.g. forests, soil, water, air, biological resources)
4 The Millennium Ecosystem Assessment (MA,) which was conducted from 2001 to 2005 by experts from 95 countries called together by the United Nations, conceptualized the previously ambiguous relationship between humans on the one hand and ecosystems and biodiversity on the other, defining "ecosystem services" as the benefits people obtain from ecosystems that allow them to live prosperous, comfortable lives. In this section, we use the term to refer to the 21 ecosystem services used in ENCORE, a tool developed jointly by the Natural Capital Finance Alliance (NCFA) (an international network of financial institutions,) the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC,) and other organizations to assess the impact of private companies on nature and the extent of their dependence on it.
5 "Recommendations of the Taskforce on Nature-related Financial Disclosures," Taskforce on Nature-related Financial Disclosures (TNFD,) September 2023

Overview of the LEAP Approach and Analytical Approach in this Section

Version 1.0 of the TNFD Framework recommends using guidance on the identification and assessment of nature-related issues (the "LEAP Approach") to identify nature-related dependencies and impacts. 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." In this section, we analyzed Locate, Evaluate and Assess. For the Assess phase, we used the indicators and approaches in Figure 2 while adding GPIF's interpretation of Assess.

Figure 2. Analytical Approach to the Locate, Evaluate and Assess Phases of the LEAP Approach

Locate your interface with nature		Indicators
L1	Span of the business model and value chain	• Data from MSCI Nature and Biodiversity Metrics • GeoSpatial Analysis
L2	Dependency and impact screening	
L3	Nature interface	
L4	Interface with sensitive locations	
Evaluate your dependencies and impacts		**Indicators**
E1	Identification of environmental assets, ecosystem services and impact drivers	Dependencies • ENCORE Dependency Rating Impacts • Biodiversity Footprint (Potentially Disappeared Fraction of Species due to GHG emissions and Water Use/Land Use) • Data on toxic emissions and waste intensity • Data on packaging waste • GeoSpatial Analysis • Biodiversity-sensitive area (BSA) screening tool
E2	Identification of dependencies and impacts	
E3	Dependency and impact measurement	
E4	Impact materiality assessment	
Assess your risks and opportunities		**Indicators**
A1	Risk and opportunity identification	• Research on biodiversity-related disclosure status in Securities report, annual report, etc.
A2	Coordination of existing risk mitigation and risk and opportunity management	
A3	Risk and opportunity measurement and prioritization	
A4	Risk and opportunity materiality assessment	

(Source) GPIF

Locate Identifying companies that operate in biodiversity-sensitive areas

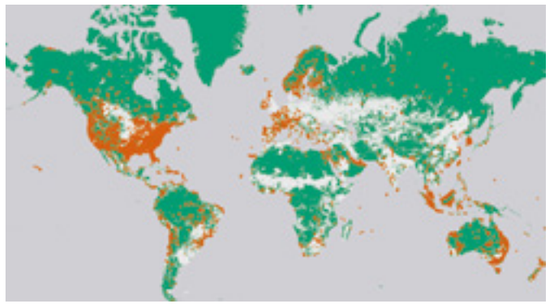
To locate our interface with nature, we used MSCI GeoSpatial analysis and a biodiversity-sensitive area (BSA) screening tool to analyze our domestic and foreign equities portfolios as of March 31, 2024. We use the BSA screening tool to identify companies with three or more physical assets and operations in BSA as those posing the risk of biodiversity loss. Here, we define biodiversity-sensitive areas as (1) Healthy forests,[6] (2) Intact biodiversity areas,[7] (3) Deforestation fronts,[8] and (4) Prime areas for conservation.[9] Physical assets found to be within 1.5 km of these areas are categorized as risk assets. Figure 3 shows that many companies in both the domestic and foreign equities portfolios have assets and operate in biodiversity-sensitive areas. In the domestic and foreign equities portfolios, 20% and 44% of companies, respectively, were shown to involve a certain level of risk.

6 Identified using the Forest Landscape Integrity Index (FLII.) This index estimates the extent of forest integrity lost in a given area on a scale of 0 to 10 points. The higher the value, the less human intervention in the forest. Under the FLII, a score of 6 to 9.6 indicates a moderate level of integrity. Thus, in this analysis, we defined "healthy forests" as areas with an FLII of 6 or higher.
7 Identified using Mean Species Abundance (MSA.) This indicator assesses the current percentage of species in a reference area in comparison to the original status of the species in the area, and is expressed as a value between 0 and 1. The closer the value to 1, the more nature is considered to be preserved in its original state. The global average MSA as of 2015 is 0.56. Thus, in this analysis, we defined "Intact biodiversity areas" as those with an MSA of 0.56 or higher.
8 Identified using data provided by WWF (Terra-i.)
9 Identified using Global Safety Net data.

Figure 3. Companies that Operate in Biodiversity-Sensitive Areas

<Domestic equities portfolio>

<Foreign equities portfolio>



(Source) MSCI

Green: Biodiversity-sensitive area
Orange: Risk assets operating in green areas

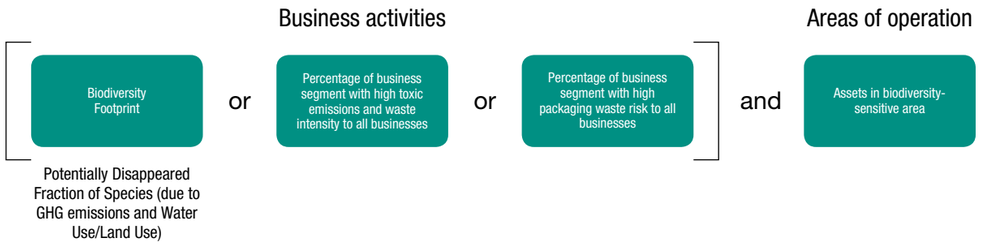
Evaluate Dependency and impact measurement and materiality assessment

In the Evaluate phase, we attempted to measure dependencies and impacts in the equities portfolio using the indicators in Figure 2. We used ENCORE[10] to measure dependencies. ENCORE is a tool that allows users to pair the 157 industry subgroups of the Global Industry Classification Standard (GICS) with the production processes of the subgroups to qualitatively understand the extent to which each process depends on ecosystem services. We aggregated the investment weights for companies in the domestic and foreign equities portfolios by production process and identified ten high-weight (i.e. high-dependency) processes. Finally, we re-connected the ten production processes to the GICS industry groups. Specifically, the foreign equities portfolio has a high investment weight in "Integrated Oil and Gas Business" production processes, which are dependent on both the direct use of resources—namely ground water and surface water—and ecosystem services necessary to sustain corporate activities, namely water purification and protection from floods and storms. Using this methodology, we rated ten and three industry groups in the domestic and foreign equities portfolios, respectively, as highly dependent on ecosystem services (Figure 5.)

10 ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC) (2024.) ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. [On-line], July/2024, Cambridge, UK: the ENCORE Partners. Available at: https://encorenature.org. DOI: https://doi.org/10.34892/dz3x-y059.

We measured impact by analyzing four MSCI indexes (Figure 2,) taking into account the market capitalization weightings of GPIF's equity portfolio, and identifying industry groups with pronounced results relative to their respective portfolio averages as those with a major negative impact on ecosystems and ecosystem service provision (Figure 4.) For detailed results for each indicator, please refer to the "2024 Analysis of Climate Change and Nature-Related Risks in the GPIF Portfolios," a report on MSCI's analysis for the preparation of this report.

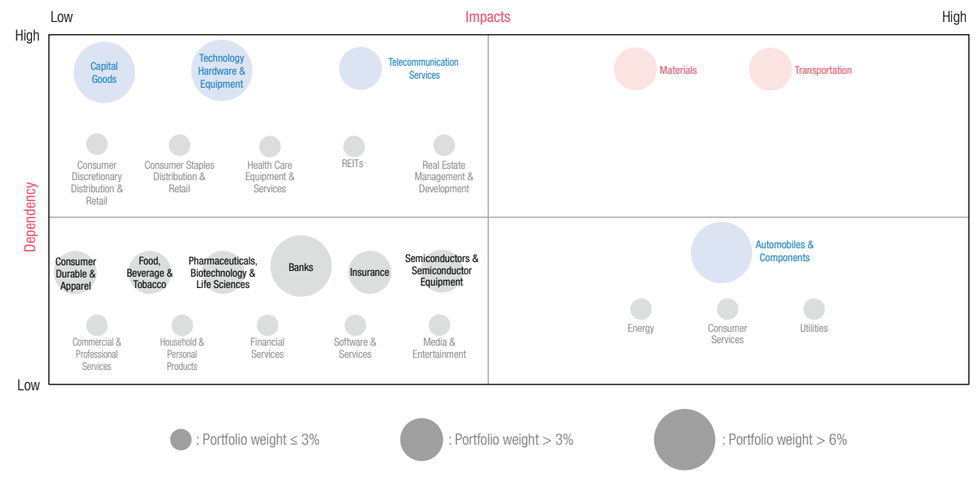
Figure 4. Methods of Identifying High-Impact Industry Groups



(Source) MSCI

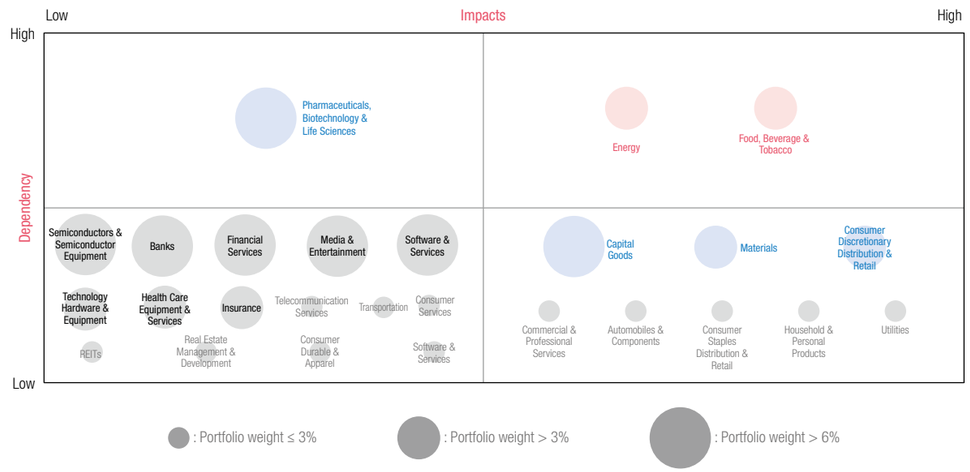
On this occasion, we assessed the materiality of biodiversity in GPIF's equity portfolio by combining industry groups with a high degree of dependency derived from ENCORE and the high-impact industry groups described previously (Figures 5 & 6.) As a result, "Materials" and "Transportation" were identified as having high nature-related risks in terms of both dependencies and impacts for the domestic equities portfolio, while "Energy" and "Food, Beverage & Tobacco" were identified for the foreign equities portfolio. Although this was our second trial analysis and disclosure in accordance with the TNFD, we feel that measuring nature-related risks is extremely complex and that many unresolved issues remain. GPIF will continue to monitor developments in disclosures by operating companies regarding the TNFD and will gradually deepen its analysis.

Figure 5. Materiality Map of Industry Groups (Domestic Equities Portfolio)



(Source) Dependencies: ©ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC); Impacts: MSCI

Figure 6. Materiality Map of Industry Groups (Foreign Equities Portfolio)



(Source) Dependencies: ©ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC); Impacts: MSCI

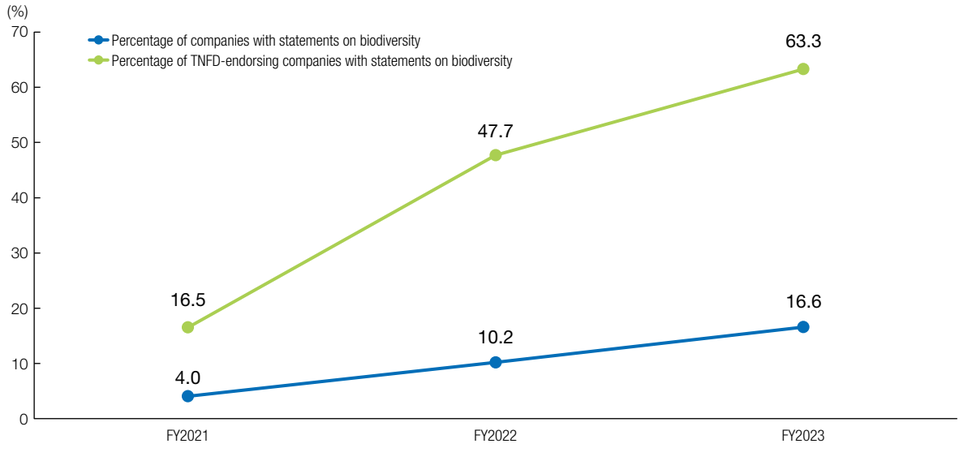
Assess Measures for mitigating nature-related risks in GPIF's equities portfolio

During the Evaluate phase, we identified industry groups susceptible to nature-related risks (dependencies and impacts) in GPIF's equity portfolio and which require action ahead of others. While companies can control nature-related risks by reviewing the locations of their asset holdings and supply chains, GPIF—as a "universal owner" that invests broadly across the entire market—believes that raising awareness of corporate risks is a pragmatic, effective way to reduce nature-related risks. In the Assess phase, we researched recent status on biodiversity by Japanese and foreign companies in their securities reports, annual reports, and the like, and confirmed the status of disclosures in this area. Due to space limitations, we have omitted the status of action by foreign companies from this report; please refer to the "2024 Analysis of Climate Change and Nature-Related Risks in the GPIF Portfolios," a report on MSCI's analysis for the preparation of this report.

We used natural language processing to extract text containing biodiversity-related keywords[11] from FY2021 to FY2023 securities reports of TOPIX companies as of March 31, 2024. Since Japan has the largest number of TNFD-endorsing companies in the world, we also checked whether there is a difference in the disclosure status between companies that have and have not endorsed the TNFD Recommendations (Figure 7.) The analysis shows that companies that have endorsed the TNFD Recommendations have a much different range of increase in disclosure rates than those that have not.

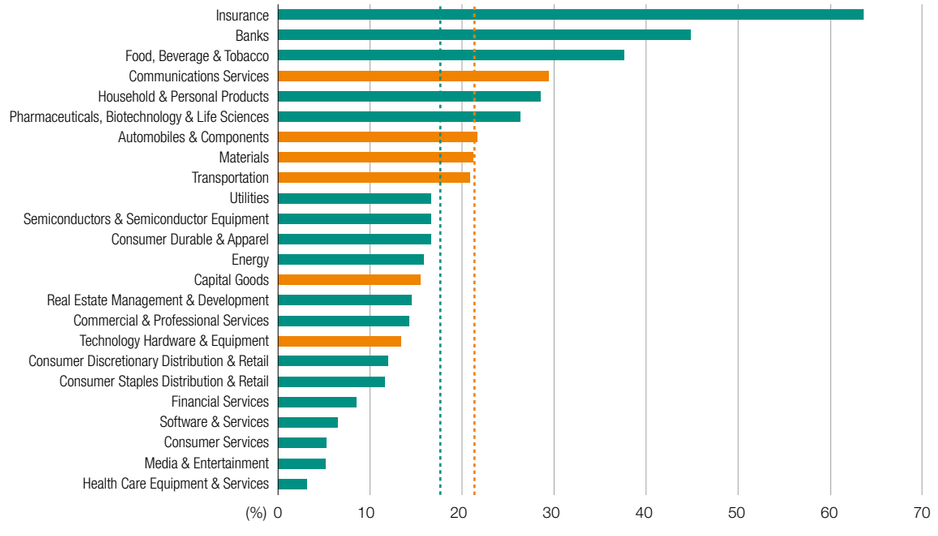
We also analyzed whether there is a difference in response status between the six industry groups identified as material industry groups in terms of biodiversity in Figure 5 and the remaining 19 industry groups (Figure 8.) The average disclosure rate for the material industry groups (20.34%) was not significantly different from that of the other groups (19.31%,) a difference of only 1.03 percentage points. However, it is clear that the "Insurance" and "Banks" industries—financial industries—are leading the way in disclosures. Additionally, according to a natural language processing-based study evaluating biodiversity-related disclosures by Japanese companies, companies that have endorsed the TNFD Recommendations made more specific statements than those that have not.[12] Looking at the number of TNFD-endorsing companies, while anticipating that leading Japanese companies in these industries will continue paving the way forward in terms of the quality and quantity of disclosures, we at GPIF will continue to keep our antennae up and gather information on the ever-evolving nature of TNFD disclosures.

Figure 7. Status of Disclosures on Biodiversity by Japanese Companies



(Note 1) TNFD-endorsing companies are the 109 companies on the List of Adopters on the TNFD website as of July 5, 2024. FY2021 and FY2022 figures calculated based on a total of 109 companies.
(Note 2) Analysis covers TOPIX constituents as of the end of each fiscal year.
(Note 3) Text containing biodiversity-related keywords was extracted from securities reports using natural language processing. DOI Nobushige and YAKABI Kiyoshi, who are conducting research in the same field, cooperated with the extraction.
(Source) Prepared by GPIF based on various materials.

Figure 8. Disclosure Rates by GICS Industry Group



(Note) Text containing biodiversity-related keywords was extracted from securities reports using natural language processing. DOI Nobushige and YAKABI Kiyoshi, who are conducting research in the same field, cooperated with the extraction.
(Source) Prepared by GPIF based on various materials.

11 The five keywords were "biodiversity," "TNFD," "Taskforce on Nature-related Financial Disclosures," "natural capital" and "ecosystem services."
12 DOI Nobushige and YAKABI Kiyoshi, "Assessing the Changes in Nature-Related Disclosures: Text Analysis in Japanese Corporate Annual Reports," July 2024 (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4908478)

Editor's Note

The Quest to Understand What Is Difficult to Measure

This is the seventh ESG Report we have published since 2018. We began publishing this report because we believe that the effects of ESG investments cannot be measured solely by short-term investment performance, and that more angles of evaluation are needed in addition to assessing risks and returns.

In the course of our daily operations, we feel that valuable data is hidden in things that cannot be easily measured. We face many difficulties when trying to visualize and quantify that data in our ESG investment and stewardship activities. However, without such data, we cannot make ESG investments or implement the PDCA cycle properly. Despite the importance of such data, KPIs that are easy to evaluate tend to be prioritized. This is not limited to investors; corporate management also falls into this trap, which goes hand in hand with excessive focus on short-term results. There are countless examples of companies that have damaged their long-term corporate value by overemphasizing current earnings and neglecting R&D and capital investment.

Based on the idea that "sustainable growth of investee companies and the capital market as a whole are vital in enhancing long-term investment returns," GPIF has set out an Investment Principle to promote investments with ESG considerations. The phrase "sustainable growth of the capital market as a whole" is the hallmark of our ESG investment as a universal owner that invests broadly across the entire capital market. The efforts we make to maintain our focus on sustainable growth for investee companies as well as the market as a whole are not about philanthropy or public policy. GPIF has ¥61.5 trillion invested in domestic equities as of March 31, 2024; if the total market capitalization (e.g. TOPIX) were to increase by 1% over the long term through the efforts of companies and asset managers, our investment returns would increase over ¥600 billion.

However, there is no clear causal relationship between our efforts and changes in the behavior of investee companies and asset managers, or between changes in the behavior of investee companies on the one hand and corporate value and investment returns on the other. Additionally, even though the effects of ESG investments should be viewed over the long term, people's emotions tend to follow the daily swings in investment returns.

That is why we understand that our ESG investments must contribute to the "sustainable growth of the capital market as a whole" while ensuring at least a market average return, a widely recognized KPI. In terms of securing excess returns, we will continue our efforts to improve ESG indexes and, as discussed in the column "Analysis of ESG Factors" (page 47 of this ESG Report,) analyze how ESG factors contribute to investment performance and translate our findings into improved investments in the future.

As for statistically demonstrating causal relationships and other elements of contributions to the "sustainable growth of the capital market as a whole" that are not easy to measure, we have taken the first step in "Verification of the Effects of Engagement" (page 50 of this ESG Report.) Although the fiscal year of 2024 marks the end of the "Measuring the Effects of Stewardship Activities and ESG Investment Project" and its four themes, we intend to further strengthen our efforts to visualize and verify things that are not easy to see or measure.

SHIOMURA Kenji

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

Memo

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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.