GPF sustainability report 2023

Sustainability Report 2023

GOVERNMENT PENSION FUND

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GPF Sustainability Report 2023

Message from Secretary General

Over the past 27 years, the Government Pension Fund (GPF) has consistently pursued its mission to ensure the financial stability and well-being of our members, civil servants. Our primary goal is to secure adequate savings to support our members in retirement.

Recognizing the importance of all stakeholders, both public and private, in alignment with the Principles for Responsible Investment (PRI), GPF maintains a steadfast commitment to economic, societal, environmental, and governance (ESG) responsibilities.

This year, GPF is resolute in integrating environmental, social, and governance (ESG) factors into its investment processes. We are focusing on environmental sustainability by measuring greenhouse gas (GHG) emissions from companies in our domestic and foreign equity portfolios. Additionally, our social initiatives underscore a strong dedication to human rights, exemplified by initiatives promoting employee welfare and gender equality within our organization.

Furthermore, GPF plays a pivotal role in stewardship as a responsible shareholder. This involves exercising voting rights at shareholder meetings based on the GPF Proxy Voting Guideline and engaging constructively with investee companies. These efforts aim to foster improvements in ESG practices, thereby fostering long-term business growth.

Looking forward, GPF's strategy emphasizes maintaining a portfolio that minimizes environmental impact, investing in initiatives that generate positive social outcomes, and actively championing human rights both within business sectors and our own organization. GPF remains committed to evolving its operations to maximize benefits for our members, aspiring to be **a stable, prosperous, and sustainable fund in Thailand.**

Mr. Songpol Chevapanyaroj
Secretary General

1 About **GPF**

1. About GPF

Government Pension Fund or GPF is a pension fund established under the Government Pension Fund Act 1996 for government employees to promote members' savings and provide welfare and other benefits to members upon retirement. As a responsible investor, GPF not only focuses on balancing between **"Preservation of Capital"** and **"Return on Investment"** under appropriate risk levels but also emphasizes the ESG-related investment which we believe can create a decent long-term return on investment for our members sustainably.

Our Vision

GPF aspires to become a **"Thai Pension Fund with World-Class Standards"**. To achieve this vision, GPF is determined to generate healthy returns to ensure that the growth of our 1.22 million members' money invested through the fund is higher than its respective accumulated inflation growth. Currently, the funds managed by GPF are among the largest in Thailand with investments of 1.29 trillion baht deployed across 17 asset classes around the globe. At the same time, GPF is one of the first pension funds to integrate Environmental, Social, and Governance (ESG) factors into its investment operations.

Our Mission

GPF has an important mission to take care of members' savings. We aim to

1) assure government employees regarding payment of gratuity and pension upon termination of their official service,
2) encourage regular savings among members, and
3) provide welfare programs and other benefits to members.

To achieve our mission, it is essential to earn the trust of the members. GPF recognizes that it is our responsibility to create both investment returns for our members and social returns for society. We committed to operating with the highest integrity by taking members' long-term benefits into account and incorporating Environmental, Social, and Governance (ESG) in investment decisions to create long-term value for the portfolio. As such, we must ensure that our decisions and actions truly adhere to our mission to do well while doing good to serve our vision of becoming the leader in ESG investing and initiatives in Thailand.

Investment Philosophy

GPF is fully aware of its importance as a 'Universal Owner', managing a significant portfolio across global capital markets. Moreover, we operate as a 'cross-generational investor', overseeing assets with a view that transcends individual generations. In this regard, our duties are not only defined as maximizing investment returns and preserving the value of pension assets, but also supporting sustainable global values within the context of environmental, social, and governance (ESG) to achieve stable income over the long run. We believe that ESG will fulfill our fiduciary duty to safeguard pension funds for future beneficiaries. As such, we have formulated a responsible investment policy – a "master policy" that guides how ESG factors would be integrated into each asset class as well as each step of the investment process from research to investment decision-making.

GPF is dedicated to leading and pioneering the ESG investment concept in Thailand. Our commitment extends beyond traditional investments as we actively spearhead efforts to promote sustainable investment practices. We play a pivotal role in nurturing the development of sustainable investments by collaborating with a diverse range of organizations including asset owners, asset managers, regulators, and standard setters, both domestically and internationally. Our objective is to drive the advancement of ESG practices within the financial industry. By prioritizing ESG considerations, GPF aims to maximize returns while ensuring alignment with stakeholders' values and long-term interests. This approach helps raise the standards of GPF investments by promoting accountability, transparency, and sustainability across their portfolios. Our sustainability journey commenced in 2018, and we remain steadfast in our endeavors to promote sustainable practices to this day.

Our journey to a sustainable investment ecosystem

Since its establishment, GPF has been valued for managing and investing in good governance. Before 2018, the Fund collaborated in endorsing the **"Principles for Responsible Investment" (PRI)** and consistently adhered to principles of good governance, maintaining ethical standards and codes of conduct throughout. In its pursuit to become a benchmark **"Thai pension fund"** with global excellence and to foster a sustainable investment environment, GPF has assimilated both domestic and international best practices into its investment strategies and operational management. Concurrently, it has made ongoing advancements in ESG investments.

- **2018: Commitment to ESG Leadership:**
  GPF has committed to being a leader in ESG investment in Thailand, by adopting the ESG Integration framework from PRI (Principles for Responsible Investment) and the OECD's Responsible Business Conduct and integrating ESG factors into the investment analysis and decision-making process.

- **2019: Collaboration and Declarations:**
  GPF collaborated with 32 institutional investors, declaring a commitment to sign the "Negative List Guideline" for registered companies with ESG issues, and started integrating ESG criteria in the external fund managers' selection process.

2020: GPF-ESG Weights and Scores together with the World Bank:
GPF, in collaboration with the World Bank, developed the “ESG Scoring” called “GPF-ESG Weights and Scores: Asset Valuation Methodology” to analyze and estimate the value of securities and private sector debt within the country.

2021: Sustainable Factors in Long-Term Investment Strategy:
GPF started to incorporate sustainability factors into the Strategic Asset Allocation (SAA) and apply the UN Guiding Principles on Business and Human Rights (UNGPs) into the office’s policies of GPF.

Sustainable Thailand 2021 Declaration:
GPF also declared a commitment to “Sustainable Investing” and “Sustainable Banking” with 43 public sector organizations, institutional investors, and banks, with assets under Management over 40.18 trillion baht. The purpose is to collectively promote responsible business practices across all dimensions to international standards.

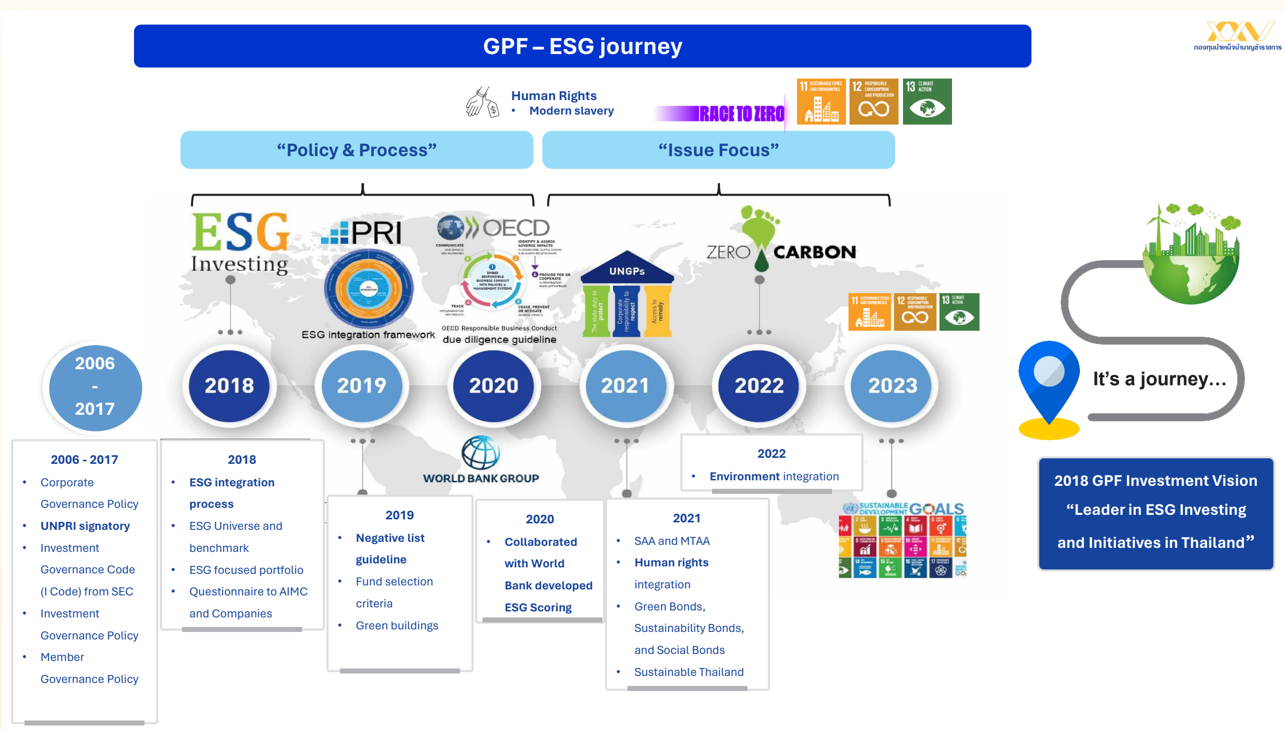
2022: Emphasis on environmental issues:
GPF focused particularly on reducing greenhouse gas emissions, and supporting Thailand’s goal of achieving Net Zero emissions.

2023: Investment according to focused SDGs:
GPF had ambitions to invest in compliance with SDG11 (Sustainable cities and communities), SDG12 (Responsible consumption and production), and SDG13 (Climate action).

Positive Engagement:

GPF engaged positively with companies in which investments are made and external fund managers to encourage ESG practices and reviewed ESG scores developed in collaboration with the World Bank (GPF-ESG Weights and Scores: Asset Valuation Methodology).

Figure1 - GPF’s ESG roadmap



2 ESG In Focus

2. ESG In Focus

While traditional investors have relied solely on quantitative financial metrics like cash flows and profit margins to assess companies, "ESG investment" goes beyond this approach by considering other non-financial factors. This method is anticipated to enhance risk-adjusted returns over the long term by integrating environmental, social, and corporate governance considerations into investment strategies.

As a 'universal owner' or an institutional investor with a large level of assets under management, GPF recognizes that our investment can create great impacts on society and the environment. In this regard, we have to pay special attention to these perspectives as well to achieve stable income over the long run. To elaborate on this, when companies prioritize short-term gains over environmental and societal impacts, it harms both society and the economy. This approach can severely damage the overall portfolio of universal owners like GPF. Hence, actively reducing negative externalities is essential for sustaining profitability and forms the core of GPF ESG investment strategy.

2.1 ESG Integration

GPF believes that ESG investments are not only a future trend but also a creative force for positive impacts on society and the environment, generating a decent financial return for its members in the long run. Consequently, GPF integrates ESG factors into its domestic and foreign investment processes.

For domestic investments, GPF also includes ESG factors as criteria for stock selection and valuation while integrating ESG factors in credit analysis for fixed-income investments. For foreign investments, GPF integrates ESG factors into its external fund managers' selection process and monitors how ESG is implemented on each fund's day-to-day management as well as seeing the results through the likes of proxy voting, carbon reporting, and other related documents.

GPF ESG Integration: Scoring & Implementation with World Bank

In 2020, the GPF collaborated with the World Bank to develop the **"GPF-ESG Weight and Score"**[1], which is considered a key component of ESG integration in our investment processes. It explains how to analyze and assign weights to ESG factors at industry and company levels, integrating them into securities valuation. GPF uses MSCI weight on ESG as a starting point, then applies a conversion factor to adjust by increasing the G weight to reflect the importance of Governance in the local market and adjust the E&S weight accordingly. Then, GPF assigns scores to the company using input from MSCI ESG data, Corporate Governance Rating from the Thai Institution of Director Association (Thai IOD), and GPF research analysts as well as fund managers. The ESG score is then integrated into the Equity Score/Credit Score. **This year we reviewed the GPF-ESG Weight and Score, providing guidelines for integrating ESG factors into investment processes.** We also adopt ESG scores for Thai context in securities valuation, assess credit for debt issuers, decide on IPOs, and select, track, and evaluate external fund managers. More details are available through the link 2

2.1.1 EQUITY INVESTMENT

Apart from decent fundamentals, GPF adopts the ESG integration approach where ESG factors are integrated into criteria for selecting securities before making an investment decision. Before the company assessment, GPF first applies the pre-assessment process to screen out companies that fail to meet the screening criteria e.g., the criteria set out in the Negative List Guidelines. In the security valuation, companies with high ESG scores (or low ESG risks) will have a lower discount rate and vice versa.

2.1.2 FIXED-INCOME INVESTMENT

GPF conducts a comprehensive credit analysis of debt issuers with ESG factors forming an integral part of the assessment. The GPF Credit Score is a combination of:

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1. More details are available through the link: https://documents1.worldbank.org/curated/en/366681600756304221/pdf/Government-Pension-Fund-Thailand-Environmental-Social-and-Governance-Weight-and-Score-Asset-Valuation-Methodology.pdf
2. More details are available through the link: https://thedocs.worldbank.org/en/doc/4c76030b87be04edd1803015eb6b197a-0320052024/original/GPS-WB-ESGThailand-Jan30.pdf

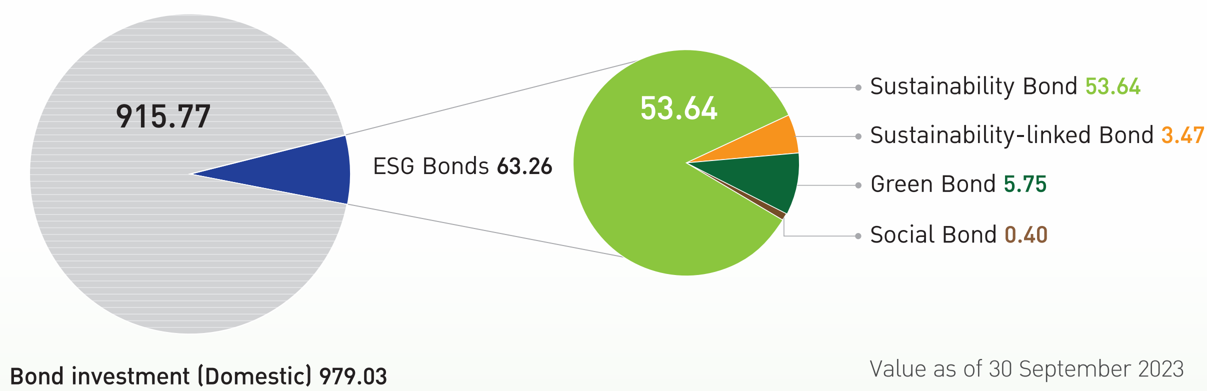
- **Credit Score (65%)** which is based on an assessment of the company's business and financial profiles. In deter **Core** mining the constituent scores for financial profile, for instance, key financial ratios such as D/E and ROA are graded against a set of predetermined thresholds;

- **Modifiers (35%)** that relate to potential support, management quality, financial policy, and ESG. A company's GPF ESG Score accounts for a quarter of the Modifiers.

Our credit research analysts determine a company's Credit Score based on several factors, including ESG performance. While GPF does not currently analyze ESG issues for its sovereign bond holdings, we do invest in Thailand' sustainability government bonds in a large portions of our GSS (Green, Social and sustainability) bonds which contribute to ESG outcomes. Although GSS bonds are a small proportion of the overall bond market, we have increased investment in until 63.26 billion Baht in 2023 GSS bonds over time since 2020 from 9.92 billion baht **(Figure 2).**

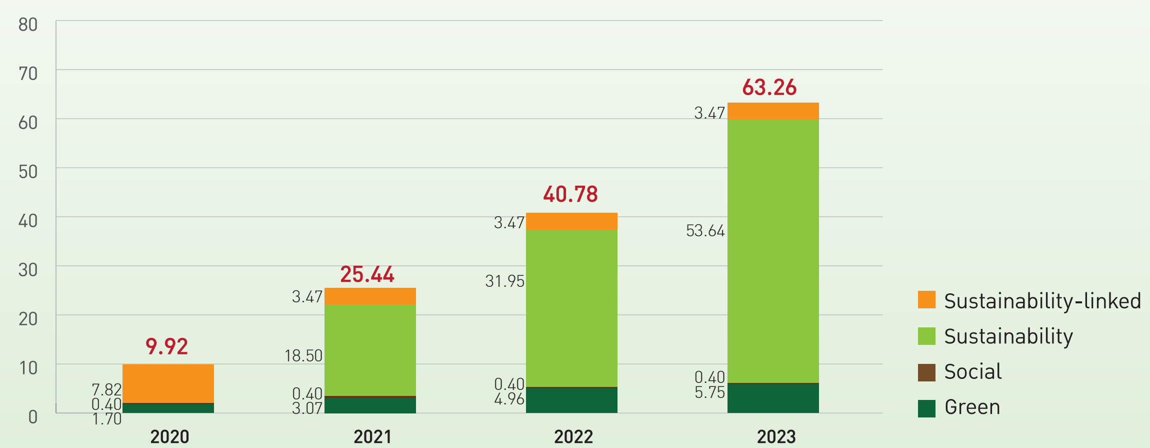
Figure 2 - Total value of GPF's green, social, sustainability, and sustainability-linked bonds

Values of GPF's Bond Investment (Billion baht)



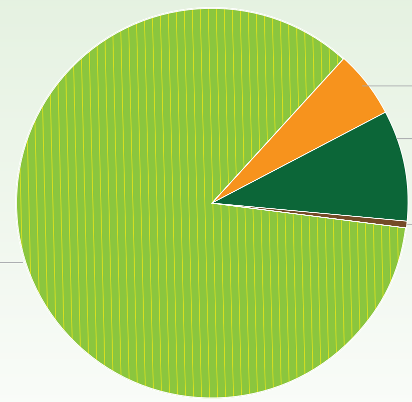
Value as of 30 September 2023
Member and resrve fund

Values of GPF's Sustainability Bond Investment (Billion baht)



Member and resrve fund

Proportion of GPF's Sustainability Bond Investment of 2023



Proportion 30 September 2023

The section below shows how GPF integrates ESG factors, such as Portfolio GHG analysis, human rights, and related SDGs, in our operation and investment to achieve a sustainable investment ecosystem.

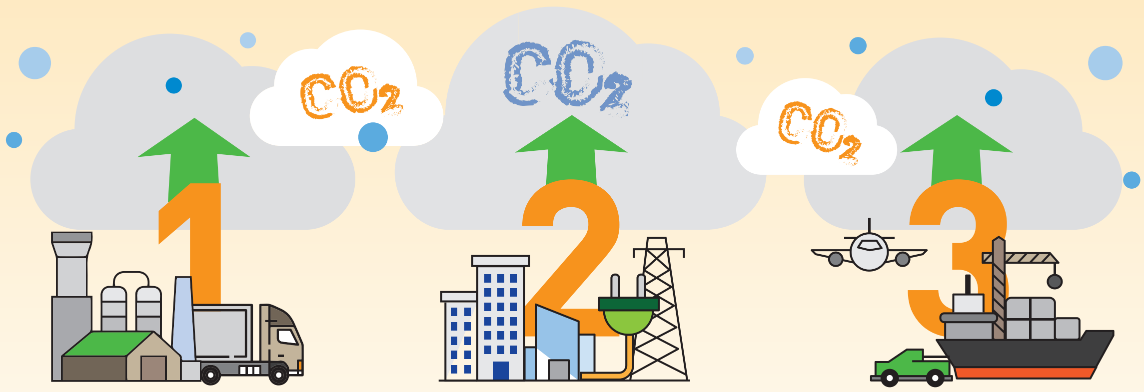
2.2 Environment: Analysis of Portfolio Greenhouse Gas Emission

In 2022, GPF initiated the reporting of carbon footprint for the equity portfolio, encompassing both domestic and international equities as we had been concerned about the climate change risks and opportunities in our investment. Such reporting also aligned with the disclosure standards established by the Task Force on Climate-Related Financial Disclosures (TCFD).

The Carbon Footprint is the amount of carbon dioxide and other greenhouse gases released from various human activities in the production of goods or services. Results are presented in terms of Carbon Dioxide Equivalent (tons CO2e/THB m) to assess the environmental impact of activities related to organizations or products/services at every stage of the life cycle. In our analysis of the carbon footprint and carbon intensity of our portfolios, GPF conducted evaluations based on the greenhouse gas emissions carried out within the confines of Scope 1 and Scope 2, utilizing the S&P Capital IQ Pro platform. The calculation is based on two indicators: **1) Weighted Average Carbon Intensity (WACI)**, an assessment of carbon footprint intensity in the investment portfolio per one million Thai Baht or US Dollars of revenue, and **2) Apportioned Carbon Emission**, a proportion of the greenhouse gas emissions based on the value of equity holdings relative to the company's total value.

In 2023, the reporting scope for greenhouse gas emissions was expanded by introducing Scope 3, aiming to encompass both domestic and foreign equities, in which GPF invested.

The Explanation of Carbon Emission Scope 1,2,3



Scope 1
emissions stem directly from an organization's owned or controlled sources, such as fuel burned in its vehicles.

Scope 2
emissions are indirectly caused by a company, originating from the production of the energy it purchases and uses.

Scope 3
emissions include those not directly produced or controlled by the company but are a consequence of its activities up and down the value chain, like the emissions associated with products purchased from suppliers.

2.2.1 Weighted Average Carbon Intensity (WACI)

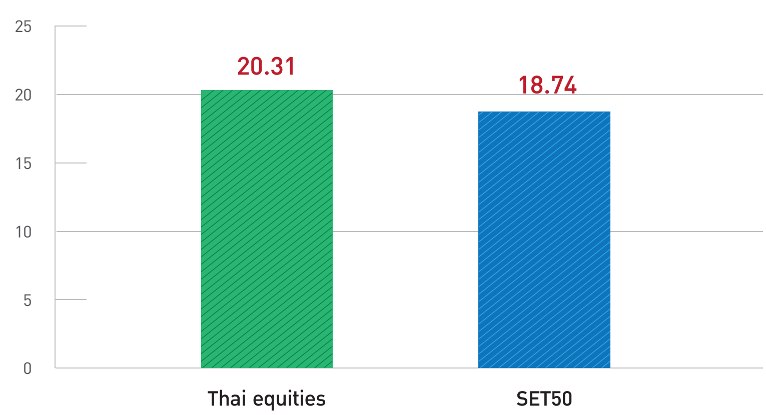
The Weighted Average Carbon Intensity (WACI) represents the intensity of carbon footprint per one million Thai Baht of revenue in the investment portfolio. A higher WACI value indicates a higher carbon intensity in the portfolio.

Domestic equities

It is observed that the WACI for the domestic equity portfolio is 20.31, slightly higher than the benchmark value of 18.74 **(Figure 3).**

Figure 3 - Weighted Average Carbon Intensity (WACI) of Domestic Equities Portfolio

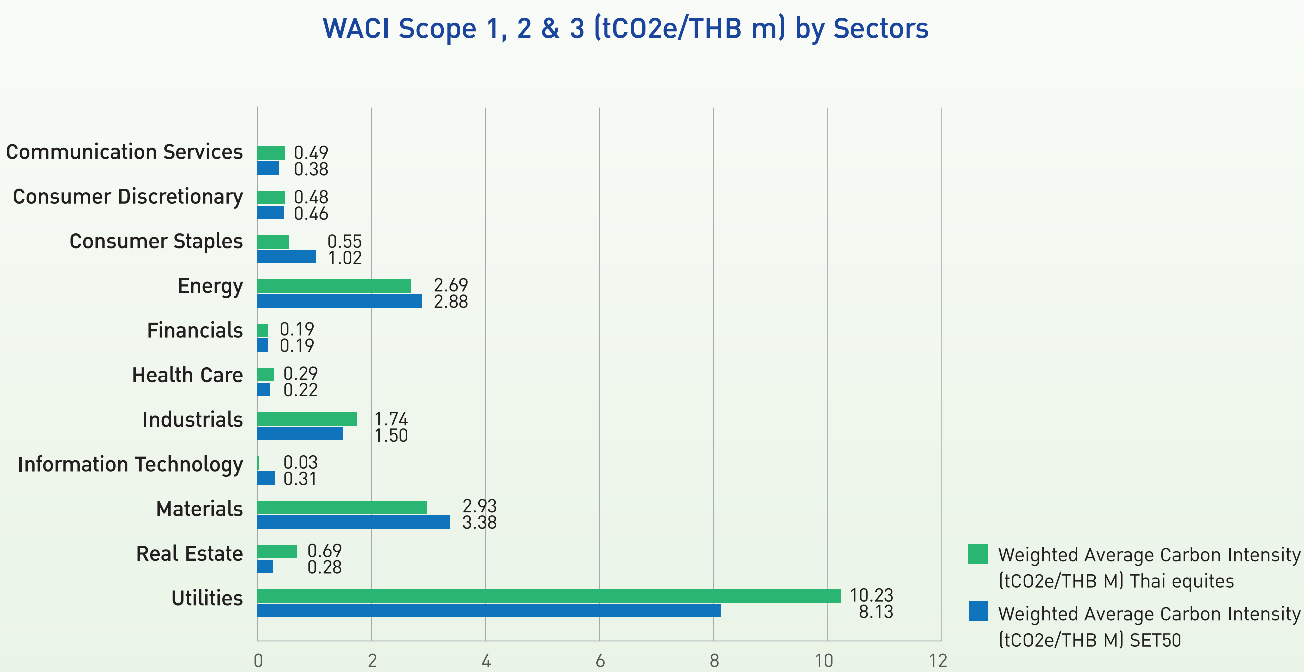
WACI Scope 1, 2 & 3 (tCO2e/THB m)



Source: Data and Calculation from S&P Global Platform as of October 2023

When analyzing the reasons behind the higher WACI value in the portfolio compared to the benchmark, it shows that the highest WACI came from the Utilities sector which we invested around 10% in our portfolio. This sector is known for its higher greenhouse gas emissions, as illustrated in **Figure 4**. As a result, the WACI value for the utility sector is 10.23 tons of carbon dioxide equivalent per one million Thai Baht of revenue, which is higher than the benchmark (SET 50) with a value of 8.13. In addition, the domestic equity portfolio has invested in off-benchmark companies in the real estate sector, which are not listed in SET50. One such company in this sector has a WACI value of 106.36 tCO2e per one million Thai Baht of revenue. This contributes to an overall higher WACI value for the domestic equity portfolio compared to the benchmark.

Figure 4 - Weighted Average Carbon Intensity (WACI) of Domestic Equities by Sectors



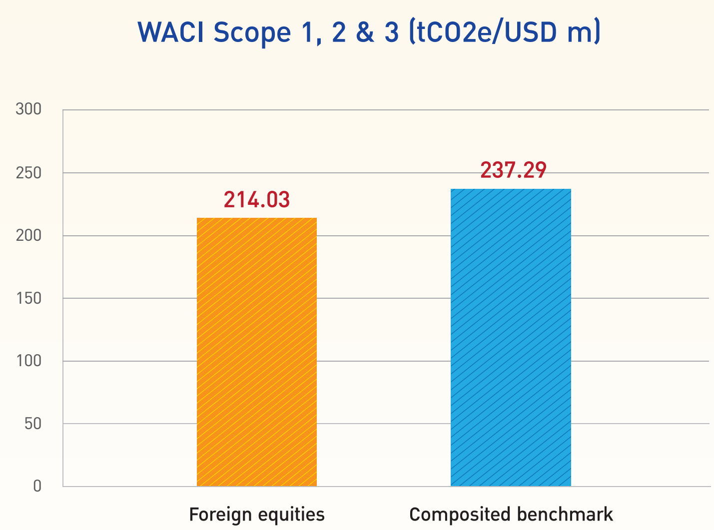
Source: Data and Calculation from S&P Global Platform as of October 2023

As we are concerned about sustainable investment. We have conducted engagement with companies which are the top 10 contributors to the highest greenhouse gas emissions (Top 10 WACI contributors) in the domestic equity portfolio. This is done to monitor operations and discussions regarding strategies for achieving the Net Zero Pathway. The summary indicates that these companies mostly have operational plans and intentions to announce net-zero emissions targets for the year 2050, although it has not been officially announced yet. This positive engagement is expected to lead to a reduction in the carbon intensity of GPF equity portfolio as the companies realize the importance of and define a clear goal to reduce carbon emissions.

Foreign Equities

According to foreign equities, the WACI (Weighted Average Carbon Intensity) is 214.03 tCO2e per million U.S. dollars of income. This value is lower than the benchmark, which is 237.29 **(Figure 5)**, measured on a comparable basis.

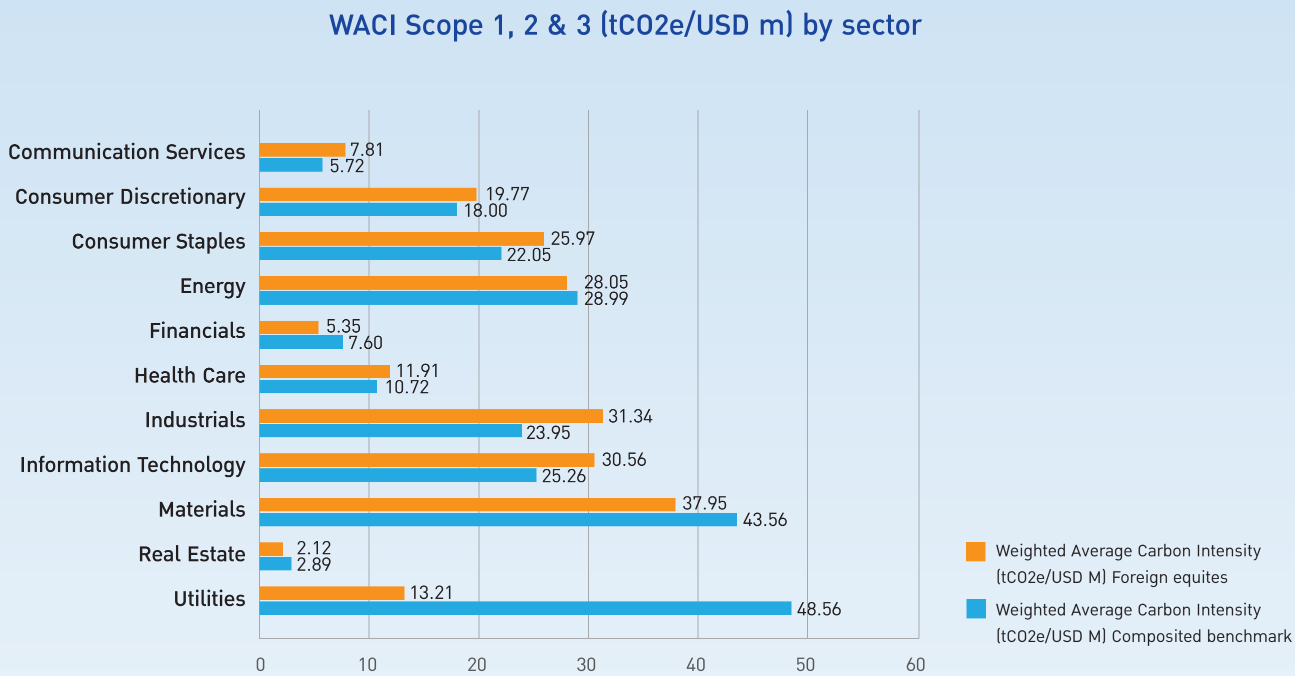
Figure 5 - Weighted Average Carbon Intensity (WACI) of Foreign Equities Portfolio



Source: Data and Calculation from S&P Global Platform as of October 2023

When comparing the greenhouse gas emissions for foreign equity portfolio in 2023, categorized by sector as shown in **Figure 6**, companies in the Utilities sector have a WACI value significantly lower than the benchmark, by up to 72.80%. On the other hand, other sectors show WACI values that are close to the benchmark. Further analysis of the foreign stock portfolio reveals that investment in the utility sector constitutes a small proportion compared to other business sectors.

Figure 6 - Weighted Average Carbon Intensity (WACI) of Foreign Equities by Sectors

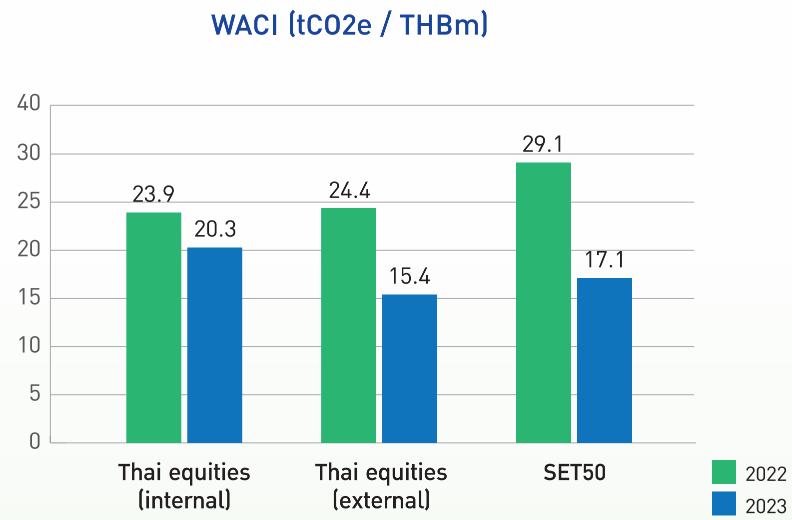


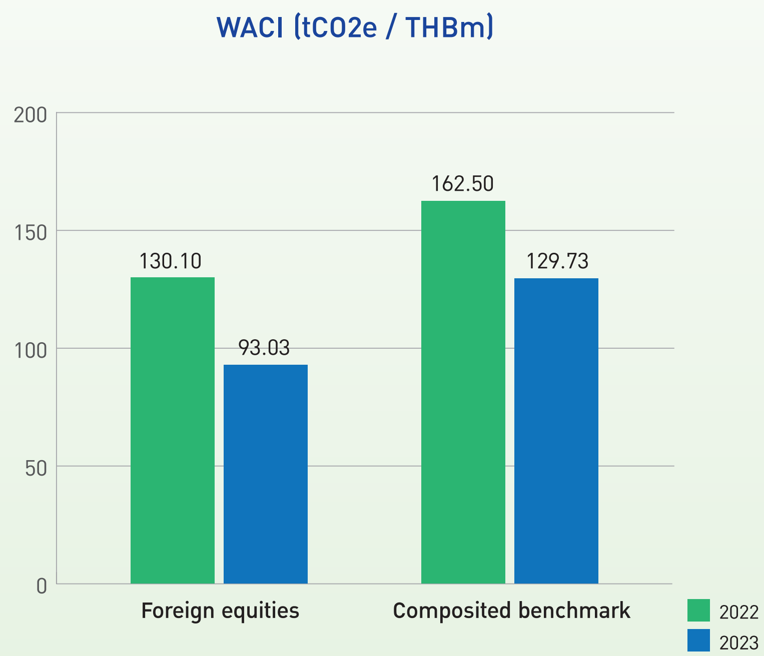
Source: Data and Calculation from S&P Global Platform as of October 2023

The comparison of WACI (Scope 1 and Scope 2) between 2022 and 2023

To compare WACI values of the domestic equities managed both by GPF internally and those externally managed by fund managers between 2022 and 2023 **(Figure 7)**, only scope 1 and 2 are considered. It shows that the WACI for the domestic portfolio in 2023 is lower than that of 2022. Similarly, for foreign equities in 2023, the WACI is lower compared to the previous year. One contributing factor can be analyzed through GPF positive engagement with various businesses in the domestic equity portfolio. It has been found that both domestic and international businesses place importance on the reduction of environmental negative impact and greenhouse gas emissions which are not only the focus of GPF but also a global trend. This includes other relevant issues related to sustainable development, such as setting net-zero emissions targets, prioritizing human rights, and more.

Figure 7 - The comparison of WACI Values of the Investment Portfolio between 2022 and 2023





Source: Data and Calculation from S&P Global Platform as of October 2023

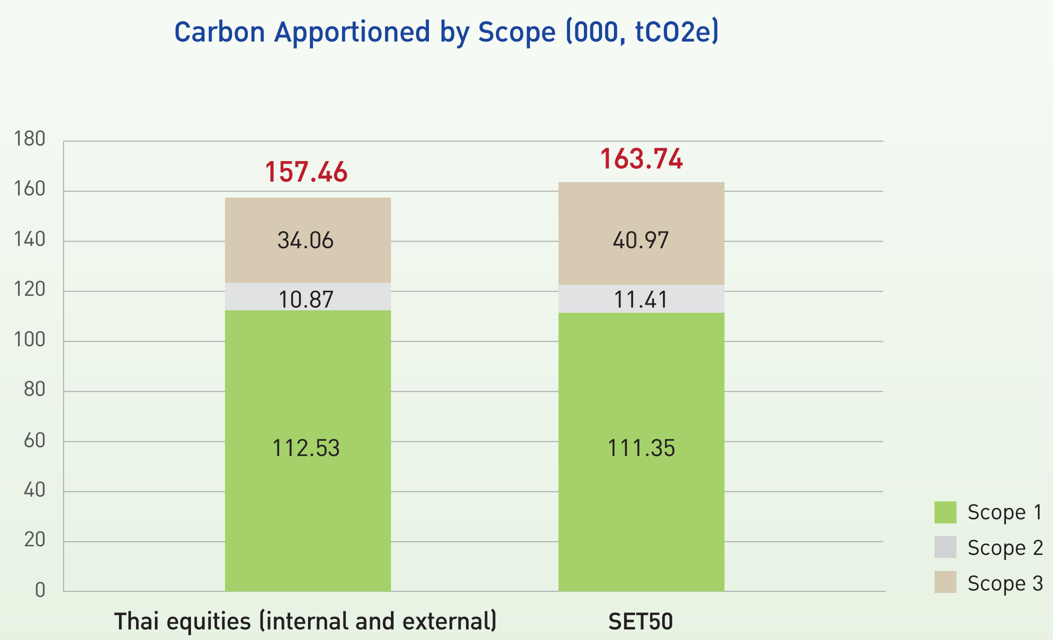
2.2.2 Apportioned Carbon Emission

Apportioned Carbon Emission is a proportion of the greenhouse gas emissions based on the value of equity holdings relative to the company's total value.

Domestic Equities

For domestic equities managed both internally by GPF and externally by fund managers, totaling 74 companies, a comparison with the benchmark index (SET50) reveals that GPF domestic portfolio has a total greenhouse gas emission of 157,463.75 tCO2e. This emission quantity is 3.84% lower than the benchmark index **(Figure 8)**.

Figure 8 - GHG Emissions of Thai Equity Investment Portfolios

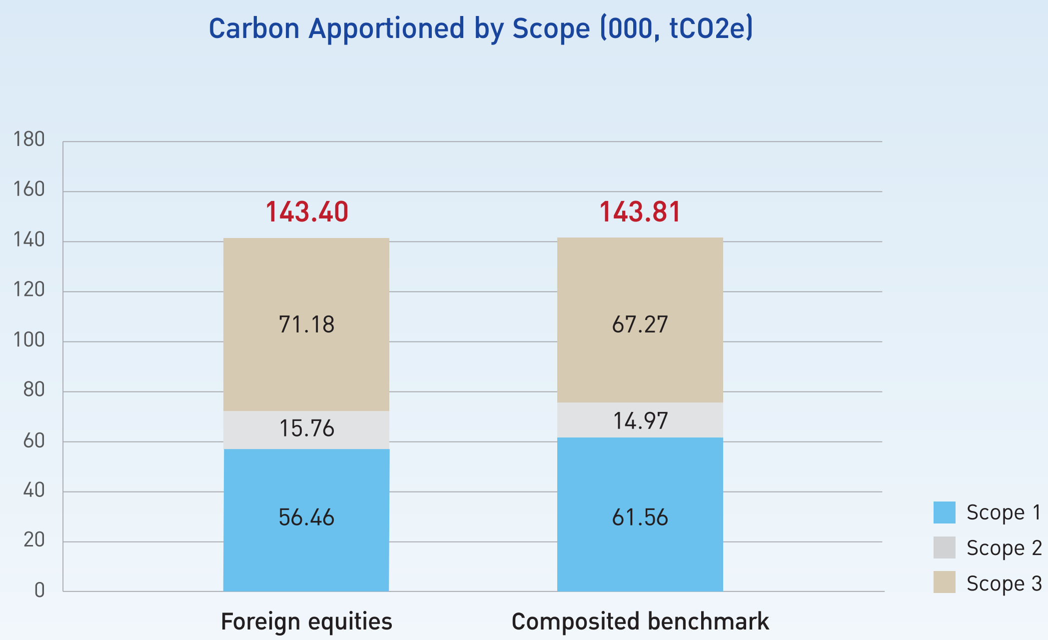


Source: Data and Calculation from S&P Global Platform as of October 2023

Foreign Equities

For the foreign equity portfolio managed by external fund managers, the total greenhouse gas emissions amount to 143,399.30 tCO2e. Compared to the Composite Benchmark (MSCI World and MSCI Emerging Markets), it is found that the greenhouse gas emissions are close to the benchmark **(Figure 9)**.

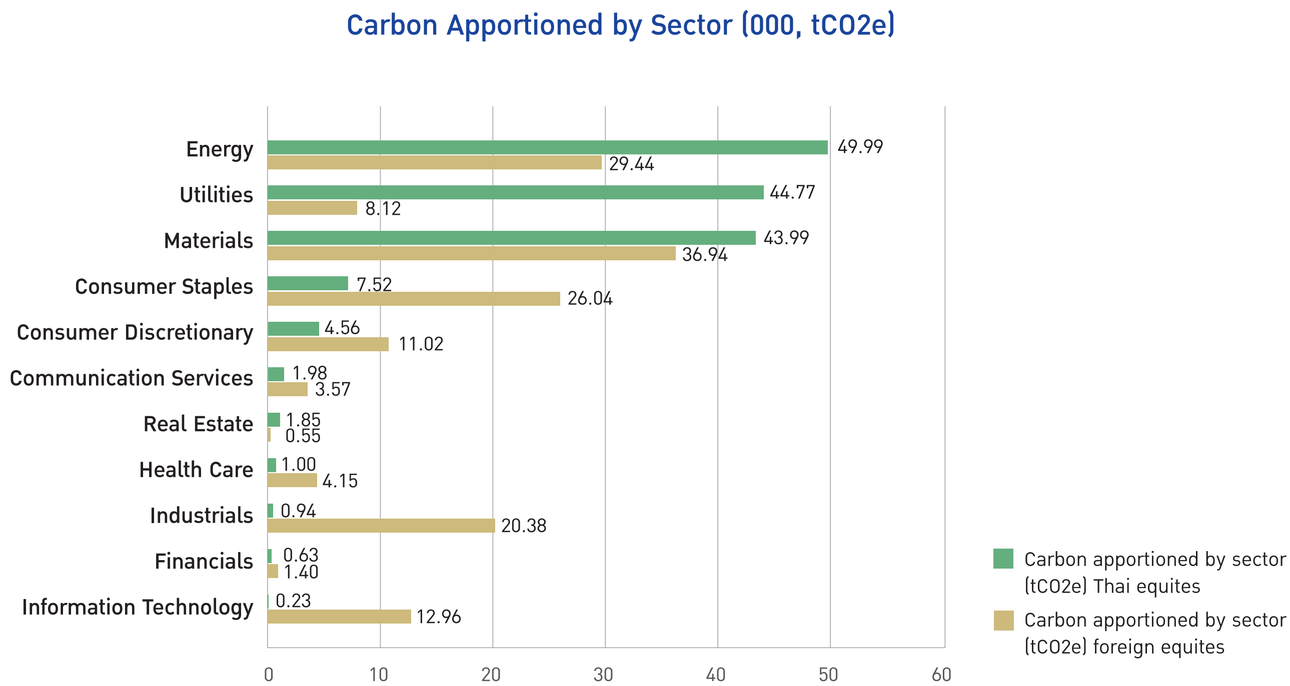
Figure 9 - GHG Emissions of Foreign Equity Investment Portfolios



Source: Data and Calculation from S&P Global Platform as of October 2023

By comparing carbon apportioned by sector between GPF domestic equities and foreign equity portfolio, the business sectors with the highest greenhouse gas emissions in GPF domestic equity portfolio are the Energy sector, Utility sector, and Materials sector, accounting for a total of 138,747.69 tCO2e (approximately 88% of the total greenhouse gas emissions for the domestic portfolio). The number of businesses in these three sectors constitutes more than approximately 26% of the total companies in the portfolio. In GPF foreign equity portfolio, the sectors with the highest greenhouse gas emissions are the Materials sector, Energy sector, and Consumer Staples sector, respectively. These sectors contribute to a total of 92,419.29 tCO2e, representing about 64.45% of the total greenhouse gas emissions for the entire foreign equity portfolio **(Figure 10)**. Moreover, carbon apportioned in the Industrial sector and Information Technology sector are significantly higher in foreign equities compared to domestic equities while it is sharply lower in the Utilities sector and Energy sector. This is because the foreign equity portfolio is more diversified to various industries. Furthermore, businesses in the foreign equity portfolio, particularly in the European region, are more advanced in utilizing renewable energy and alternative energy sources in the Energy and Utilities sectors.

Figure 10 - Greenhouse Gas Emissions by Sectors



Source: Data and Calculation from S&P Global Platform as of October 2023

2.3 Social: Human Rights

2.3.1 Human Rights Pulse Survey & Heatmap

Apart from environmental practices, social perspective is also a concern in the investment portfolio. As a responsible investor, GPF places importance on conducting business with a focus on human dignity, freedom, equality, and non-discrimination. The United Nations Guiding Principles on Business and Human Rights (UNGP) serves as the framework for business operations on Human Rights. These principles are internationally recognized and promoted for implementation.

From June 12 to August 11, 2023. We conducted the Human Rights Pulse Survey & Heatmap in collaboration with the United Nations Development Program (UNDP) and the Thai listed companies' association. The objectives of the survey are to 1. Evaluate and monitor material human rights risks, 2. Assess and identify gaps in human rights practices, and 3. Publish survey results and share knowledge. The questionnaire was designed based on the United Nations Guiding Principles on Business and Human Rights (UNGPs) under 3 pillars, which are Protect, Respect and Remedy. These define the duties of States and businesses to protect human rights. We got responses from 55 companies. The questionnaire is the checklist of the 5 steps operational framework for human rights practices:

1. Announcing a company human rights policy.
2. Assessing human rights risks and impacts.
3. Providing remedies and preventing human rights impacts.
4. Establishing complaint mechanisms for those who witness or are impacted by human rights issues.
5. Periodically reporting on human rights performance.

Based on the survey analysis, it was found that the majority of companies are effectively operating in the area of human rights. Specifically, 91% have a Company Human Rights Policy Announcement, 75% conduct Human Rights Risk Assessment & Impact Evaluation, 89% engage in Remediation & Prevention of Human Rights Violations, 96% establish a Complaints Mechanism, and 91% provide Periodic Human Rights Performance Reporting.

Gaps in the implementation of human rights practices

1. Medium and small-sized businesses are facing challenges in implementing human rights practices compared to big companies, which already adhere to global standards and best practices.
2. Assessment of human rights risks is the step that the companies do the least.
3. Human rights risk topics are often confined to traditional risks, not covering the emerging risks yet.

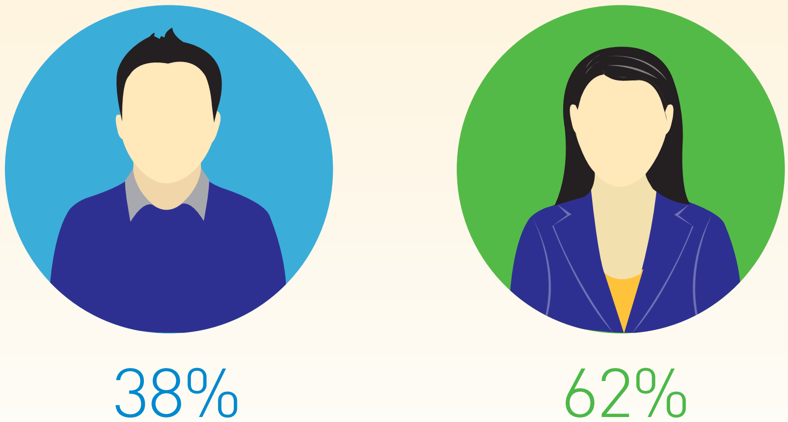
Implications for GPF Investment Portfolio

The results of the Human Rights Pulse Survey indicate that, overall, listed companies in Thailand are conducting human rights practices following the United Nations Guiding Principles on Business and Human Rights (UNGP). For domestic equity portfolios, GPF only invested in large companies with strong fundamentals to ensure a low risk of human rights violations. However, we plan to engage with small and medium-sized enterprises to support and promote human rights practices. We will also engage with their supply chains in this endeavor.

2.3.2 GPF's human rights management

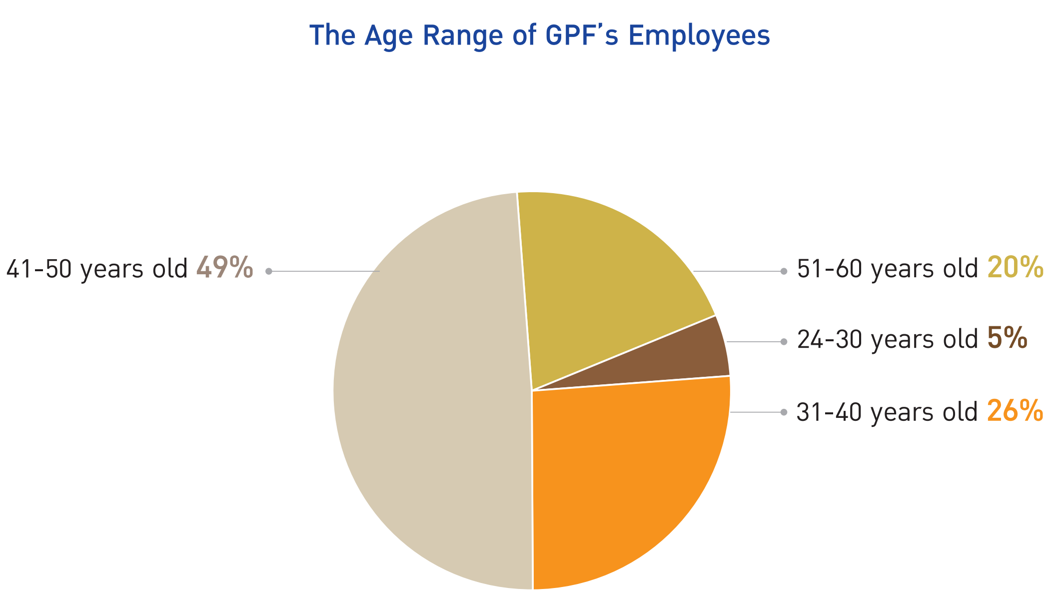
GPF integrates the social perspective not only in the investment decision but also within our organization. We prioritize employee skill development to fulfill our mission, integrating human rights practices into our organizational culture. Ensuring the well-being of our employees and fostering a positive community environment is paramount for achieving excellent results. Moreover, we invest in both internal and external training to enhance employee skills. Particularly, we offer mandatory training on the Personal Data Protection Act (PDPA) to mitigate human rights risks. Gender equality is a fundamental principle, emphasizing skills and experience regardless of gender.

As of September 2023, GPF employs a total of 255 individuals, including temporary staff, with 62% female (158) and 38% male (97) representation. Furthermore, 59% of top management positions are held by females.



In addition to gender equality, the figure shows the breakdown of employee age ranges **(Figure 11)**. This comprehensive overview provides insights into the diverse age demographics within our workforce. We actively adhere to the Disabilities Act 2007 by Section 33, hiring disabled staff and continuing to offer job opportunities for individuals with disabilities.

Figure 11 - The age range of GPF's employees

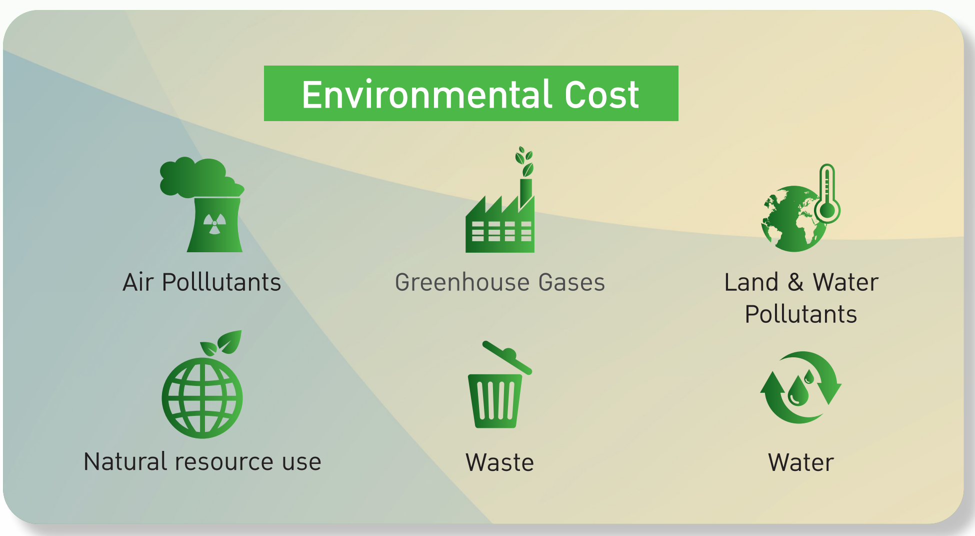


2.4 Further ESG Considerations

Beyond the information presented in the greenhouse gas emissions report for both domestic and foreign equities this year, GPF has conducted additional ESG analyses in various areas to integrate them into our sustainable investment ecosystem. These encompass **1) Environmental Cost;** financial commitments associated with environmental costs in business processes reflecting the fiscal responsibilities linked to environmental stewardship, and **2) SDG-aligned revenue;** an assessment of financial returns generated by companies within domestic equity portfolio where positive impacts align with Sustainable Development Goal (SDG) objectives.

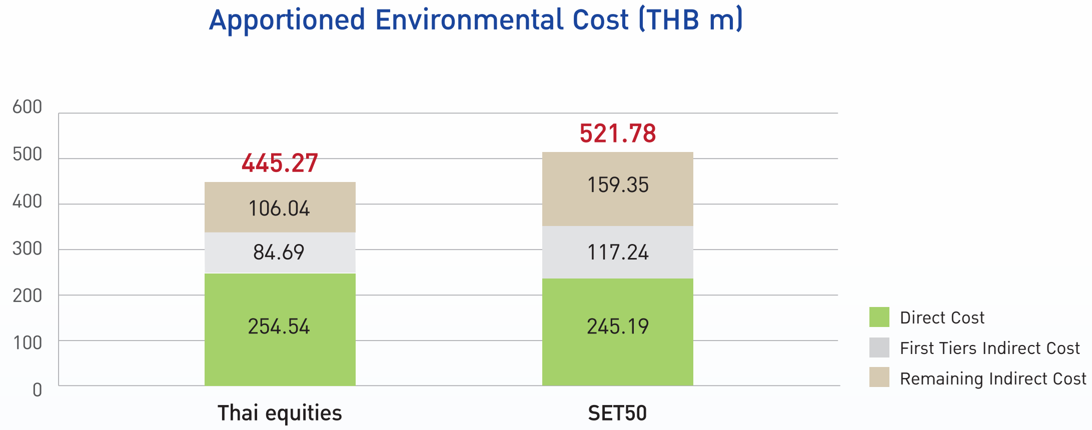
2.4.1 Environmental cost of GPF Thai Equities Portfolio

Environmental cost has become a continuously significant factor for investors and financial institutions. Investors use such costs to assess the efficiency of business operations and incorporate them into investment portfolio management strategies to help mitigate environmental impacts. Environmental costs arise from evaluating the impacts of resource utilization. The report quantifies the amount of money companies allocate to environmental management in proportion to the enterprise value of their stocks.



The environmental cost of GPF's domestic equities is lower than the benchmark (SET50 index), indicating that businesses in which GPF invests are environmentally conscious. From the data, it is found that the environmental cost of GPF domestic equity portfolio is 445.27 million Baht, which is lower than the benchmark of 521.78 million Baht, representing a difference of 14.66% **(Figure 12)**.

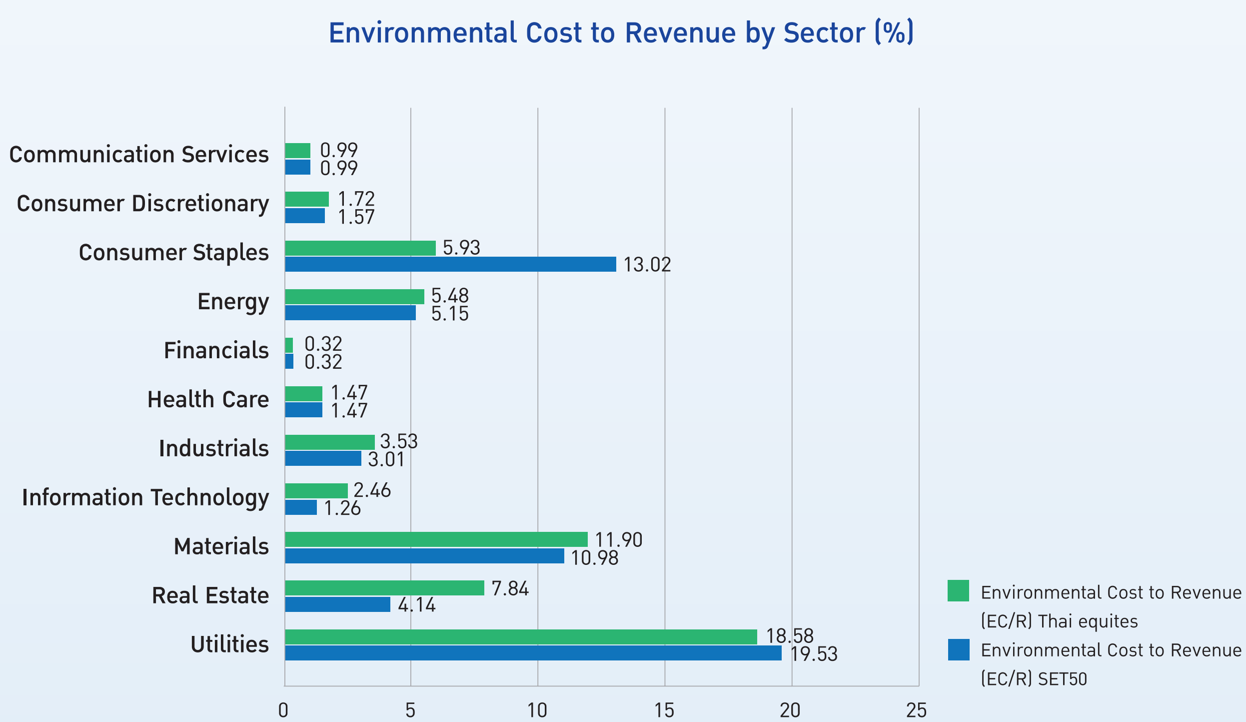
Figure 12 - Apportioned Environmental Cost (Thai equities)



Source: Data and Calculation from S&P Global Platform as of October 2023

The consumer staples sector is the industry with the lowest environmental cost compared to the benchmark. On the other hand, the utility sector, such as energy production, is the industry with the highest environmental expenditure. These costs account for approximately 20% when compared to revenue. The main factors contributing to these high environmental costs are greenhouse gas emission management, water resource usage, and air pollutant emissions, in that order **(Figure 13)**.

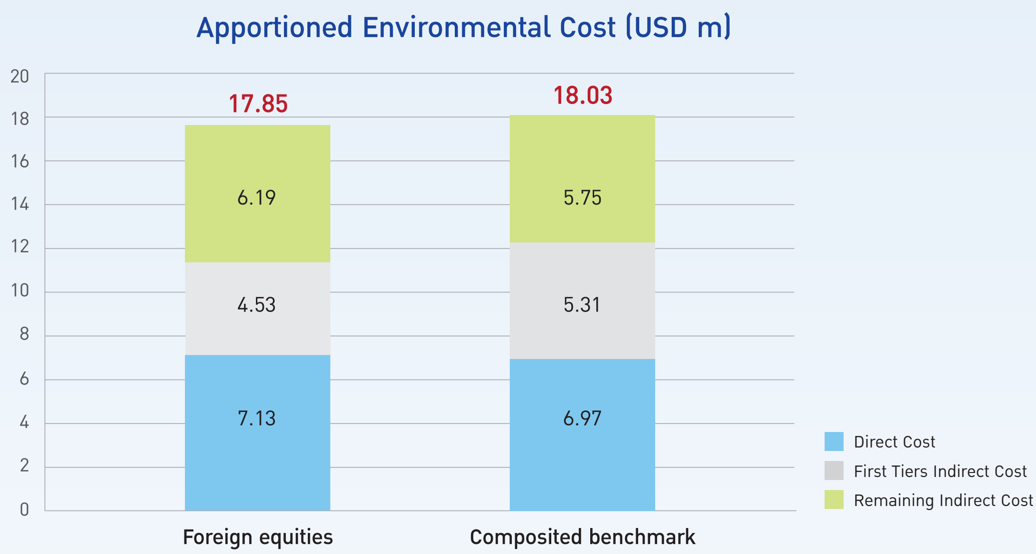
Figure 13 - Environmental cost to revenue by sector (%)



Source: Data and Calculation from S&P Global Platform as of October 2023

In the foreign portfolio of GPF, it is found that the environmental expenditures are slightly lower than the benchmark. The environmental cost for GPF portfolio stands at $17.85 million, while the benchmark expenditure is at $18.03 million **(Figure 14)**.

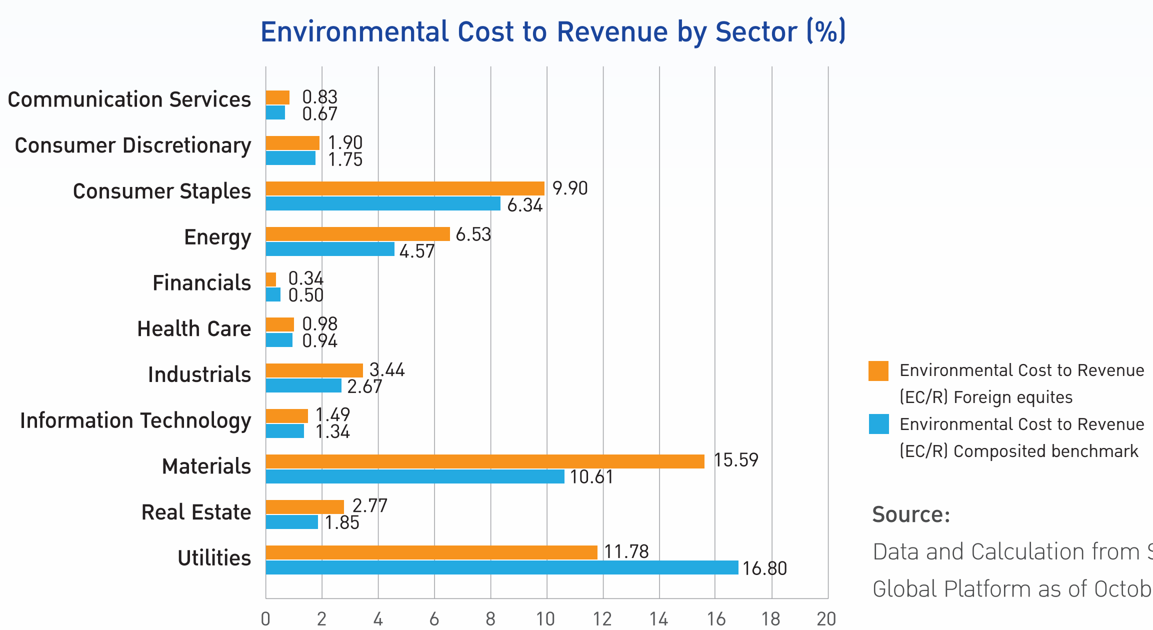
Figure 14 - Apportioned Environmental Cost (foreign equities)



Source: Data and Calculation from S&P Global Platform as of October 2023

Compared to the benchmark, the utility sector has lower environmental costs (approximately 5.02%). This is the main reason for having lower environmental costs when compared to the benchmark. On the other hand, the Material sector is considered the industry with the highest environmental expenditure in GPF foreign equity portfolio. The expenditure for this sector is approximately 16% when compared to income. The three main factors contributing to these high expenditures include natural resource usage, greenhouse gas emission management, and water resource usage. Meanwhile, the financial sector is the industry with the lowest environmental expenditures when compared to other sectors **(Figure 15)**.

Figure 15 - Environmental cost to revenue by sector (%)



Source:
Data and Calculation from S&P Global Platform as of October 2023

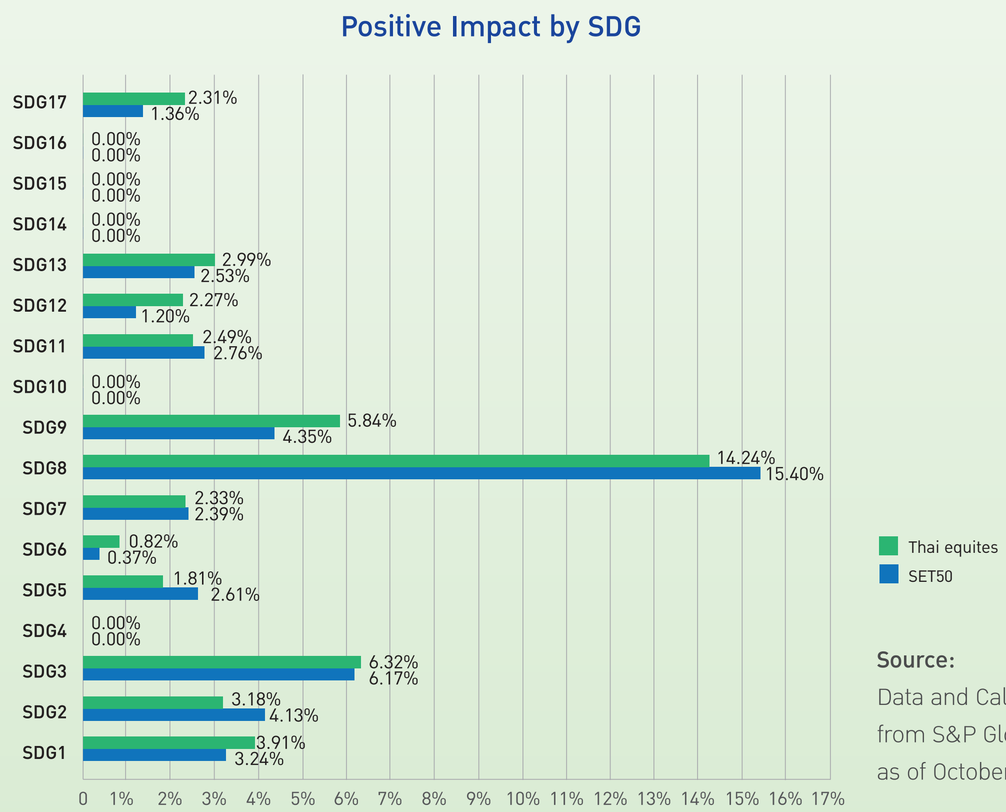
Based on the analysis conducted on the S&P platform, it is evident that the companies in which GPF has invested exhibit effective environmental management practices, leading to a positive impact on their costs. The reduced costs not only contribute to higher profits for these companies but also serve to mitigate their environmental footprint simultaneously.

2.4.2 Assessment of Revenue Impact on Sustainable Development Goals (SDGs) for Companies in GPF's Domestic Equities

In 2015, the United Nations established a total of 17 Sustainable Development Goals (SDGs) to promote sustainability across economic, social, and environmental dimensions. GPF assesses and analyzes companies in its domestic equities based on the revenue distribution derived from products, services, and technologies that align and support the 17 SDGs (mapped according to the Trucost Positive Impact Taxonomy, 2021). The assessment reveals that approximately half of the revenue from businesses in the portfolio significantly supports and positively impacts 12 SDGs.

SDG 8, related to decent work and economic growth, is the goal most strongly supported by the portfolio, accounting for 14.24% of the invested businesses' revenue, mainly from the financial sector. **SDG 9** (industry, innovation, and infrastructure) follows, driven by investments in energy, industry, technology, and communication. **SDG 3** (good health and well-being) is also positively impacted, with contributions from investments in healthcare, real estate, and consumer goods. **(Figure 16)**.

Figure 16 - SDG Aligned Revenue



Source:
Data and Calculation from S&P Global Platform as of October 2023

SDG	Sustainable Development Goals Descriptions
1	End poverty in all its forms everywhere
2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3	Ensure healthy lives and promote well-being for all at all ages
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5	Achieve gender equality and empower all women and girls
6	Ensure availability and sustainable management of water and sanitation for all
7	Ensure access to affordable, reliable, sustainable and modern energy for all
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10	Reduce inequality within and among countries
11	Make cities and human settlements inclusive, safe, resilient and sustainable
12	Ensure sustainable consumption and production patterns
13	Take urgent action to combat climate change and its impacts
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Source: (United Nations, 2015a).

Moreover, GPF portfolio analysis emphasizes Goal 11 (Sustainable Cities and Communities), Goal 12 (Responsible Consumption and Production), and Goal 13 (Climate Action) through direct investments and mutual funds, contributed to the three SDGs as follows:

- **Infrastructure and Real Estate:** Investments in special infrastructure and digital communication networks play a crucial role in urban and community development, supporting Sustainable Development Goal 11.

- **Real Estate and Office Management:** GPF investments in real estate and office management prioritize environmentally friendly practices, such as reducing greenhouse gas emissions, aligning with the targets of Sustainable Development Goal 13.

- **Sustainability Bonds:** Investments in green bonds linked to environmental projects help address climate change (Goal 13) and promote the sustainability of private businesses operating responsibly (Goal 12). Moreover, Investments in bonds for sustainable public transportation businesses are often used to develop clean transportation, contributing to sustainable urban and community development (Goal 11). Government bonds for sustainability also contribute to Goals 11 and 13 by utilizing funds raised for relief projects, mitigating the impacts of COVID-19, and the development of clean energy transportation projects, such as the Orange Line Cultural Center Extension (Suvintawong).

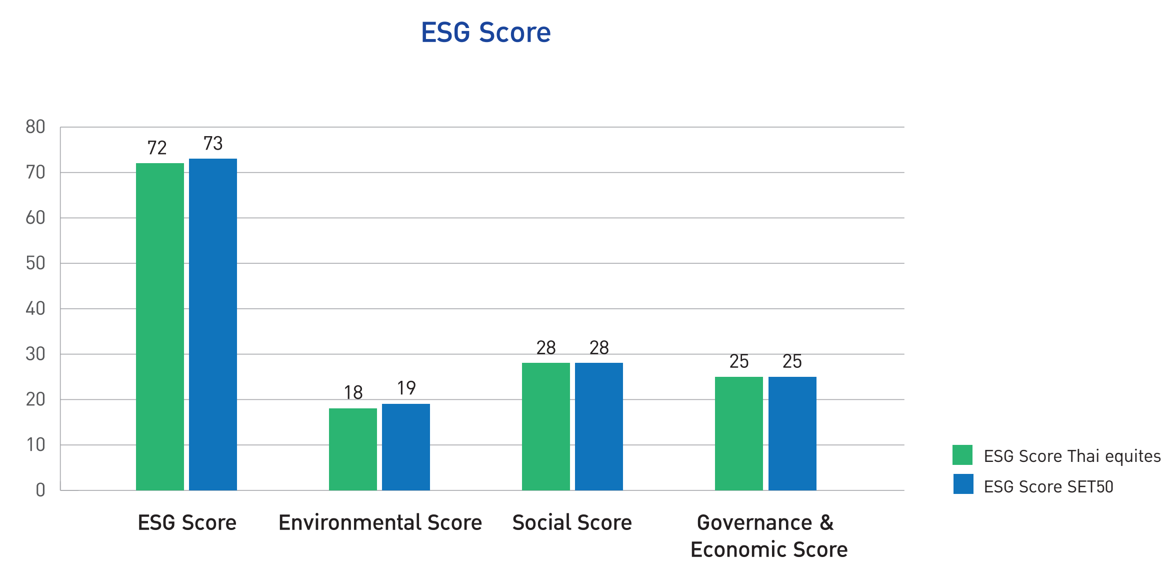
GPF commitment to these SDGs showcases its dedication to responsible and sustainable investment practices across various sectors. GPF can manage the capital allocation appropriately to support these SDGs. However, there is room for improvement for certain companies in our portfolio to enhance their ability to support SDGs in the future.

2.5 Assessment of the ESG Performance: The ESG Score

To assess the ESG integration in our portfolio investment, GPF uses the ESG Score which is an assessment of Environmental, Social, and Governance operations, including risk management, opportunities, and related impacts, focusing on sustainable development of domestic equity portfolio. It utilizes assessment data from S&P Global and assigns scores ranging from 0 to 100, where 100 represents the highest score. ESG scores are crucial for investors who prioritize social responsibility and aim to invest in businesses that emphasize sustainable development. These scores can be used as a basis for comparing the operations of businesses based on various factors. S&P Global tool evaluates 65 relevant factors, such as human rights management, biodiversity, and ethical business conduct.

From **Figure 17**, the overall ESG score for the GPF's domestic investment portfolio is 72 out of a maximum score of 100. This score closely aligns with the SET50 index, which has a score of 73.

Figure 17 - The ESG Score

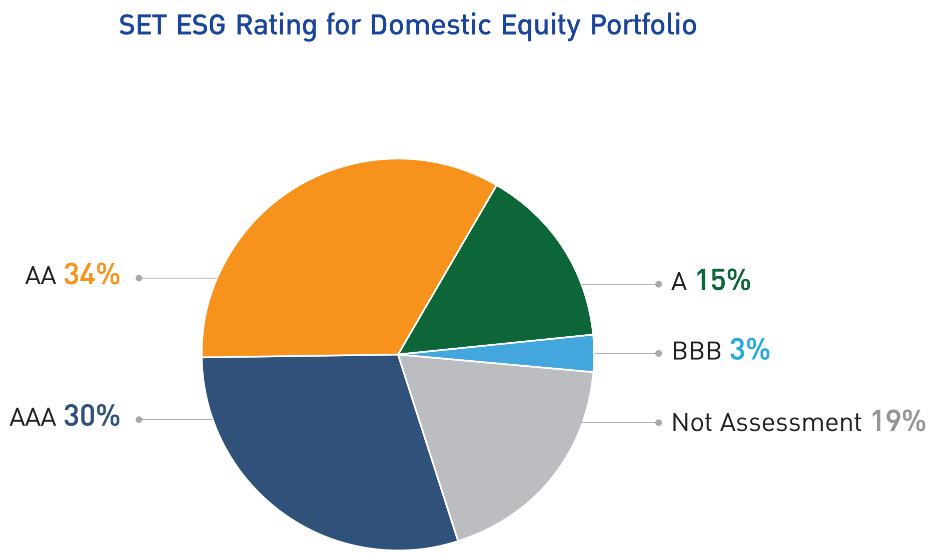


Source: Data and Calculation from S&P Global Platform as of October 2023

The top three sectors in the domestic equities with the highest overall ESG scores across all three dimensions are Materials, Communication Services, and Utilities. Conversely, the three lowest-scoring sectors include Real Estate, Health Care, and Information Technology. Approximately 70% of the companies in the Thai equity portfolio (50 companies) have ESG scores of 70 or higher. This indicates that listed companies in Thailand, particularly those in the top sectors, are effectively managing and operating with a focus on sustainable development.

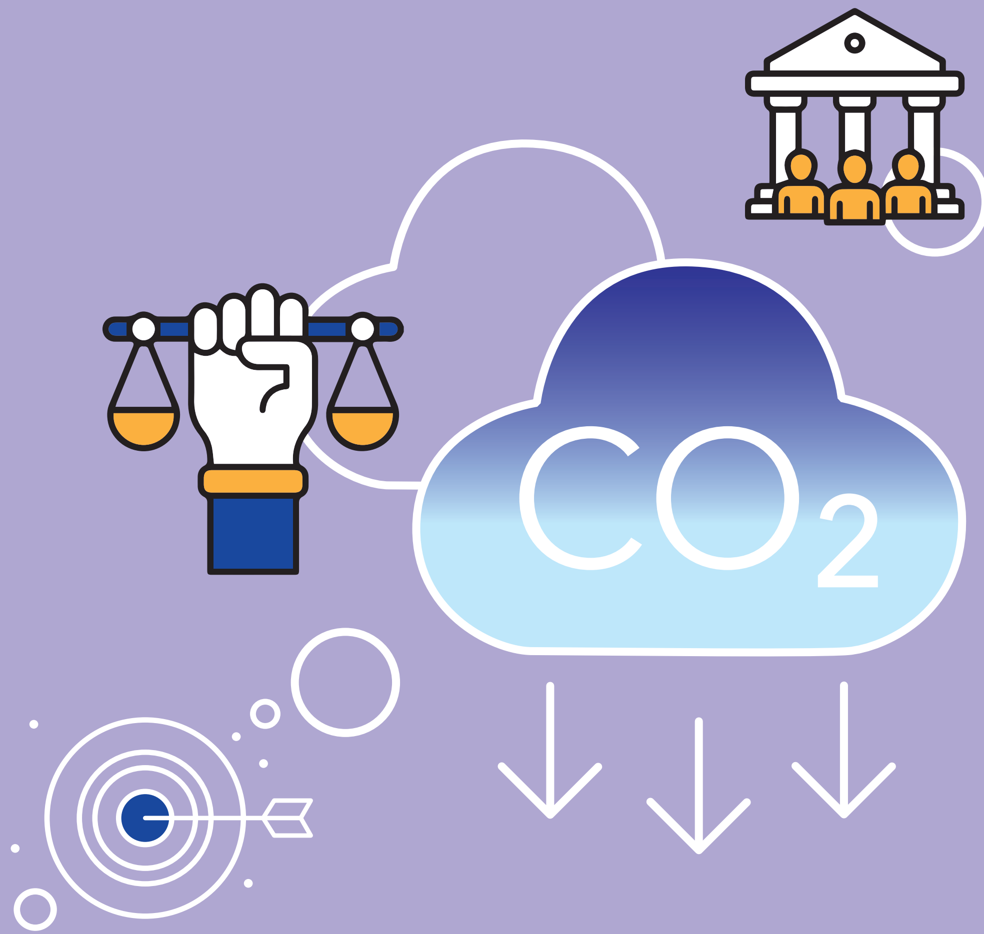
From this information, it is evident that the ESG scores of the domestic equities' portfolio are in close alignment with the companies listed in the SET50 index. GPF has incorporated ESG factors into its investment decision to invest in businesses that prioritize sustainability and social responsibility. Additionally, this approach helps mitigate financial risks associated with potential ESG-related issues that could impact businesses in the future.

Figure 18 - SET ESG Rating for domestic equity portfolio



Furthermore, the Stock Exchange of Thailand (SET) evaluates the Environmental, Social, and Governance (ESG) performance of listed companies and assesses their credibility through the SET ESG Ratings. These ratings provide valuable information for investors when making investment decisions. Approximately 79% of our Thai equities are ranked highly, with ratings of AAA, AA, and A (details provided in **Figure 18**). This not only assures investees of our portfolio's commitment to sustainable development but also indicates our strong emphasis on ESG factors.

However, we aim to extend our efforts to engage with small and medium-sized enterprises to support and promote human rights practices by engaging more with small and medium enterprises to support and promote human rights practices and other dimensions of sustainability.



3

2023 Highlight

3. 2023 Highlight: Stewardship Activities

Active Ownership

We believe that active ownership is a powerful means of safeguarding long-term shareholder value, enhancing long-term returns, and driving positive change. We engage in active ownership by exercising our voting rights for our holdings, participating in Annual General Meetings (AGMs), and engaging fully with companies.

3.1 Proxy Voting

GPF has adopted customized Proxy Voting Guidelines (GPF-Proxy Voting Guidelines) to guide the exercise of voting rights for holdings in our portfolio. For domestic equities, we have conducted proxy voting for shareholders' meetings and have actively exercised our right to vote and raise concerns when negative incidents occur in the companies in which GPF has invested. In Q1-Q3 of the year 2023, we participated in ninety-eight meetings (100%). The most significant issues we voted against are:

- The appointment of independent directors due to continuous tenure exceeding 9 years, low attendance at board meetings (less than 75%), and individuals involved in insider trading.

- The allocation of capital increases under the General Mandate, due to the unspecified allocation of funds.

- The remuneration of Directors and/or Board of Committee, as it is deemed excessively high in comparison to the company's profits.

3.2 Positive Engagement

GPF believes that effective engagement can benefit companies, investors, and society at large. We mainly engaged with the investees to share information and thoughts on how to make improvements in terms of ESG.

Since 2022, we have engaged with 10 Public Limited Companies (PLCs) across 8 business sectors, namely agricultural and food, consumer goods, financial, industrial products, real estate and construction, energy services, and technology, to consult on human rights and climate change as primary concerns. In conclusion, we have made several key findings. Every company prioritizes business sustainability and has established a committee or sub-committee for sustainability to guide its objectives. However, each business sector has a different focus within ESG parameters, depending on specific challenges and risks. For example, service businesses prioritize the governance (G) and social (S) aspects of supplier information safety over environmental (E) issues, etc. This year we engaged with 10 companies, and focused on climate change.

3.2.1 Net Zero Pathway Engagement Program

For environmental practices, our latest round of engagement focused on climate change and the transition toward Net Zero emissions. As Thailand has declared its commitment to achieving Carbon Neutrality by the year 2050 and a Net Zero greenhouse gas emissions target by 2065, GPF as a government agency and a responsible investor can support this goal by pushing the investee companies to operate their business to achieve the Net Zero goal.

In 2022, GPF has begun calculating and disclosing the carbon footprint of domestic equity portfolios. Analysis of the composition (Attribution) of carbon footprint helps identify our investee companies, which have a significant impact on the carbon footprint in our portfolio. If such companies have operated to reduce greenhouse gas emissions, it will also help reduce the carbon footprint of our portfolio.

We reported carbon footprint estimates (Scopes 1 & 2) of our equity portfolio as part of the climate risk assessment. Two metrics, calculated according to the methodology of the Partnership for Carbon Accounting Financials (PCAF), are presented here.

- **Apportioned Carbon Emission** shows GPF carbon footprints from to ownership in the investee companies. The companies' aggregate emissions are apportioned by the proportion of holdings to the enterprise value and are shown in tons of CO_2 equivalent.

• **Weighted Average Carbon Intensity (WACI)** is the exposure to the carbon intensity of a portfolio, considering percentages invested in each company. Technically, WACI is calculated by summing the product of each company's weight in the portfolio with that company's carbon-to-revenue intensity. Higher figures indicate larger exposure to carbon.

Domestic Equity Portfolio generated carbon emissions measured by Apportioned Carbon Emissions of approximately 130,000 tCO_2e (Ton CO_2 Equivalent) and weighted average carbon intensity (WACI), which is a measure of carbon emissions normalized by revenues. (Amount of Carbon emissions per 1 million bath investment (revenue). It's about 24 TCO_2E/1 million Baht.

Based on the Weighted Average Carbon Intensity (WACI) data, we have identified the Top 10 WACI Distributor Companies with the highest carbon emissions in our Domestic equity portfolio. Consequently, we engage with these Top 10 WACI Contributor companies, which significantly impact our portfolio due to their high rank in carbon emissions (measured by WACI) and their substantial investment proportion. Here are our findings:

• **Six out of ten companies which are significant contributors to carbon emissions**, mainly operating in the energy and utilities sectors. Two out of ten companies are in the material sector, while the remaining two are in the transportation and real estate sectors.

• **Six out of ten companies have already announced Net Zero or Carbon Neutrality Targets.** The four companies that have not yet announced Net Zero Targets operate in the Energy, Utility, Transportation, and Real Estate sectors.

Example of the WACI Contributor company:

Disclosed Carbon Emissions (Scope 1,2,3) in 2022

(Data. As of Sep 2023)

A	total of **13.7** million TCO_2,	the investment amount **1.2** billion Baht	**6.4** % domestic equity
B	total of **14.3** million TCO_2,	the investment amount **0.53** billion Baht	**6.4** % domestic equity

The GPF team has engaged with the four companies that have not announced Net Zero Targets to ensure their commitment to setting goals and operational guidelines to achieve Net Zero shortly. Here are the key points from our engagements:

1) **Utility sector company:** While the company has not officially announced a Net Zero target, it plans to declare Net Zero 2050, covering Scopes 1&2, by 2023. Operational plans include enhancing power plant efficiency to achieve a more than 25% reduction in Carbon Intensity by 2030 and increasing renewable energy proportion to at least 40% of total production capacity. Additionally, exploring Carbon Capture Utilization & Storage (CCUS) technology and alternative energy sources like Hydrogen Fuel.

2) **Energy sector company:** Currently studying the establishment of a Net Zero 2050 target and developing a Decarbonization Roadmap, with plans to announce intentions within the year. Operational plans include increasing renewable energy proportion to no less than 25%, expanding Carbon Capture, Utilization, and Storage (CCUS) capacity at production bases, and allocating 60% of investment capital in Energy Technology during 2023 - 2025. Studying the operational framework of Task Force on Nature-related Financial Disclosure (TNFD), focusing on biodiversity.

3) **Transportation sector (Shipping):** Committed to the International Maritime Organization's (IMO) goal of achieving net-zero greenhouse gas emissions by 2050 but may not set its own Net Zero target due to operational challenges related to compliance with various conditions and potential changes in IMO regulations.

4) **Real Estate sector company:** Currently in the process of setting a Net Zero target for 2050. Forming a sustainability committee and implementing clean energy initiatives such as solar rooftops, maintenance of cooling machines, and installation of sensor systems for escalators. Facing challenges in adapting long-standing spaces to meet LEED green building standards. Integrating a 3-year ESG roadmap into the group's strategy towards a Net Zero pathway. Additionally, we have engaged in dialogues with other companies to understand their challenges and business opportunities in transitioning towards a Net Zero pathway.

Case study: GULF site visit

GPF has entered an engagement on environmental issues with GULF Energy Development Public Company by visiting and studying Gulf Nong Saeng (GNS) power plant in Saraburi Province, Thailand. The objective of the engagement is to understand GULF's Net Zero Pathway

This power plant is one of the natural gas-fired Independent Power Producer: IPP project under the Gulf JP Company Limited (GJP) group, with a total installed electricity production capacity of 1,668.2 megawatts. The company aims to minimize negative environmental impacts that may result from their operations, and also positively contribute to the social and Net Zero Pathway.

There are 4 focus areas

to operate to tackle with the environment, including climate change, as below:

Water Management:
reusable water

Emission Management:
Solar cell

Noise Control:
Use a noise barrier, three walls, green area around the plant

Waste Management:
Reuse / Recycle/ Rehabilitate

The company is also working on the operation to reduce heat rate, for example improving their machines and purchasing a new model machine, which can reduce more heat rate to replace the old one. The company also established the Agricultural Learning Center and Demonstration Farm around the Power Plant area. This serves as a circular economy. The objective is to maintain good relationships with the community help them learn sustainable agricultural practices and disseminate knowledge to farmers nationwide. Furthermore, the establishment of this center reflects the collaborative efforts between the community and the industrial sector.

From the site visit, GPF understands GULF's pathway to Net Zero more and ensures that the company is making the effort to minimize the negative environmental impact and to achieve the Net Zero target.

3.2.2 Social focus: human rights

All companies which we have engaged emphasize human rights in their business operations through the announcement of human rights policies based on international standards such as the United Nations Guiding Principles on Business and Human Rights (UNGPs), the Universal Declaration of Human Rights (UDHR), and standards set by organizations like the World Business Council for Sustainable Development (WBCSD) and the International Labour Organization (ILO). These policies apply to all stakeholders, including employees, customers, and partners (including contractors).

Three main risk issues have been identified:

- **Privacy & Personal Data Protection** under the Personal Data Protection Act (PDPA). Companies manage this risk by establishing guidelines based on the PDPA and implementing measures such as establishing Data Protection Committees or conducting training programs.

- **Occupational Health & Safety**, is governed by both internal policies and international legal regulations. Manufacturing businesses face higher risks, particularly due to the COVID-19 pandemic.

- **Products & Services, and Customer Safety:** most companies manage risks related to occupational health & safety, and products and services by publishing standard operational procedures for safety and providing training guidelines for employees, partners, or contractors. Criteria for raw materials manufacturing and services with quality control have also been established, along with training guidelines for all relevant parties.

However, many companies have highlighted the challenge of improving human rights practices, particularly concerning medium and small partners who may not be prepared to comply.

3.2.3 Governance

As we evaluate not only the environmental and societal aspects but also the critical components of good governance, the subsequent examples elucidate our constructive engagements with specific companies. Consequently, we intend to persist in these engagements with other companies across both domestic and global equities.

Here are two cases as examples:

Case I:

One of the companies in which GPF has investments had two Board Directors, one of whom was also involved in an affiliated company, prosecuted by the Securities and Exchange Commission (SEC) with Civil Sanctions for buying company shares based on insider information and supporting such violations.

In response, GPF followed the Negative List guidelines and temporarily suspended investments in both shares and debentures before meeting with the Company's executives. GPF engaged with the company twice:

First Engagement:

GPF engaged collaboratively to discuss the company's facts and its preventive measures while urging positive engagement. The Company's Chairman confirmed effective management policies with preventive measures regularly and strictly reviewed. Reporting measures were implemented for stocks held by board members and executive officers, with strict prohibitions on share trading during silent periods, including strict control over information access. Board directors involved were informed of the consequences, fined, and required to resign from their positions at the end of the prohibition period.

Second Engagement:

GPF engaged with the company's corporate governance division to ensure business improvements and prevent future incidents. The company implemented improved governance measures, including setting up a sub-committee for Nomination and Remuneration and Governance, introducing practical guidelines, and submitting reports to the board of directors at least twice a year.

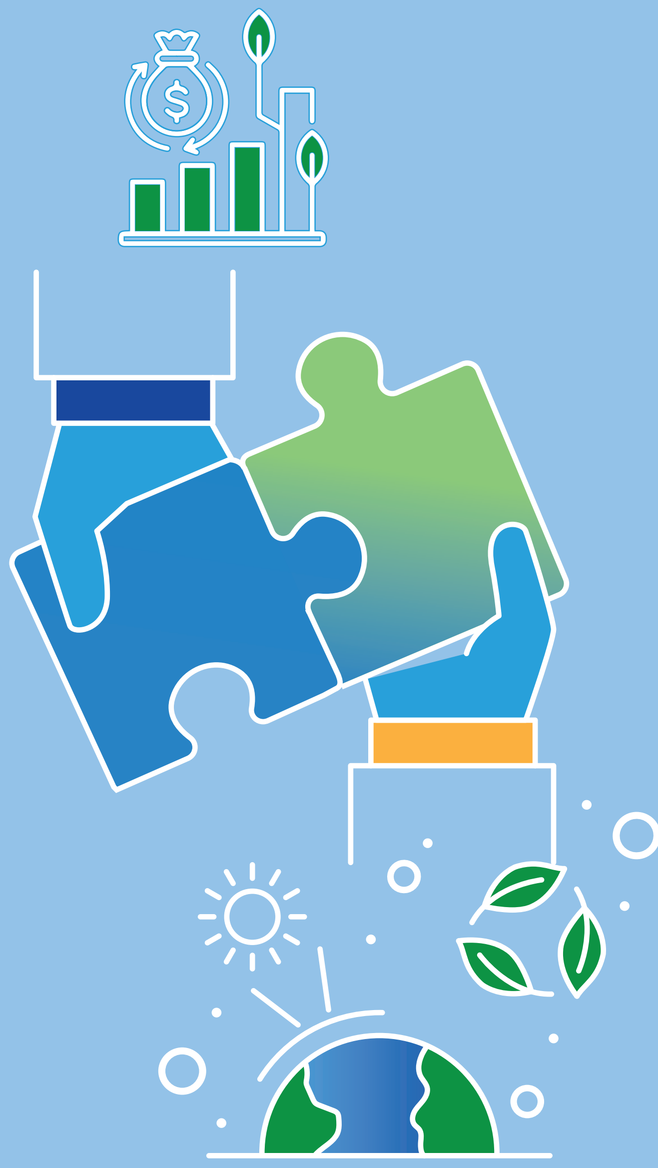
Additionally, securities trading policies were extended to include board directors, executives, and officers. This engagement highlighted the company's focus on good governance with proper controls and increased measures to prevent conflicts of interest and the use of internal information. As a result, based on the Negative List guidelines, the company was not listed, and GPF lifted the suspension on investment.

Case II:

This case involves monitoring the progress of executives of a business entity within GPF's stock universe, focusing on their use of privileged internal information for purchasing company shares.

In a specific instance in the healthcare sector, executives faced legal action for trading shares based on insider information. GPF identified transparency issues in corporate governance and diligently followed up on the matter, assessing causes, problems, and corrective plans. If the company fails to implement effective and appropriate corrective measures upon examination, GPF is prepared to remove it from our universe. While the monitoring process revealed actual misconduct by the company, it has taken corrective actions and implemented measures to prevent similar incidents in the future.

GPF continues to closely monitor and oversee the operations of invested companies, along with events related to ESG in Thai and foreign equities, ensuring that our investments avoid engaging in activities with adverse ESG impacts.



4 GPF's Partnership and Collaboration

4. GPF's Partnership and Collaboration

GPF pursued promoting Responsible Investment, communicating our ESG work, and exchanging experiences about driving SDG issues. Here are our highlight activities

- **Bloomberg-GPF Sustainability Forum 2023**

GPF has co-hosted the event Bloomberg-GPF Sustainability Forum 2023 Bloomberg-GPF Sustainability Forum 2023 on 21 Mar 2023. Topic: "Accelerate Sustainability & Climate Finance – Measure, Mitigate and Manage" to coordinate cooperation among public and private sectors in solving global climate change problems together. There are some key messages from the seminar as follows:

"Good Governance is an important foundation of Sustainability."

There are 3 elements of tackling climate change, including **Measure:** Data must be collected, measured, and reported under the same standards, such as Green Taxonomy. **Mitigate:** The Financial sector plays a big part in reducing greenhouse gas. It should support the projects reducing the impacts of climate change. **Manage:** Investment in Technology is important with the high cost e.g. Infrastructure in the electrical grid. Therefore, it requires the cooperation of both the public and private sectors.

- **IESG South Africa, Johannesburg.**

GPF joined the event to share the ESG Integration Journey of the Thai Government Pension Fund: "ESG is a journey of a moving target."

- ## Responsible Financing and Infrastructure 7th Bangkok Business and Human Rights Week,

The Role of Responsible Business Conduct in balancing development objectives with climate commitments. GPF joined the event to share its experience of the case for responsible infrastructure to gain more understanding of the best practices and current frameworks for financing sustainable infrastructures, which are key to delivering climate and development objectives in the region.

- ## OECD-ADBI-IRDAI Roundtable on Insurance and Retirement Savings in Asia Hyderabad City, India.

GPF shared experiences about how to establish and strengthen voluntary retirement savings by convincing government officials to contribute more than compulsory. There are some strategies for example, Gain Benefit Tax reduction, accumulate wealth and discipline, Reward motivation, and Application to calculate retirement plan. Moreover, we shared the experience and knowledge about using technology and innovation to better communicate on pensions and engage individuals with retirement savings.

- ## Sustainable Investment Seminar on "Investment management and Ethics"

It was organized by the International Labour Organization (ILO) and the Social Security Office. The objective was to enhance capabilities, particularly in research and services related to actuarial science in insurance, investment, ethics, and communication. GPF shared its belief in ESG investments, which will give favorable returns in the long term. GPF also pointed out that operating in the ESG domain involves working with a 'moving target' that is subject to constant changes. Collaborative efforts from all stakeholders are crucial to reduce the ESG impacts.

5. Outlook

In 2024, GPF is continuing to implement the responsible investment as follows:

1. **Decarbonized Portfolio:** As Thailand announced its goal to reduce greenhouse gas emissions by 30-40 percent by 2030. It will be carbon neutral in 2050 and have net zero greenhouse gas emissions (Net Zero) by 2065. We are one of the biggest institutional investors in Thailand with the responsibility to society to protect the environment and to support the country's ambition. We will decarbonize our investment portfolio focusing on Thai Equities first then extend to other asset classes in the future

2. **Impact investing:** We will set up an investment portfolio, which seeks to generate financial returns while also creating a positive social or environmental impact. We will consider a company's commitment to corporate social responsibility to positively serve society.

3. **Human rights supply chain engagement and training:** We will continue to work on Human rights issues to escalate the investment industry on human rights practice. We will support the human rights practice for small and medium companies on the whole supply chain. We will collaborate to work with big companies and global organizations such as UNDP to address human rights in business for the investment industry such as training, or collaborative engagement.

GPF has prioritized the pursuit of sustainable operations with tangible actions. The Fund is dedicated to pioneering ESG investments in Thailand, aiming to set the standard in this field. Furthermore, it seeks to foster partnerships in responsible investing through initiatives such as "ESG Collaborative Engagement." GPF recognizes that achieving positive impacts through ESG investments necessitates collective efforts from all sectors within the sustainable investment ecosystem.

DEFINITION

Carbon Company Breakout: C/R Intensity (TCO2E/USD M) This is the Carbon to Revenue (C/R) intensity of the portfolio's or benchmark's underlying constituents.

Carbon Company Breakout: C/R Intensity Contribution (%) This is metric shows the marginal impact on the portfolio's relative carbon efficiency from the inclusion of each constituent in isolation of all other constituents.

Carbon Company Breakout: Carbon Apportioned (% OF TOTAL) This is the absolute quantity of portfolio-owned emissions attributed to an individual company, as at the analysis date, expressed as a percentage of total portfolio-owned emissions.

Carbon Company Breakout: Carbon Apportioned (TCO2E) This is the absolute quantity of portfolio-owned emissions attributed to an individual company, as at the analysis date.

Carbon Footprint Summary: Apportioned Carbon Emissions (TCO2E)This is the absolute quantity of portfolio or benchmark emissions attributed from their underlying constituents on an ownership basis, as at the analysis date, based on the defined GHG methodology you select. Absolute carbon emissions are apportioned from a company to a portfolio based on equity ownership (market capitalization) or share of financing (enterprise value Including Cash). If you own 1% of a company's shares, or finance 1% of its total debt, you also own 1% of that company's emissions.

Carbon Footprint Summary: C/R v (TCO2E/USD M) This is the Carbon to Revenue (C/R) intensity of the portfolio and benchmark using the absolute apportioned carbon emissions and apportioned revenues, calculated on an ownership basis (value of holdings divided by chosen apportioning metric), as at the analysis date. This metric gives an indication of carbon efficiency with respect to output as revenues are closely linked to productivity.

Carbon Footprint Summary: C/V Carbon Footprint Summary Table: (TCO2E/USD M) By normalizing Total Carbon Emissions, market participants can compare portfolios of different sizes. The Carbon to Value (C/V) Invested metric offers one approach for doing this, taking the total Carbon Emissions (apportioned using either market capitalization or enterprise value Including Cash) and dividing by the value of holdings in a portfolio or benchmark on a given date.

Carbon Footprint Summary: WACI (TCO2E/USD M): The Weighted Average Carbon Intensity (WACI) metric takes the carbon intensity (total carbon emissions divided by total revenue) of each holding and multiplies it by its investment weight (the current value of the holding relative to the current value of the whole portfolio). The final footprint is the sum of these weighted intensities. Unlike other approaches, the calculation does not require market cap or enterprise value Including Cash as inputs and can therefore be applied more easily to asset classes beyond equity and listed fixed income.

Direct + First Tier Indirect Direct emissions are inclusive of GHG Protocol's scope 1 emissions, plus any other emissions derived from a wider range of GHGs if relevant to a company's operations (e.g., CCl4, C2H3Cl3, CBrF3, CO2 from Biomass). First-tier indirect emissions are defined as GHG Protocol scope 2 emissions, plus the company's other first-tier upstream supply chain—its direct suppliers. The goal of this approach is to include some of the company's most relevant upstream scope 3 emissions, while limiting the extent of the double counting of emissions.

GHG Methodology There are a variety of greenhouse gas (GHG) methodologies to choose from prior to running a footprint: Scope 1, Scope 1 + Scope 2, Scope 1 + First-tier Indirect, Direct + First-tier Indirect, or Scope 1 + 2 + 3 upstream.

Scope 1 Scope 1 emissions are from directly emitting sources that are owned or controlled by a company. Reference: Greenhouse Gas (GHG) Protocol.

Scope 1 + First Tier Indirect Scope 1 emissions are from directly emitting sources that are owned or controlled by a company (reference: Greenhouse Gas (GHG) Protocol). First-tier indirect emissions are defined as GHG Protocol scope 2 emissions, plus the company's other first-tier upstream supply chain—its direct suppliers. The goal of this approach is to include some of the company's most relevant upstream scope 3 emissions, while limiting the extent of the double counting of emissions.

Scope 1 + Scope 2 Scope 1 emissions are from directly emitting sources that are owned or controlled by a company. Scope 2 emissions are from the consumption of purchased electricity, steam, or other sources of energy generated upstream from a company's direct operations. Reference: Greenhouse Gas (GHG) Protocol.

Scope 1 + Scope 2 + Scope 3 Upstream Scope 1 emissions are from directly emitting sources that are owned or controlled by a company. Scope 2 emissions are from the consumption of purchased electricity, steam, or other sources of energy generated upstream from a company's direct operations. Scope 3 upstream includes indirect greenhouse gas emissions, such as from the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc. Reference: Greenhouse Gas (GHG) Protocol.

Scope 1 + Scope 2 + Scope 3 Upstream + Scope 3 Downstream Scope 1 emissions are from directly emitting sources that are owned or controlled by a company. Scope 2 emissions are from the consumption of purchased electricity, steam, or other sources of energy generated upstream from a company's direct operations. Scope 3 upstream includes indirect greenhouse gas emissions, such as from the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc. Reference: Greenhouse Gas (GHG) Protocol. Scope 3 Downstream includes downstream indirect greenhouse gas emissions associated with the use of sold goods and services.

Sector Carbon Intensity: Portfolio/Benchmark GICS Sectors C/R Intensity (TCO2E/USD M) This table summarizes the Carbon to Revenue (C/R) intensity of each portfolio and benchmark to each GICS sector.

Portfolio Score Met The weighted-average Score Met, across a portfolio of companies.Portfolio Score Unmet. The weighted-average Score Unmet, across a portfolio of companies.Score MetThe financial materiality weighted E, S or G score, i.e. the contribution to Total ESG score. For example, if the E score achieved was 60 out of 100, and E's financial materially weight was 25%, then the Score Met would be 15 (60x25%).Score UnmetThe reverse of the Score Met. For example, if the E score achieved was 60 out of 100, then a further 40 could have been achieved. If E's financial materiality is 25%, then the 40 represents a 10 point contribution (40x25%) that E could have made to the final ESG score, but did not.

Environmental Footprint Company Breakout: Environmental Footprint (%) Total direct and indirect external cost as a percent of revenue. The external cost is an estimate of the value of a service based on the cost of damage that results from its loss. It is based on the assumption that the cost of maintaining an environmental benefit is a reasonable estimate of its value.

Environmental Footprint Company Breakout: Environmental Footprint Contribution (%) This is a company specific metric showing the marginal impact on the portfolio's relative environmental efficiency from the inclusion of each company in isolation of all other companies.

Environmental Footprint Summary: Apportioned Environmental Cost (USD M) This is the apportioned environmental costs of all constitutents analyzed in the portfolio or benchmark, as at the analysis date. The ownership share is multiplied by each constituent's Total Direct + Indirect Cost (USD M).

Government Pension Fund

990 Rama IV Road, Silom, Bangrak, Bangkok 10500

Tel.: +66 2636 1000 Fax: +66 2636 0603-4

website: www.gpf.or.th e-mail: member@gpf.or.th