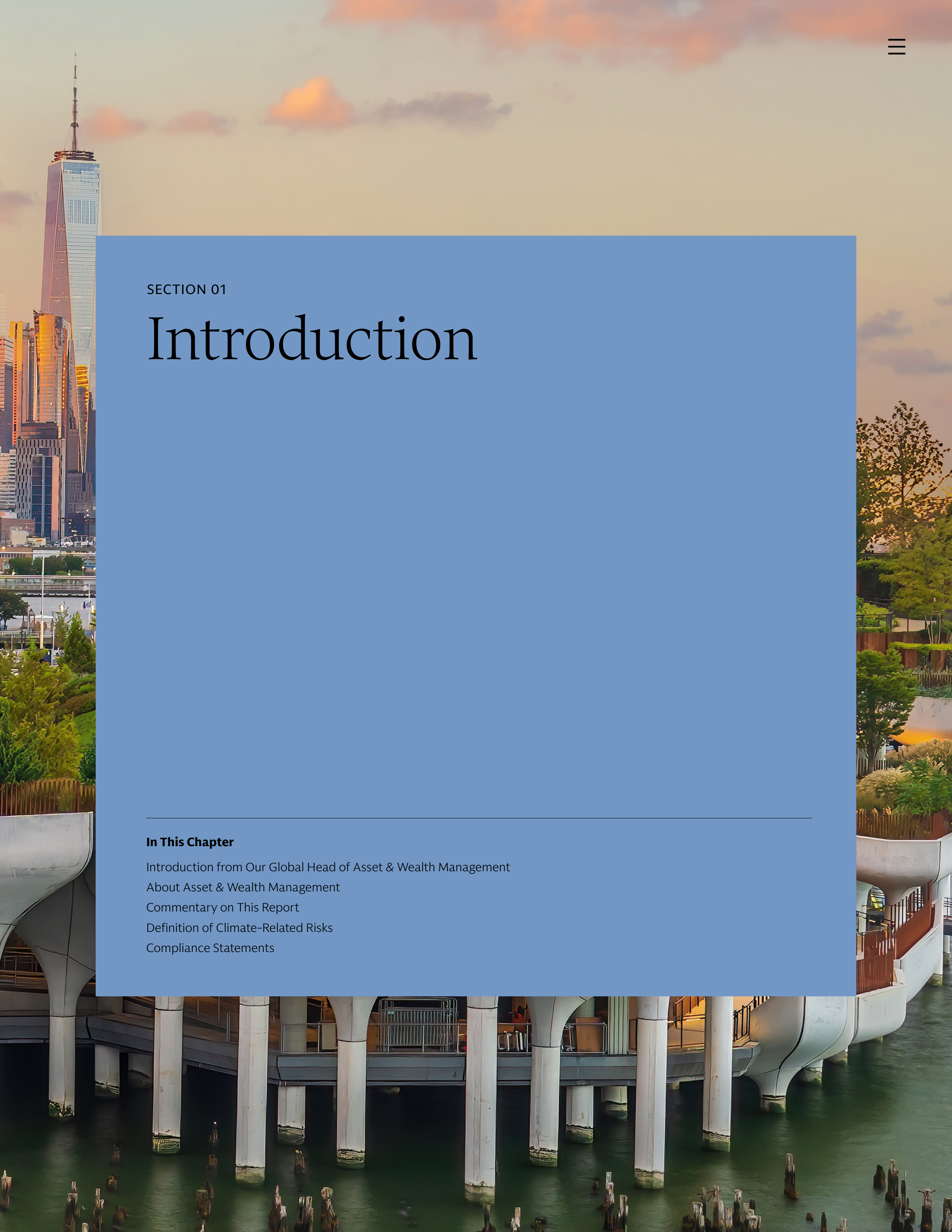
Goldman Sachs

GOLDMAN SACHS ASSET & WEALTH MANAGEMENT

TCFD Report 2023

Table of Contents



SECTION 01

Introduction

In This Chapter

Introduction from Our Global Head of Asset & Wealth Management

We recognise that climate change is a material driver of diverse, interrelated, and persistent risks and opportunities for our clients. To address this, we remain committed to leveraging our market insights and capabilities across our platform to provide products and solutions that help our clients respond to the scale and urgency of climate change.

As a leading global asset and wealth manager with a diverse and global client base, we take a pragmatic approach to the climate transition, partnering with our clients to uncover opportunities for transformative impact and financial returns[1] within the climate transition.

Our clients have a wide range of investment philosophies and operate across different geographies and regulatory environments. This requires us to offer a broad range of solutions, to leverage data and analytics to inform our investment decisions, and work with our clients and portfolio companies to help them navigate the transition.

Our *One Goldman Sachs* approach combines the breadth of our platform and allows us to bring clients the best of Goldman Sachs to help achieve their sustainability and climate goals.

We recognise that we have a critical role to play in this transition, channelling funding to transform, decarbonise, and build resilience within energy systems, transportation, supply chains, and infrastructure. As part of our holistic approach, we consider climate alongside other significant macro-trends, such as the rise of artificial intelligence, the growing importance of nature and biodiversity considerations, continued inflationary pressures, and shifting regulatory environments.

We deploy capital into both climate and transition solutions, such as battery storage, water treatment, resiliency infrastructure, and biofuels. As a result of these investment efforts, we are proud that Asset & Wealth Management (AWM) has accounted for 43% of the approximately $555 billion in commercial activity achieved to date of the firmwide $750 billion sustainable finance target.[2,3]

We continue to monitor and manage the global and regional policies and regulations that shape a macro-environment where investors can deploy climate transition capital in an efficient, effective, and transformative manner.

We also believe that decision-useful climate risk data and analytics are critical to informing sound investment decision-making. Since our last ***GS AWM UK TCFD Report***, we have focused on further embedding and expanding our climate- and sustainability-focused resources within AWM, enhancing our data environment, encouraging greater disclosure within our investments, and developing and leveraging new tools and analytical capabilities to manage and mitigate climate risks within our investment portfolios.

Our view is that investors also need to act on that data through stewardship and engagement. In this manner, we have continued to strengthen engagement processes with our investments to help them benefit from the transition and build resilient business models. We are working with investments to support them in their decarbonisation journey, reducing their transition and physical risk exposure. Our approach is focused on value-accretive opportunities for our investments as we believe pragmatic and well-informed climate-related risk and opportunity management can directly and positively impact investment returns.

With that in mind, we are pleased to share our 2023 Task Force on Climate-Related Financial Disclosures (TCFD) report focused on Asset & Wealth Management and its business activities carried out within two of our material United Kingdom legal entities.

Looking ahead, we are focused on helping our clients achieve their climate goals and further contributing towards the climate transition through the growth of our offering.

Marc Nachmann
Global Head of Asset & Wealth Management

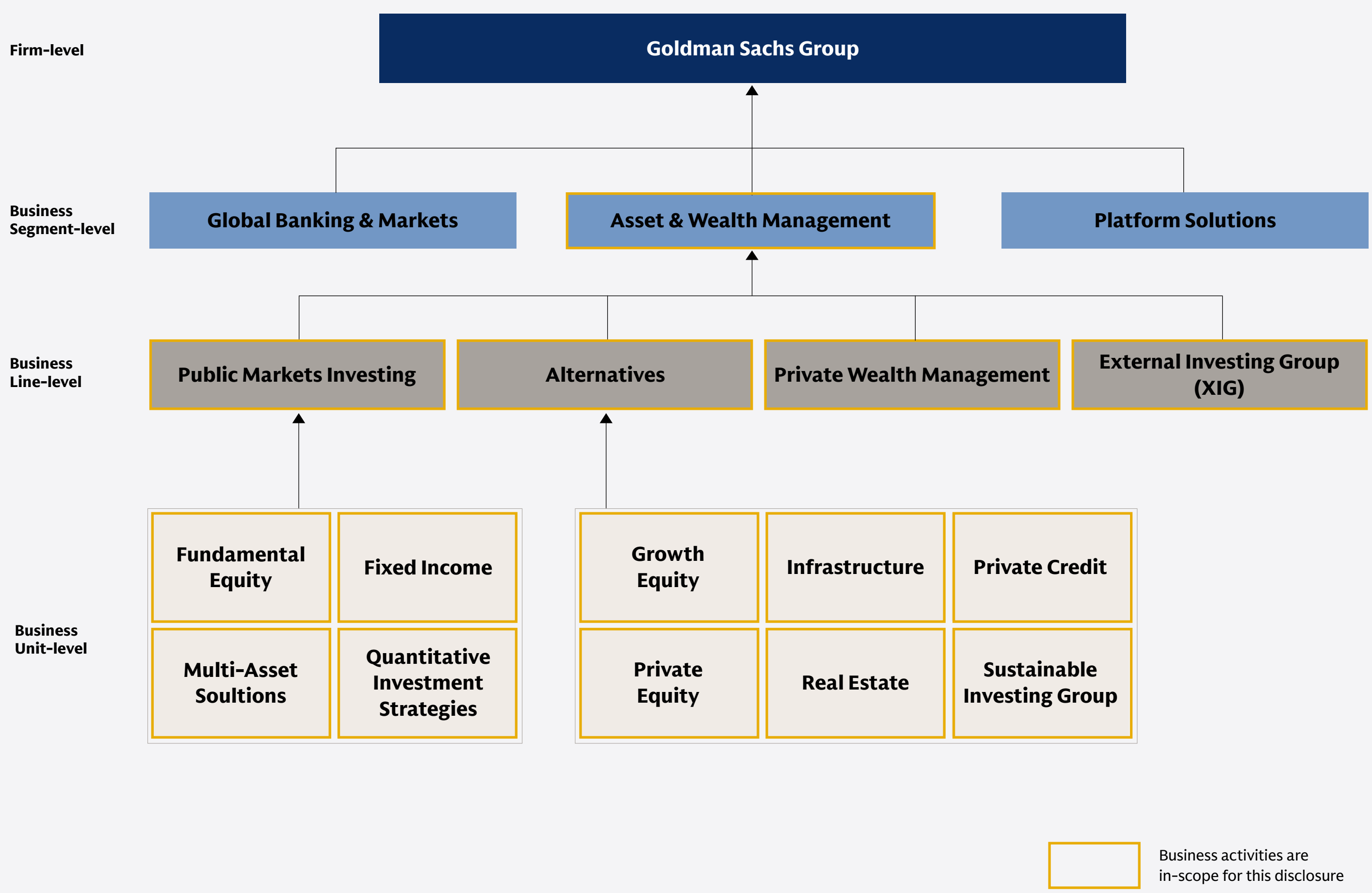
[1] There is no guarantee that objectives will be met.
[2] As of 31 December 2023, Goldman Sachs has achieved approximately $555 billion in commercial activity, including $302 billion in climate transition, $74 billion in inclusive growth and the remainder in multiple themes. See ***Goldman Sachs 2023 Sustainability Report***.
[3] Firmwide sustainability goals are not binding characteristics of specific products. There is no guarantee that any particular ESG objective will be pursued or met with respect to any particular product.

About Asset & Wealth Management

AWM (referred to as “we”, “our”, or “us”) is a business segment within The Goldman Sachs Group, Inc. (referred to as “Goldman Sachs”, “the firm”, “firmwide”). AWM provides investment services to help clients preserve and grow their financial assets and achieve their financial goals. We provide these services to our clients, both institutional and individuals, including investors who primarily access our products through a network of third-party distributors around the world.[4]

AWM includes Goldman Sachs Asset Management, which includes investing in public markets (referred to as “Public Markets Investing”) and alternatives (referred to as “GS Alternatives”),[5] and Goldman Sachs Private Wealth Management (referred to as “Private Wealth Management”). See Figure 1 for additional details on AWM’s position within the broader Goldman Sachs organisational structure.

Figure 1: Goldman Sachs Group Organisational Structure



[4] AWM also invests Goldman Sachs’ on-balance sheet alternative assets.
[5] GS Alternatives was previously known as Private Markets Investing in prior TCFD reporting.

Today, AWM is a leading global active asset manager[6] with a top five global alternatives business[6] and a premier wealth management franchise. As of 31 December 2023, we have more than $2.8 trillion in assets under supervision (AUS) globally.[7]

More than

$2.8TN

AWM provides investment services to help clients preserve and grow financial assets and achieve their financial goals. We manage assets across a broad range of investment strategies and asset classes, including equity, fixed income, and alternatives. Our GS Alternatives activities, which are typically longer-term, include investments in Private Equity, Private Credit, Real Estate, and Infrastructure Assets.

Private Wealth Management provides tailored wealth advisory services to its clients. We operate globally, serving a wide range of clients from individuals, families, and family offices, to foundations and endowments. These services begin with identifying clients' objectives and continue through portfolio construction, asset allocation, risk management, and investment execution. We leverage a broad investment platform, and our global execution capabilities, to help clients achieve their investment goals.

Our External Investing Group (XIG) is responsible for identifying, researching, and selecting leading third-party investment managers. Imprint is a dedicated team within XIG focused on thematic research, manager selection, and co-investments across sustainable growth themes.

The AWM segment also benefits from the broader Goldman Sachs ecosystem, which gives clients access to a wide range of products and solutions, as well as our market expertise.

Commentary on This Report

The Asset & Wealth Management Task Force on Climate-Related Financial Disclosures 2023 Report (referred to as "AWM UK TCFD 2023 Report", "this report") has been developed in line with the United Kingdom (UK) Financial Conduct Authority (FCA) rules and guidance as set out in the Environmental, Social, and Governance (ESG) Sourcebook and TCFD Recommendations. This report builds on our ***AWM UK TCFD 2022 Report*** published last year and focuses primarily on the progress we have made in the past year to support our clients with their climate-related investment objectives through the development of climate-related products and services, innovative climate tools and analytics, and continued alignment of capabilities across our business lines (see **"Executive Summary"** for key highlights in the past year). Across this report, we have distinguished between existing climate-related activities and future initiatives, focusing on existing activities.

Based on the ESG Sourcebook, the Goldman Sachs legal entities in scope for this report (collectively referred to as the "UK legal entities") are Goldman Sachs International (GSI) and Goldman Sachs Asset Management International (GSAMI). Within GSAMI and GSI, the business activities conducted in 2023 within Public Markets Investing and GS Alternatives (both in GSAMI), and Private Wealth Management (in GSI) are in the scope of the FCA requirements.

Effective 1 April 2023, the UK GS Alternatives business moved from GSI to GSAMI to align governance more effectively across public markets and alternatives, and as such, for the purpose of this report is captured under GSAMI.[8] For full details of in-scope assets within these business lines, refer to **"Appendix A: In-Scope Asset & Wealth Management Assets"**.

AWM's business activities and processes are largely global in nature, with considerable overlap between legal entities on products and strategies and associated processes and governance, given that we serve clients in different regions and under different regulated investment vehicle regimes. As a result, certain sections of this report are written from a global AWM perspective (for example, the **"Strategy"** section), while other sections and details are UK legal entity-specific where appropriate (or required by the FCA guidance) and are highlighted as such. In particular, the **"Governance"** and **"Metrics and Targets"** sections focus on the two UK legal entities.

For additional commentary on this report, refer to **"Appendix B: Additional Commentary on the AWM UK TCFD 2023 Report"**.

Note that all data and metrics are as of 31 December 2023, and unless stated otherwise, the information provided in this report relates to the 2023 calendar year.

Note that all references to figures in dollars ($) are in **USD**.

[6] Rankings as of 4Q23, as measured by actively managed AUS. Peer data compiled from publicly available company filings, earnings releases and supplements, and websites, as well as eVestment databases and Morningstar Direct. GS total alternatives investments of $485 billion as of 4Q23 includes $295 billion of alternatives AUS and $190 billion of non-fee-earning alternatives assets.
[7] Note: This figure represents global AWM assets under supervision.
[8] Note: The shift of GS Alternatives to GSAMI does not impact the capabilities, products, strategies, risk management practices, or metrics detailed in this report.

Definition of Climate-Related Risks

In evaluating climate-related risks and opportunities, we use definitions and methodologies consistent with the principles of TCFD.

These risk definitions are incorporated in the Goldman Sachs comprehensive firmwide risk taxonomy, which includes both financial and nonfinancial risks to the firm.

Transition Risk

Transition risk is the risk that asset values may change because of changes in climate policies or changes in the underlying economy due to decarbonisation. Transition risks include technological change risks, policy and regulation risks, liability and legal risks, and market sentiment risks.

Physical Risk

Physical risk is the risk that asset values may change as a result of changes in the climate. Risks related to the physical impacts of climate change include acute risks and chronic risks.

Compliance Statements

As set out above, this report covers the in-scope businesses of both GSI and GSAMI.

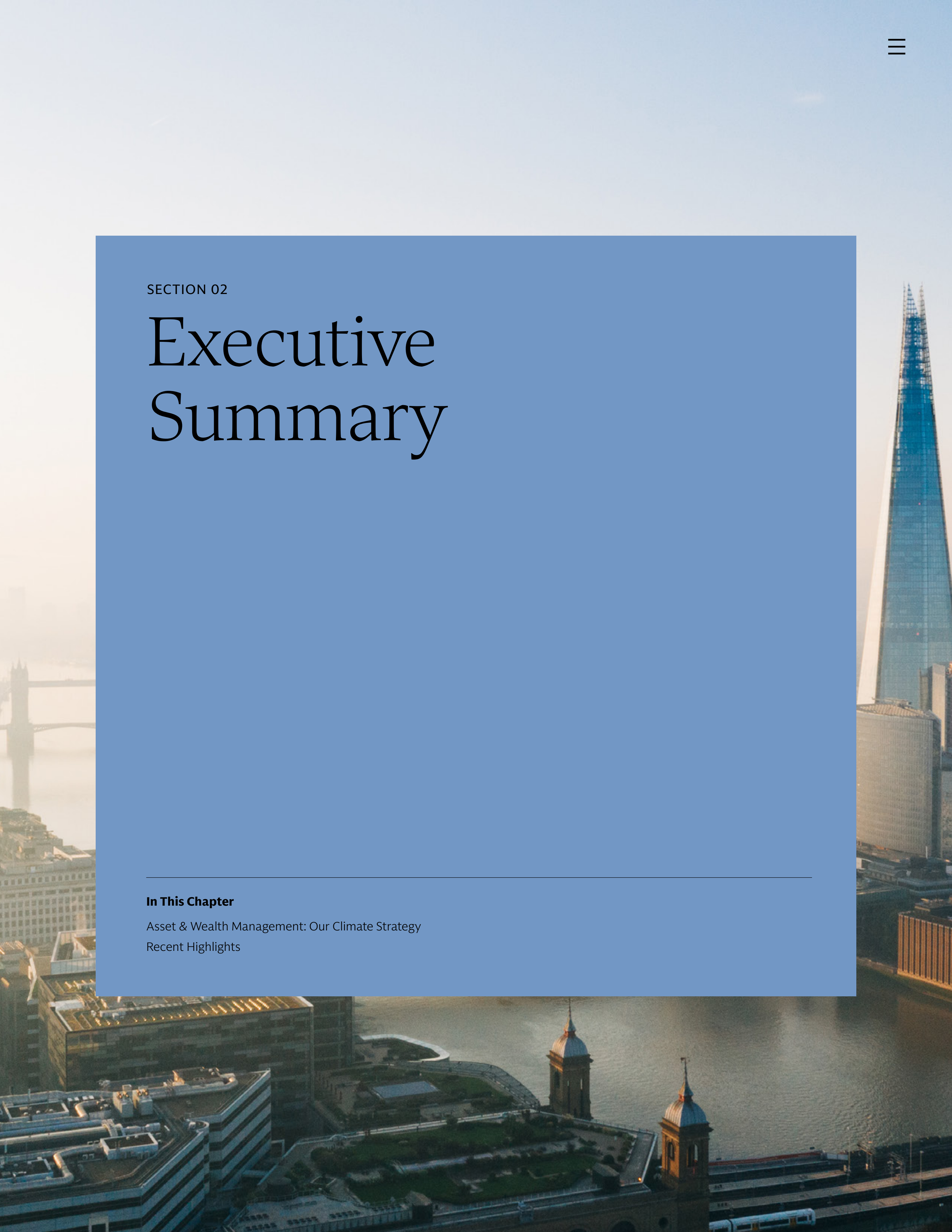
In accordance with the FCA's ESG Sourcebook, senior management for GSI and GSAMI confirms, on behalf of the respective UK legal entities, that the information provided in this report in relation to GSI (Private Wealth Management business) and GSAMI (Public Markets Investing and GS Alternatives businesses), as relevant, complies with the requirements set out in Chapter 2 of the ESG Sourcebook.

Fadi Abuali
Co-Chief Executive Officer of Goldman Sachs Asset Management International and Global Co-Head of the Institutional Client Business and Co-Chief Executive Officer of Goldman Sachs for the Middle East and North Africa (MENA)

James Reynolds
Co-Chief Executive Officer of Goldman Sachs Asset Management International and Global Head of Direct Lending within Goldman Sachs Asset Management

Stefan Bollinger
Co-Head of Private Wealth Management for Europe, the Middle East, and Africa (EMEA)

Christopher French
Co-Head of Private Wealth Management for EMEA



SECTION 02

Executive Summary

In This Chapter

Asset & Wealth Management: Our Climate Strategy

Within AWM, our aim is to achieve long-term, risk-adjusted returns for our clients.[9] Given the impact of the climate transition across sectors, geographies, and markets, we believe that a strategy for managing climate-related risks and opportunities is important for serving our clients' preferences and delivering risk-adjusted returns.

The foundation of our climate strategy is an important platform that allows our diverse and global client base to optimise their unique climate preferences and investment objectives and oversight.

We combine breadth—across public markets and alternatives, proprietary and third-party products, portfolio strategy and implementation—and depth, with specialist sustainable investing teams and strategies. This allows us to partner with our clients to uncover opportunities for transformative impact and financial returns within the climate transition.[10] For further details on our climate strategy across AWM, see the **"Strategy"** section of this report.

The level of integration of climate-related considerations into clients' portfolios is dependent on the client's stated investment and climate objectives.[11] Specific products and strategies for each asset class are implemented to optimise for the client's climate goals, based on each client's expressed interests. As such, the broad climate strategy outlined below may not apply across the entirety of AWM. In this report, we describe how AWM incorporates climate into key governance and oversight structures, risk management processes, and specific metrics in line with the TCFD Recommendations.

Governance

Our board-level oversight and management-level governance structures incorporate climate considerations as part of their respective responsibilities.

Risk Management

Our climate-related risk management approach aims to assess and manage the risks posed by climate change to our business and seeks to integrate climate considerations into risk management practices.

Metrics and Targets

We have produced climate-related metrics across a portion of our investment products and strategies in AWM, including financed greenhouse gas (GHG) emissions metrics at the business line-level for Public Markets Investing, GS Alternatives, and Private Wealth Management. Since the publication of last year's GS AWM UK TCFD, we have expanded our GHG emissions metrics to include additional asset classes (Sovereign Debt and Real Estate) as well as Scope 3 emissions for certain asset classes. We have not set AWM-specific GHG emissions reduction targets but select business units continue to assess potential target-setting approaches, some of which may be specific to individual clients.

9 There is no guarantee that objectives will be met.
10 AWM leverages the resources of Goldman Sachs & Co. LLC subject to legal, internal, and regulatory restrictions. For additional details on Goldman Sachs' capabilities and approach to climate, refer to the *Goldman Sachs 2023 TCFD Report* and *Goldman Sachs 2023 Sustainability Report.*
11 It is important to note that the availability of climate-related investment solutions varies across the Private Wealth Management business due to strategy minimums and suitability relative to the client size.

Recent Highlights

Since the publication of our inaugural AWM UK TCFD Report last year, AWM has continued to develop new climate products and solutions, expand resources, and enhance tools for clients while evolving our existing offerings and efforts to engage our portfolio companies on climate issues.

RECENT HIGHLIGHTS

Climate Products and Solutions

Public Markets Investing continues to build out its suite of products and solutions to help clients capture the potential opportunities presented by the climate transition.

- In November 2023, the Global Environmental Transition Equity Strategy was launched and has raised approximately $61 million.[12] The strategy is Public Markets Investing's first strategy dedicated to the transition from a carbon emissions-intensive economy to one that is increasingly renewable energy-based and low carbon.

GS Alternatives continues to build out its climate and environmental impact solutions through the Horizon platform.

- As of 2023, GS Alternatives has raised approximately $2.6 billion for climate transition-related strategies through its Horizon platform.[13]

Private Wealth Management continues to enhance climate investment opportunities available to its clients across its multi-asset class portfolios.

- In March 2023, Private Wealth Management began to offer three actively managed green bond funds in partnership with the Green, Social, & Impact Bond Team within Public Markets Investing. These funds provide Private Wealth Management clients with exposure to debt instruments where the proceeds will be applied to finance or refinance in part or in full new and/or existing projects that are intended to be beneficial to the environment. These bonds are mainly issued by supranationals, sub-sovereigns, agencies, and corporates pursuing policies of sustainable development while observing ESG principles.[14]

[12] Includes all capital closed as of 31 December 2023.
[13] Includes all capital closed as of 31 December 2023.
[14] Source: Goldman Sachs Asset Management Prospectus Goldman Sachs Funds III.

RECENT HIGHLIGHTS

Climate Resources and Tooling

In 2023, we expanded our internal climate resources within AWM and expanded our efforts to enhance climate education and awareness across various investment teams, clients, and portfolio companies.

- In early 2023, GS Alternatives recruited a new Head of Climate Strategy, who leads the development of climate platform resources, tools, and assessment, partnering closely with investors and ESG Business Leads across Private Equity, Infrastructure, Sustainable Investing Group (SIG), Private Credit, and Real Estate.
- As part of the 2023 Sustainability and Impact Seminar Series, Public Markets Investing provided its clients with insights and education on important climate and sustainability topics, including decarbonisation, energy security and affordability, actionable investment levers to capture climate transition opportunities, nature-based solutions and how to leverage nature to achieve net-zero goals, and sustainability in real estate.
- As part of The Forum (a regular internal meeting series held by Public Markets Investing), ESG and climate are frequently discussed. In 2023, topics included key areas impacting the sustainability landscape, such as: the evolving regulatory environment, the complexity of the energy transition and the increased scrutiny on ESG, and detail on investment opportunities in which Public Markets Investing can expect capital formation for sustainable solutions. The Forum helps portfolio managers and research analysts keep up with the latest developments in a rapidly evolving space and helps to inform investment processes.
- During 2023, GS Alternatives engaged internally with investment teams and support functions on ESG topics, as well as externally, with clients and portfolio companies on a range of ESG matters.
  - The Sustainability & Impact (S&I) team held multiple trainings for different investment teams on topics including ESG data collection, impact investing, and the EU Sustainable Finance Disclosure Regulation (SFDR).
  - Following requests from various clients to better understand impact investing in alternatives in relation to SIG, GS Alternatives facilitated knowledge-sharing sessions with certain clients to provide insights on how to interpret key definitions, impact measurement and management, and relevant regulations and frameworks, among other topics.
- In 2023, Private Wealth Management hosted inaugural Climate Investment Forums in London and San Francisco for current and prospective clients. These forums convened industry thought leaders and experienced impact investors to engage in candid and interactive dialogue about the challenges and opportunities surrounding the climate transition.

Finally, we built out select climate tools to support our clients and portfolio managers.

- In 2023, Public Markets Investing further refined its proprietary Paris Alignment Lens, and began to integrate and roll it out within its proprietary research tool, Fluent.[15] The Paris Alignment Lens combines quantitative and qualitative information from internal and external data on a company's ambitions and target-setting, emissions performance, climate disclosures, decarbonisation strategies, and capital allocation alignment to provide a forward-looking categorisation of a company's alignment with the aims of the 2015 Paris Agreement. This is offered to certain clients as part of a tailored solution and in many cases, is offered to supplement proprietary investment analysis.
- Public Markets Investing began developing a comprehensive Sustainability Measurement Toolkit that integrates data-driven analysis and industry best practices, such as key issues surrounding climate change and resource use and natural capital, among others. The tool aims to address the lack of consistency across industry indices and ratings that have previously made it difficult to draw meaningful comparisons across rating subjects.
- In 2023, GS Alternatives onboarded and developed new tools to assess climate risk across its portfolio.[16]
  - These tools, which assist risk identification, underwriting, and value creation planning, include a Vulnerability Assessment questionnaire to assess portfolio company transition risk diligence, capabilities to identify company physical locations, and analytics to quantify physical and transition risk corporate exposures. To reduce these risks, GS Alternatives has also piloted value creation opportunities to help build resilience and decarbonise investment portfolios.
  - Informed by the Private Markets Decarbonisation Roadmap (PMDR) and The Institutional Investors Group on Climate Change (IIGCC) Net Zero Investment Framework (NZIF), GS Alternatives developed an in-house Climate Transition Maturity Framework to report on portfolio company practices that advance alignment to the Paris Agreement.[17] This framework captures many of the measurement, decarbonisation, and target-setting actions supported through available programme resources, including, for example, primary footprinting services.
- Private Wealth Management further developed its public markets Portfolio Diagnostic Tool to help clients articulate, refine, and work towards their long-term sustainable investing goals. Clients can leverage certain climate transition and inclusive growth metrics available in the tool to assist with risk management, transparency, and engagement on climate and other sustainability objectives. This tool was enhanced to align with TCFD recommendations by including expanded GHG emissions-related metrics, in particular, Scope 3 metrics, climate risk for sovereign securities, and climate value-at-risk (CVaR) assessment.

[15] As of 31 December 2023, the Paris Alignment Lens was used to assess corporates only. Public Markets Investing are assessing an expansion of the Paris Alignment Lens to sovereign investments, at a future state.
[16] For the purpose of this report, this portfolio refers to GS Alternatives strategies within the scope of this report where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes activities within certain Private Equity, Growth Equity, Private Credit, SIG, Infrastructure, and Real Estate strategies.
[17] In 2023, GS Alternatives provided this reporting to one client to map the portfolio company practices across two strategies.

RECENT HIGHLIGHTS

Engaging with Portfolio Companies[18]

Within Public Markets Investing and GS Alternatives, we are continuing to uplift our efforts and approaches to engaging with our portfolio companies on financially material climate-related risks and opportunities.[19] Given the differing nature of investments between Public Markets Investing and GS Alternatives (such as ownership, influence, and investment horizon), our approach to engagement differs materially across these business lines and our strategies.

- Building on prior engagement initiatives, in 2023, the Public Markets Investing Global Stewardship Team, in collaboration with the Public Markets Investing Fixed Income and Fundamental Equity investment teams, enhanced its approach to engagement on the climate transition, by assessing companies representing 70% of its financed GHG emissions[20] against the criteria in its proprietary Paris Alignment Lens.
- Additionally, the Public Markets Investing Global Stewardship Team expanded their engagement efforts on biodiversity and nature to cover engagement with companies on deforestation, for companies in sectors identified as being exposed to potentially material deforestation risk. This is in addition to the continued engagement focus on plastics.
- GS Alternatives launched its dedicated climate-related webinar series, available for senior and operational leaders across portfolio companies. This webinar series featured a session on improving GHG measurement and inventory management planning, among other topics. Throughout the year, GS Alternatives also supported engagement with portfolio companies on topics including GHG measurement, life cycle assessments, decarbonisation, and transition planning.
- GS Alternatives continued to connect certain portfolio companies in equity investing portfolios within Private Equity, Infrastructure, and SIG with GHG emissions accounting services through a third-party vendor. In 2023, this involved working with third parties to design new packages for portfolio company support services, refining estimation methodologies, and assisting these third parties to launch new capabilities, including delivery of GHG inventory management plans and high-level decarbonisation recommendations to participating portfolio companies.
- In 2023, GS Alternatives advanced support available for portfolio company decarbonisation services offered by third parties, including gathering extensive request for proposal (RFP) responses for decarbonisation engineering, analytics and consulting, developing and launching a decarbonisation 'cohort', and drafting a decarbonisation playbook, which will be made available on demand to portfolio companies in equity investing strategies via the GS Value Accelerator in 2024. The Real Estate team also piloted resilience advisory services with a third party, intended to uplift property transactions with higher climate risks.
- GS Alternatives also conducted its third full year of ESG data collection in 2023, with more than 80 portfolio companies in scope across Private Equity, Infrastructure, Growth Equity, and SIG. In 2023, the focus of the data programme has been to continue supporting portfolio companies in their ESG data tracking and reporting with the objective to enhance data quality, while streamlining the process and portfolio company experience. To that end, in 2023, GS Alternatives rolled out a software tool to enhance ESG data collection efforts across its equity businesses, to gather and analyse ESG and impact data from its investments. Real Estate also conducted an ESG data collection process and engaged, where considered financially material, with particular assets to discuss results and identify potential opportunities, including on climate-related topics.

18 Private Wealth Management does not engage directly with portfolio companies.
19 The engagement highlights presented here outline examples of Goldman Sachs' initiatives. There is no assurance that Goldman Sachs' engagement directly caused the outcome described herein.
20 Financed GHG emissions measures a portfolio's GHG emissions impact normalised by the size of the portfolio. To identify the companies accounting for 70% of global financed Scope 1 and 2 GHG emissions for Public Markets Investing (not limited to UK legal entities), Public Markets Investing leveraged the following formula, as recommended by PCAF:

$$\frac{\sum \left(\frac{\text{Current Value of Investment}}{\text{Issuer or Company EVIC}} \times \text{Issuer or Company Scope 1 and Scope 2 GHG Emissions } (tCO_2 e) \right)}{\text{Current Portfolio Value (\$ million)}}$$

SECTION 03

Governance

In This Chapter

Governance Overview

We remain committed to formalising an effective and resilient governance and risk environment for climate- and sustainability-related issues. To achieve this, alongside embedding climate-related risks into our risk management practices, we continue to formalise our governance and oversight of climate-related risks and opportunities. In 2023, for example, the move of the UK GS Alternatives business from GSI to GSAMI allowed governance to be aligned more effectively across public and private markets investing activities.

Our governance includes board-level oversight at the firmwide and legal entity levels as well as internal governance structures and responsibilities across our management teams and specific functional groups. Our governance and oversight continue to evolve, including in response to increasing demand for reporting and transparency from key stakeholders and regulators.

Firmwide Governance

In this section of the report, we provide detail on Goldman Sachs Board-level oversight and other firmwide internal governance structures that play a critical role in overseeing climate-related risks and opportunities across Goldman Sachs.

Firmwide Board Oversight

The Goldman Sachs Board and its committees play a critical role in overseeing firmwide risks, including with respect to climate matters.

Goldman Sachs Board of Directors (the Goldman Sachs Board)	Goldman Sachs Board of Directors (the Goldman Sachs Board) and its committees are responsible for overseeing the business and affairs of the firm, including oversight of the management of the firm's most significant risks. Given the interdisciplinary nature of the oversight of sustainability risks, including climate-related risks, the Board carries out its oversight of these matters directly, at the full Board level, as well as through its committees, including its Risk and Public Responsibilities Committees. This may include periodic updates on the firm's sustainability strategy and initiatives, as well as targets, progress, and incentives related thereto, discussions regarding the climate models the firm utilises to assess physical and transition risks, and reviews of our sustainability- and climate-related reporting.
Risk Committee of the Goldman Sachs Board	The Risk Committee of the Goldman Sachs Board (the Risk Committee) oversees firmwide financial and nonfinancial risks. This includes the firm's overall risk-taking tolerance and risk governance, including with respect to climate risk. As part of its oversight, the Risk Committee receives periodic updates on our climate risk management approach, including scenario analysis capabilities and integration into existing risk management processes.
Public Responsibilities Committee of the Goldman Sachs Board	The Public Responsibilities Committee (PRC) of the Goldman Sachs Board assists the Board in its oversight of our firmwide sustainability strategy and sustainability issues affecting the firm, including climate change. As part of its oversight, the PRC receives periodic updates on our sustainability strategy and reporting. The PRC also periodically reviews our governance and related policies and processes for sustainability- and climate-related matters.

Firmwide Internal Governance Structures

Senior Management Committees

Various senior management committees and groups oversee Goldman Sachs' transaction selection decisions and risk management processes.

Firmwide Enterprise Risk Committee	The Firmwide Enterprise Risk Committee (ERC) is responsible for overseeing all of Goldman Sachs' financial and nonfinancial risks, including climate-related risk. The ERC, through its oversight of the Enterprise Risk Management Framework, monitors the firm's risk profile on both an aggregate and segment level, inclusive of key trends, top and emerging risks, and significant events that potentially affect the firm's risk profile. The ERC is co-chaired by the Chief Risk Officer (CRO) and Chief Operating Officer (COO). The Chief Financial Officer (CFO) is Vice-Chair, and the Committee also includes senior firm leaders, many of whom are also members of other firmwide risk committees.
Firmwide Reputational Risk Committee	The Firmwide Reputational Risk Committee is responsible for assessing reputational risks through thematic discussions and by reviewing transactions identified as having potential heightened reputational risk, including those driven by sustainability-related issues, pursuant to the criteria established by the Firmwide Reputational Risk Committee and as determined by committee leadership.

Sustainability and Climate Focused-Forums

In addition to senior management committees, several firmwide forums are focused on convening key senior stakeholders from across our businesses and corporate functional groups to oversee climate- and other sustainability-related issues.

Sustainability Steering Group	The Sustainability Steering Group convenes key senior stakeholders, including those from the Sustainable Finance Group (SFG), Risk, Controllers, Global Banking & Markets (GBM), and Asset & Wealth Management (AWM). This group provides guidance on key climate risk and opportunity decisions, including interim goal setting to achieve our long-term net zero by 2050 pathway target. Chaired by the firm's CRO and head of SFG, the group reviews progress and provides feedback on climate strategy, risk management, integration, and climate-related capabilities more broadly. This includes oversight of our 2030 sectoral targets in Energy, Power, and Auto Manufacturing, and associated voluntary reporting.[21] Further, the group oversees firmwide regulatory sustainability implementation, including oversight of sustainability reporting requirements.[22]
Sustainable Asset Working Group	The Sustainable Asset Working Group (SAWG) discusses, guides, and validates sustainable client offerings and attributions at the transaction and product-level, as well as applies our allocation methodology for transactions that contribute towards Goldman Sachs' firmwide $750 billion sustainable finance target. This goal is built on commercial activity that is aligned with our firm's Sustainable Finance Framework (see the ***Goldman Sachs 2023 Sustainability Report*** for more details). SAWG also governs the firm's Sustainability Issuance Framework and sustainability issuances. Finally, SAWG serves as an internal control group to help ensure accuracy and accountability for Goldman Sachs' firmwide $750 billion sustainable finance target and, consists of members from Goldman Sachs' businesses, SFG, and control-side personnel.

Internal Functional Groups

Sustainable Finance Group	In 2019, the Executive Office (EO) launched the SFG to formalise and drive the firm's sustainability strategy and related efforts across Goldman Sachs. In partnership with other EO teams including Office of Government & Regulatory Affairs, Investor Relations, Corporate Communications, and others, SFG advances the firm's integrated commercial approach to sustainability through central coordination of the firm's regulatory preparedness, goals and targets, reporting, strategic partnerships, environmental and social risk policies, and cross-segment commercial delivery strategy.

[21] These firmwide sectoral targets are not AWM-specific reduction targets. However, AWM business activities are considered within the scope of review for the firmwide targets. Refer to the ***Goldman Sachs 2023 TCFD Report*** for additional details on the firm's 2030 sectoral targets.

[22] The Sustainability Steering Group was formerly referred to as the Firmwide Climate Steering Group and was reconstituted in April 2024.

Entity-Specific Governance

In this section of the report, we describe how specific legal entity boards, management committees, and functional groups combine to provide oversight and governance of climate- and sustainability-related issues for the Asset & Wealth Management activities within GSI and GSAMI.

Board Oversight

At an entity level, the boards of directors of GSI and GSAMI are responsible for overseeing their businesses in the UK, including AWM:

GSI Board

The Goldman Sachs International Board of Directors (GSI Board) is responsible for the oversight of businesses within GSI (which includes Private Wealth Management).

GSAMI Board

The Goldman Sachs Asset Management International Board of Directors (GSAMI Board) is responsible for oversight of the businesses within GSAMI (which includes client assets in Public Markets Investing and both client assets and the firm's on balance sheet alternative assets from GS Alternatives).

Climate-related considerations may be raised to the GSI Board and/or GSAMI Board, as appropriate, as summarised below.

GSI Board Oversight Bodies

Governance Body	Climate-Related Responsibilities
GSI Board	The GSI Board is responsible for oversight of climate strategy, including climate-related risks and opportunities, and oversight of progress against any future climate-related goals and targets, where applicable, to the extent that this relates to GSI activities. The GSI Board receives updates on climate-related matters from its Risk and Audit Committees. These committees discuss climate-related topics in greater detail and present summarised findings at the GSI Board level. Additionally, in 2023, the GSI Board received an update on the strategy and performance of its Private Wealth Management business, which included climate and updates on climate-related reporting obligations.
GSI Board Risk Committee	The GSI Board Risk Committee reviews the effectiveness of the risk management frameworks with reference to climate-related risks, considers GSI's exposure in managing climate-related risks, and escalates climate-related risks issues to the GSI Board, as required. On several occasions in 2023, the GSI Board Risk Committee discussed climate-related topics with regular briefings and as a key focus topic.
GSI Board Audit Committee	The GSI Board Audit Committee is responsible for advising and assisting the GSI Board by overseeing, in particular, the integrity of GSI's systems, controls, accounting, financial statements, and financial reporting processes. In this regard, in 2023, this committee was briefed on relevant climate-related topics.

GSAMI Board Oversight Bodies

Governance Body	Climate-Related Responsibilities
GSAMI Board	The GSAMI Board is responsible for the oversight of climate strategy, including climate-related risks and opportunities, and oversight of progress against any future climate-related goals and targets, where applicable, to the extent that this relates to GSAMI activities. The GSAMI Board has implemented an annual agenda item on climate-related risks where they receive an update on the metrics related to TCFD disclosure and contextual information on the relative climate considerations for Public Markets Investing and GS Alternatives, which may include comparisons to other businesses and peers. On an ad hoc basis, climate-related topics may be discussed more frequently. In 2023, alongside updates on TCFD, the GSAMI Board was updated on AWM's Climate Strategy and the Stewardship and Sustainability Programmes for Public Markets Investing and GS Alternatives.
GSAMI Board Risk Committee	The GSAMI Board Risk Committee reviews the effectiveness of the risk management frameworks with reference to sustainability risks, considers GSAMI's exposure in managing sustainability risks, and escalates risk issues to the GSAMI Board, as required. This committee has a regular agenda item on climate-related risks and risk management frameworks. In 2023, alongside updates on TCFD, the discussions focused on the evolution of Public Markets Investing Risk's sustainability risk monitoring framework to include headroom monitoring of key sustainability goals and approaches employed by certain portfolios.

Internal Governance

Oversight of climate-related risks and opportunities forms part of our internal governance structures across Asset & Wealth Management.

Senior Management Committees

Dedicated senior management committees manage climate-related risks and opportunities that sit within GSAMI and GSI:

Governance Body	Climate-Related Responsibilities
The GSI Executive Risk Committee	The GSI Executive Risk Committee oversees and monitors climate-related risks (including physical and transition risk) and provides periodic updates to the GSI Board Risk Committee on climate-related risk management through the CRO, who co-chairs the GSI Executive Risk Committee and reports to the GSI Board Risk Committee.
The GSAMI Executive Risk Committee	The GSAMI Executive Risk Committee oversees climate-related risks (including physical and transition risks in relation to the legal entity) and provides periodic updates to the GSAMI Board and the GSAMI Management Committee on sustainability risk management, including climate-related risk management as appropriate, through the CRO, who chairs the GSAMI Executive Risk Committee and reports to the GSAMI Board Risk Committee.
European Management Committee (EMC)	The European Management Committee (EMC) oversees the activities of Goldman Sachs (inclusive of AWM) within Europe, the Middle East, and Africa. The EMC is accountable for business standards and practices and key risks (including climate-related risks).

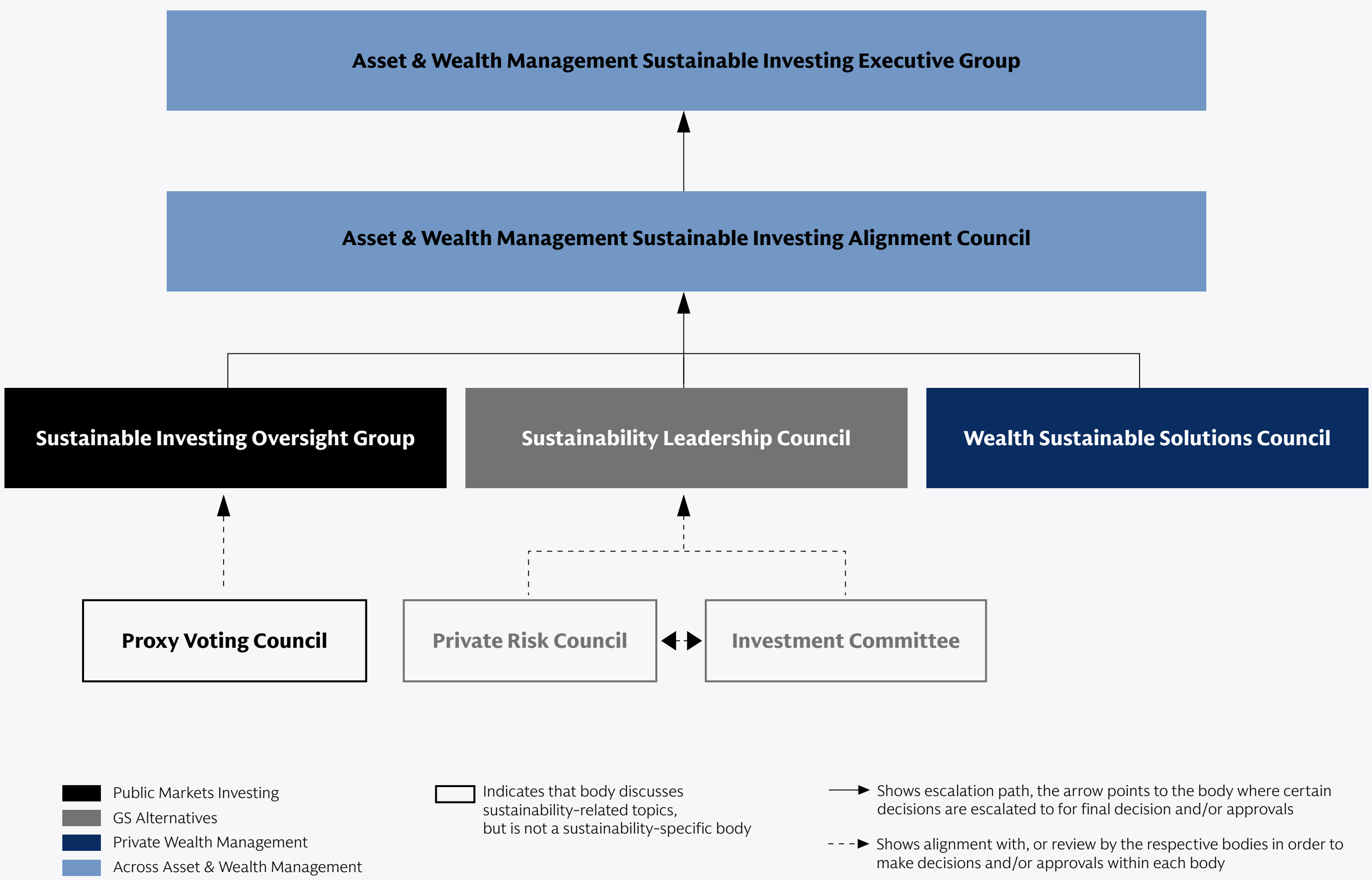
Additionally, there is overlap in the membership of these management bodies. The CEO of GSI is on the Firmwide Management Committee and is the Chair of the European Management Committee, while the two co-CEOs of GSAMI are also members of the European Management Committee. Both committees are involved in the implementation of strategic direction, including AWM's climate and sustainability strategy.

AWM-Specific Governance

AWM Sustainable Investing Governance Bodies

Figure 2 provides an overview of the governance bodies with climate-related responsibilities. We have noted where bodies have oversight across specific business lines. As we continue to drive further alignment within AWM, we have enhanced and expect to further evolve our combined governance structures to define and align the appropriate oversight and escalation protocols.

Figure 2: Asset & Wealth Management Sustainable Investing Governance Bodies



Asset & Wealth Management—Internal Governance Bodies

Governance Body	Overview	Escalation Path
Asset & Wealth Management Sustainable Investing Executive Group	The AWM Sustainable Investing Executive Group oversees AWM's sustainability strategy, including its climate strategy; ensuring consistency among the business lines within AWM; supporting these business lines to meet firm, client, and regulatory expectations; resolving conflicts if they arise from other sustainable investing governing bodies; and managing sustainability and climate-related risks. This group contains senior representatives from Public Markets Investing, GS Alternatives, Private Wealth Management, XIG, and Asset Management (AM) Sustainability and Impact Solutions. This group meets periodically throughout the year; it receives an update periodically, as needed.[23]	Relevant climate-related issues may be escalated to Goldman Sachs' Executive Office.[24] Additionally, the Global Head of AWM is a member of this group and may escalate climate-related issues to other management
Asset & Wealth Management Sustainable Investing Alignment Council	The AWM Sustainable Investing Alignment Council is responsible for aligning on AWM's sustainable investing ambition and strategic sustainable investing initiatives across business lines, providing updates to the AWM Sustainable Investing Executive Group, and escalating relevant sustainability risks to AWM leadership. This group meets monthly, or more frequently on an ad hoc basis as needed. In 2023, discussions were held on the implementation of TCFD, inclusive of the approach taken to metrics calculation, the development and the execution of the AWM Climate Strategy, and the application of the AWM governance frameworks regarding management of sustainability and climate-related risks.	There is a mechanism in place whereby relevant climate-related issues may be escalated to the AWM Sustainable Investing Executive Group, as appropriate.

[23] The Asset & Wealth Management Sustainable Investing Executive Group operates within the AWM business segment; however, ultimate authority rests with the relevant legal entities pursuant to UK regulation.
[24] The Goldman Sachs Executive Office plays an integral role in setting and advancing Goldman Sachs' strategy and in supporting and enhancing the firm's distinctive culture. The Executive Office contains the SFG, which serves as the centralised group responsible for driving climate strategy efforts across Goldman Sachs. The Executive Office sits above the GSI and GSAMI entity level and includes personnel who form part of the Goldman Sachs Board.

Public Markets Investing—Internal Governance Bodies[25]

Governance Body	Overview	Escalation Path
Sustainable Investing Oversight Group[26]	The Sustainable Investing Oversight Group oversees the sustainability strategy and climate strategy for Public Markets Investing; ensures Public Markets Investing is meeting firm, client, and regulatory expectations; approves policies, memberships, sustainability related reports, frameworks, and methodologies of the strategic sustainable investing direction for Public Markets Investing. The Group is a formal decision-making body. This is a multidisciplinary body led by the Sustainable Investing Platform (SIP)[27] and comprises members from Public Markets Investing Leadership, ESG Sustainable Investing (SI) Heads, Global Stewardship Team, Sustainability and Impact Solutions within the Client Solutions Group, Legal, Risk, Compliance, Marketing, Product Strategy, and Engineering. Starting in 2023, the Sustainable Investing Oversight Group also assumed governance responsibilities for the Sustainable Investing Leadership Council[28] in order to enhance and streamline sustainability-related governance. Members with overlap across these bodies continued to serve on the Sustainable Investing Oversight Group.	There is a mechanism in place whereby climate-related issues are escalated to the AWM Sustainable Investing Executive Group, when deemed necessary.
Proxy Voting Council	The Proxy Voting Council oversees the Public Markets Investing Global Proxy Voting Policy, including sustainable investing-related sections. This multidisciplinary body comprises representatives from the Global Stewardship Team, equity investment teams, Public Markets Investing Management, Legal, and Compliance. This Council meets quarterly, or more frequently, as needed.	Informs the Sustainable Investing Oversight Group, but does not escalate decisions.

[25] Note: Public Markets Investing also contains other internal governance bodies with a sustainability focus, these bodies do not have climate-related focus.
[26] Note: This oversight body was formed in 2023.
[27] Formerly known as the Sustainable Investing and Innovation Platform (SIIP).
[28] The Sustainable Investing Leadership Council existed at the beginning of 2023 but was disbanded within the calendar year.

GS Alternatives—Internal Governance Bodies

Governance Body	Overview	Escalation Path
Sustainability Leadership Council	The Sustainability Leadership Council helps drive the climate strategy and key climate initiatives for GS Alternatives, as part of the broader sustainability strategy. Members include the Global Head of Sustainability for GS Alternatives, Business Unit Leaders, COOs for each asset class, the AWM CRO, Legal, and Compliance. Updates are provided to the Council every other month, or on an ad hoc basis, as needed.	Recommendations and areas requiring decisions from this group may be escalated to the AWM Sustainable Investing Executive Group, where alignment with other areas of AWM is required.
Investment Committees	The six Investment Committees for GS Alternatives include: 1. The Private Equity Investment Committee 2. The Infrastructure Investment Committee 3. The Growth Equity Investment Committee 4. The SIG Investment Committee 5. The Private Credit Investment Committee 6. The Real Estate Investment Committee Each committee comprises a senior group of investors and individuals from the firm's second line of defence. Potential climate-related risks may be identified at Investment Committees through the Investment Committee memo (see the **"Help Portfolio Companies and Client Assets Navigate and Benefit from the Climate Transition"** section for more details). Additionally, there is a mechanism in place whereby the CRO may recommend escalation of climate-related investment-level risks to the Investment Committee. Committees meet as needed when a potential investment opportunity arises (typically weekly).	There is a mechanism in place whereby climate-related issues may be raised to the Sustainability Leadership Council and/or Risk Council (see below), when deemed necessary.
Risk Council	The Risk Council assesses and proposes mitigation measures for risks related to business activities in GS Alternatives. The Risk Council includes senior business leaders, risk management, and other key stakeholders. Where appropriate, the risk function may recommend escalation of climate-related risks to the Risk Council. Potential climate-related risks identified at a fund or investment level can be escalated to the Risk Council with remedial actions discussed and agreed, as appropriate. The Risk Council meets monthly.	There is a mechanism in place whereby climate-related issues may be escalated to the applicable Investment Committee and/or the Sustainability Leadership Council, when deemed necessary.

Private Wealth Management—Internal Governance Bodies

Governance Body	Overview	Escalation Path
Wealth Management Sustainable Solutions Council	The Wealth Management Sustainable Solutions Council supports the curation of climate and sustainability resources for the Wealth Management client franchise, as part of the broader sustainability strategy, and oversees climate-related issues for Wealth Management.	Climate-related issues may be escalated to the AWM Sustainable Investing Executive Group, when deemed necessary.

AWM Business and Functional Groups

In addition to incorporating climate considerations into board-level oversight and internal governance structures, AWM has integrated climate considerations into how its businesses are strategically managed and how commercial opportunities are identified.

Business and Functional Groups with Climate-Related Responsibilities

Group	Overview
Product and Distribution Working Group (PDWG)	The Product and Distribution Working Group reviews product-specific sustainability-related requirements for Public Markets Investing and GS Alternatives (inclusive of climate considerations, as appropriate) through a standardised template included in meeting materials.
Asset Management Sustainability and Impact Solutions (AM SIS)	Asset Management Sustainability and Impact Solutions is a dedicated team within Asset Management (encompassing Public Markets Investing and GS Alternatives) that mobilises the full range of sustainability insights, advisory services, and investment solutions across our client segments.

Additionally, climate-related governance is embedded across roles within AWM's business lines and within other functional teams.

Public Markets Investing, GS Alternatives, and Private Wealth Management convene to align on climate- and sustainability-related considerations. These groups are focused on aligning across key topics such as climate strategy, sustainable investing, ESG integration and regulation, research, stewardship, client strategy and engagement, and thought leadership and policy.

There are various other teams including Legal, Compliance, Risk, Controllers, and Sustainable Operations within Corporate Planning & Management[29] involved in helping support the governance of climate-related risks and opportunities in AWM.

Public Markets Investing

In Public Markets Investing, sustainable investment professionals are supported by the centralised Sustainable Investing Platform (SIP). There is emphasis on enhancing and setting the direction for sustainability through sustainability research and regulatory expertise. SIP develops sustainable investing data, methodologies, and internal education; provides sustainable investing strategic advice and analytics; and enhances ESG integration (inclusive of climate) within investment strategies. Additionally, Public Markets Investing has appointed ESG SI Heads who are embedded within its investment teams: Equities, Fixed Income, and Multi-Asset Solutions.

GS Alternatives

In GS Alternatives, the S&I team focuses on scaling sustainability practices across the GS Alternatives business.[30] The Head of Climate Strategy for GS Alternatives leads the climate programme partnering with ESG Business Leads who are embedded in the Private Equity, Infrastructure, SIG, Private Credit, and Real Estate businesses. ESG Business Leads are responsible for integrating and implementing, where appropriate, sustainability best practices and climate strategy into the investment process for their business unit. These individuals work closely with investment teams to support the integration of climate-related tools and analytics, transition planning, and portfolio company and asset-level climate integration, along with sustainable investing product development.

Private Wealth Management

In Private Wealth Management, the Sustainable Solutions Group (SSG) supports the development of sustainable investing capabilities (including climate) for Private Wealth Management clients, globally. SSG advises on sustainable portfolio solutions across clients' multi-asset class portfolios. The team is client-facing and strategic in nature, working with other groups across the firm to ensure the Private Wealth Management platform fully serves clients' sustainable investing objectives.

[29] Corporate Planning & Management (CPM) unifies Finance & Planning, Spend Management, Operational Risk and Resilience, and CPM Engineering teams to deliver business planning and analytics, expense management, third-party risk management, sustainability initiatives for our operations and supply chain, and governance strategies across the firm. As part of CPM, the Sustainable Operations team manages the firm's operational and supply chain sustainability-related goals and partners with Corporate & Workplace Solutions to deliver environmentally responsible workplace solutions.

[30] For the purposes of this report, the scope of GS Alternatives disclosures includes assets where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes activities within certain Private Equity, Infrastructure, Growth Equity, SIG, Private Credit, and Real Estate strategies.

SECTION 04

Strategy

In This Chapter

Asset & Wealth Management: Our Climate Strategy

Given the nature of our diverse and global client base, AWM takes a client-centric approach, which aims to address clients' unique climate objectives through innovative products and services.[31] While the AWM climate strategy described in this section is largely reflective of this approach, it is also informed by firmwide climate- and sustainability-related strategic considerations. For example, the Sustainable Finance Framework—organised around two sustainability themes we expect to facilitate the greatest impact through our commercial work with clients including Climate Transition and Inclusive Growth—informs the AWM climate strategy. In particular, the Climate Transition theme informs the investment focus areas for business lines within AWM, as evidenced in GS Alternatives' Horizon Environment & Climate Solutions Strategy, which deploys capital in the same five sub-themes as the firmwide Climate Transition theme: Clean Energy, Sustainable Transport, Sustainable Food and Agriculture, Waste and Materials, and Ecosystem Services.

The level of integration of climate-related considerations into clients' portfolios is dependent on the clients' stated investment and climate objectives.[32] Specific products and strategies for each asset class are implemented to optimise for the client's climate goals, based on each client's expressed interests. As such, the broad climate strategy outlined below may not apply across the entirety of AWM. Additionally, note that the overarching climate strategy framework and approach outlined in this upfront sub-section has remained the same from last year's AWM UK TCFD Report; however, specific products, strategies, tools, and capabilities have evolved from last year's report and are detailed in subsequent sub-sections.

In light of the scale of the global climate transition, managing climate-related risks and opportunities alongside other financial and nonfinancial factors is integral to serving our clients and their climate-related objectives. We leverage expertise and capabilities across the firm to uncover opportunities for our clients.

Our approach to sustainable investing aims to manage and mitigate climate-related risks,[33] while managing value creation opportunities for portfolio companies and client assets.

This requires investment in climate-related data, tools, resources, and product development, all of which can factor into our business strategy and financial planning, where financially material. We continue to invest in climate-focused tools and data, and we have built out our sustainability-focused teams, developed a suite of climate-related products and solutions, and provided our portfolio companies and clients with resources to help them manage climate-related risks and navigate the transition. This enables us to better understand the impact of climate-related risks and opportunities on our financial performance and position, and to assess potential adaptation and mitigation measures for the investments we manage.

Our ability to effectively manage climate-related risks and capture opportunities has the potential to impact our business as an asset and wealth manager. Specifically, our effectiveness on climate-related matters can impact our reputation among current clients, create direct valuation impacts to our investments, and affect our ability to attract and retain client assets. As a result, in addition to building resiliency within our investments through our approach to the management and mitigation of climate-related risks, AWM considers resiliency in the context of our broader business strategy. We seek to build resiliency in our business strategy to the risks, as well as opportunities, posed by the climate transition by investing in climate-related data, tools, resources, and product development. Given the rapidly shifting geographic, market, and industry dynamics, we periodically assess and adjust our strategy accordingly to meet evolving client demand.

Given the nature of its diverse and global client base, the broad climate strategy outlined in this section does not apply across all portfolios or strategies managed or offered by Private Wealth Management, but only to certain products and strategies managed by Public Markets Investing and GS Alternatives. Private Wealth Management seeks to implement a client's climate goals, based on their expressed interests, through the implementation of specific products and strategies for each relevant asset class.

The following sections provide further detail on AWM's climate strategy, holistically and across business lines. This includes how select investment strategies and products have incorporated climate-related considerations in response to the potential impacts from the transition to a lower-carbon economy (e.g., Fixed Income within Public Markets Investing, certain GS Alternatives strategies, among others).[34]

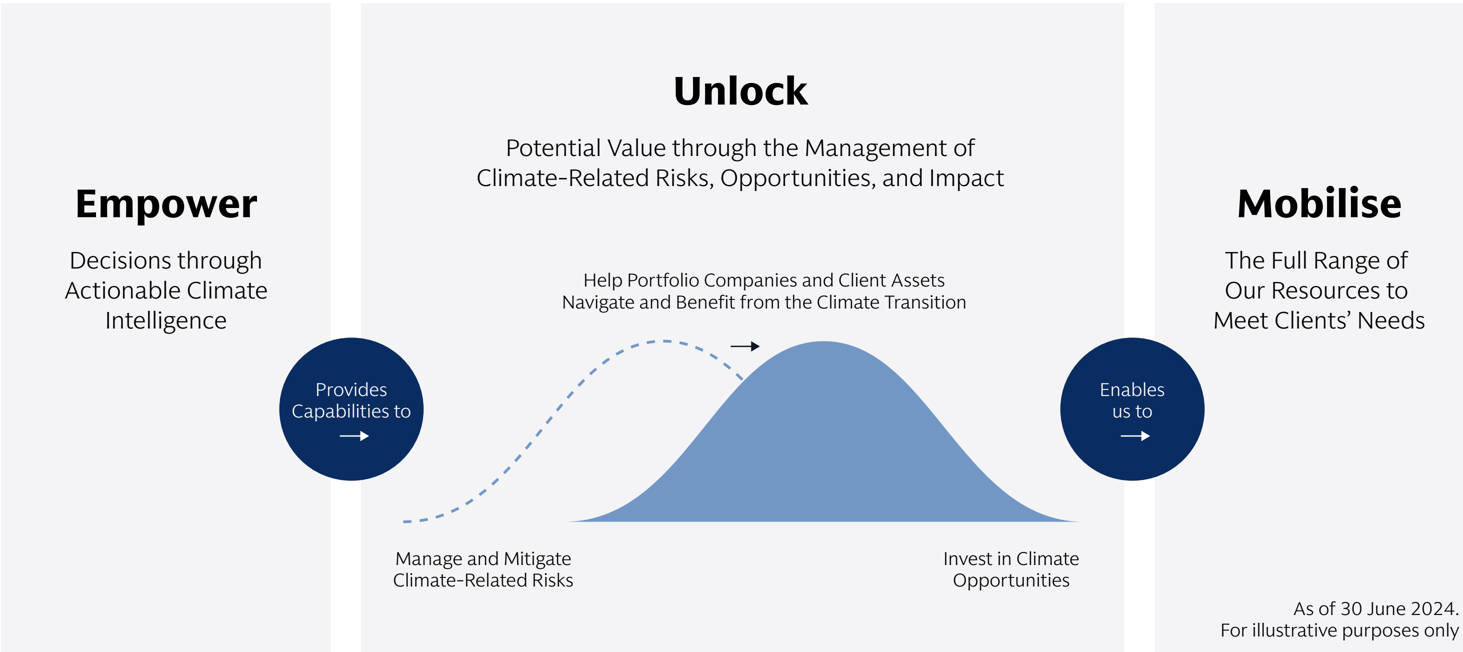
[31] Each of the Public Markets Investing, GS Alternatives, and Private Wealth Management businesses covered in this report may take a different approach to managing climate-related risks and opportunities, considering factors such as investment size, climate exposures, asset classes, client preferences, and business strategy. Within each business line, individual investment teams may also adopt different approaches to managing climate-related risks and opportunities, as appropriate.

[32] It is also important to note that the availability of climate-related investment solutions varies across the Private Wealth Management business due to strategy minimums and suitability relative to the client size.

[33] The portfolio risk management process includes an effort to monitor and manage risk but does not imply low risk.

[34] However, this entity-level report does not provide a comprehensive description of the climate-related impact for each product and investment strategy in scope for the AWM report. Details for individual products and investment strategies will be included in individual product-level reports that are made available to clients (on request).

Figure 3: Our Climate Strategy Designed to Help Meet Clients' Needs



Empower Decisions through Actionable Climate Intelligence

The basis of our climate strategy is our climate-related insights, tools, and analytics from across Goldman Sachs. This provides us with a foundation of actionable information, which can be used in select investment products and strategies for understanding and mitigating climate-related risks, supporting portfolio companies and client assets in the transition, identifying climate opportunities, and creating impact.

Unlock Potential Value through the Management of Climate-Related Risks, Opportunities, and Impact[35]

We seek to unlock potential value for our clients by integrating climate considerations in the investment life cycles for select investment products and strategies, for example, by enhancing climate-related risk management, driving operational and strategic improvements in portfolio companies and client assets, and investing in thematic climate-related growth opportunities.

Manage and Mitigate Climate-Related Risks

Our efforts to understand climate-related risks across the investment process help to unlock potential long-term returns for our clients.[36] Our clients may seek to manage climate-related risks, and in doing so look to our capabilities to actively manage and mitigate exposure, where appropriate. Within certain strategies,[37] these capabilities include, for example, transition and physical risk-screening tools, enhanced due diligence processes on climate-related risks, and strategic portfolio tilts to partly mitigate physical and transition risk exposure. Through these efforts, we try to help clients make climate-related decisions, unlock potential value, and mobilise capital to deliver on their objectives.

Help Portfolio Companies and Client Assets Navigate and Benefit from the Climate Transition

We seek to support portfolio companies and client assets in navigating the climate transition. We look to support operational and strategic improvements within select portfolio companies, while engaging and stewarding these companies through changing economic and climate conditions. Our efforts focus on positive impacts, while also seeking to appropriately manage the long-term risk-return outlook for our clients.

Invest in Climate Opportunities

We have identified investment opportunities that enable the climate transition across regions and markets through our traditional, alternative, and climate-focused products.

[35] As noted in **"Appendix B: Additional Commentary on the AWM UK TCFD 2023 Report"**, we seek to embed climate considerations more comprehensively and systematically across some aspects of our business in-line with client preference.
[36] The portfolio risk management process includes an effort to monitor and manage risk but does not imply low risk.
[37] This includes certain Public Markets Investing and GS Alternatives strategies within scope of this report, including strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023.

Mobilise the Full Range of Our Resources to Meet Clients' Needs

Our scale and approach to climate investing allows us to provide tailored investment solutions across public markets and alternatives to satisfy our clients' investment and climate objectives. We deliver a range of products and capabilities across our platform to support clients with insights, analytics, and portfolio tools to co-create strategies to meet their specific needs. We aim to serve as the partner of choice for clients in navigating the climate transition within their portfolios.[38]

The global climate transition will require transformative change across sectors, regions, technologies, and communities. As we build on our insights, tools, and capabilities in these areas, we continue to refine and adapt the solutions we offer to our clients. In turn, as our understanding of climate-related risks and opportunities relevant to our business evolves, we continue to re-evaluate our commercial strategy, as appropriate.

HIGHLIGHT

Biodiversity and Nature in Public Markets Investing and GS Alternatives

Biodiversity has been rising up the sustainable finance agenda due to a diverse set of drivers—regulators are accelerating legislation on biodiversity and nature with Europe taking the lead on due diligence, disclosure, and target setting-related regulations; investors are raising awareness on potential financial losses from material biodiversity drivers;[39] and there is growing scientific clarity on nature-based issues being pivotal for climate ambitions.[40] In response to this increased focus, we are in the process of designing solutions that seek to address three interrelated objectives on biodiversity and nature issues in our products and investment processes:

- Understand and manage financially material risks and dependencies
- Support select equity portfolio companies on activities that address and mitigate potential negative biodiversity impacts
- Identify, use, and grow biodiversity solutions and nature-positive investments

These objectives are interconnected, but also distinct as they require different inputs and tools.

[38] This material is provided for informational purposes only and should not be construed as investment advice or an offer or solicitation to buy or sell securities. This material is not intended to be used as a general guide to investing, or as a source of any specific investment recommendations, and makes no implied or express recommendations concerning the manner in which any client's account should or would be handled, as appropriate investment strategies depend upon the client's investment objectives.
[39] The World Economic Forum ***estimates*** that more than half of the world's GDP is generated in industries that depend on nature and its services.
[40] For example, the UN Environmental Programme ***estimates*** that conserving and restoring nature would provide one-third of the mitigation effort needed in the next decade.

Empower Decisions through Actionable Climate Intelligence

Public Markets Investing

Public Markets Investing leverages several tools to enhance the integration of climate-related factors into investment products and strategies. Fundamental Equity and Fixed Income leverage a proprietary research tool to embed climate- and sustainability-related considerations, among other factors, into their research of portfolio companies and issuers within certain investment products.[41] In addition, Public Markets Investing investment teams leverage insights from stewardship activities with portfolio companies (see the **"Help Portfolio Companies and Client Assets Navigate and Benefit from the Climate Transition"** section for further details).

Quantitative Investment Strategies (QIS) also leverages data-driven techniques within certain investment products and strategies as further described in the **"Manage and Mitigate Climate-Related Risks"** section. Further, Multi-Asset Solutions (MAS), through allocations in their managed portfolios to the Fundamental Equity, Fixed Income, and/or QIS strategies, are able to integrate these factors and processes into select multi-asset portfolios.

In addition to monitoring environmental practice through a risk lens, Public Markets Investing seeks to capture potential upside by encouraging portfolio holdings to disclose their sound business practices, so they can be incorporated into market valuations. This process involves close collaboration with the Public Markets Investing Global Stewardship Team (see the **"Help Portfolio Companies and Client Assets Navigate and Benefit from the Climate Transition"** section for more details).

[41] As part of the investment process, Public Markets Investing may integrate ESG factors alongside traditional factors. The identification of a risk related to an ESG factor will not necessarily exclude a particular investment that, in the view of Public Markets Investing, is otherwise suitable and attractively priced for investment, and Public Markets Investing may invest in an issuer without integrating ESG factors or considerations into the investment process. Moreover, ESG information, whether from an external and/or internal source, is, by nature and in many instances, based on a qualitative and subjective assessment. An element of subjectivity and discretion is, therefore, inherent to the interpretation and use of ESG data. The relevance and weightings of specific ESG factors to or within the investment process vary across asset classes, sectors, and strategies, and no one factor or consideration is determinative. Public Markets Investing in its sole discretion and without notice may periodically update or change the process for conducting its ESG assessments and implementation of its ESG views in portfolios, including the format and content of such analysis and the tools and/or data used to perform such analysis. Accordingly, the type of assessments depicted here may not be performed for every portfolio holding. The process for conducting ESG assessments and implementation of ESG views in portfolios, including the format and content of such analysis and the tools and/or data used to perform such analysis, may also vary among portfolio management teams.

HIGHLIGHT

Fluent: Public Markets Investing's Proprietary Research Tool

Research analysts in Fundamental Equity and Fixed Income leverage a proprietary tool, Fluent, to conduct climate- and sustainability-related assessments on portfolio companies and issuers. Fluent provides a centralised repository of externally and internally generated research, storing climate-related metrics in themes such as climate change and energy, biodiversity and habitat, air quality, and water scarcity, that may inform investment decision-making.

Research can be stored and retrieved in a variety of ways, including by ticker symbol, analyst name, investment theme, source, sector, or country, making it seamless for Public Markets Investing's team members to retrieve and share all relevant information.

Fluent also houses the Public Markets Investing Paris Alignment Lens, developed to help assess the alignment of portfolio companies with the goals of the 2015 Paris Agreement. By combining quantitative and qualitative information from internal and external sources on a company's climate disclosures, climate strategy, capital allocation, and target setting, the Paris Alignment Lens provides a forward-looking analysis on how a company is transitioning and how that transition is aligning with the goals of the Paris Agreement. Companies may be "Achieving Net Zero", "Aligned", "Aligning", "Committed to Aligning", or "Not Aligned".

Fluent can play an important role for Fixed Income when they apply and track ESG ratings over time across specific issuers, as further described in the **"Manage and Mitigate Climate-Related Risks"** and **"Fixed Income: Bespoke Portfolio Approaches"** sections.

HIGHLIGHT

Fluent: Enhancing Integration of ESG through the Inclusion of the Sustainability Measurement Toolkit

In 2023, Public Markets Investing began developing a sustainability measurement toolkit, to support its investment teams that seek to integrate ESG factors or considerations in their investment process. The toolkit aims to enhance existing internally developed scorecards and tooling by incorporating data and promoting collaboration among Public Markets Investing teams[42] on sustainability issues. The development process focused on identifying financially material ESG issues for public companies. Based on this principle, as well as on existing Public Markets frameworks and industry standards, Public Markets Investing built this toolkit predicated on 14 key issue areas, including climate change themes such as GHG emissions, energy management, and physical climate risk; resource use and natural capital themes such as pollution and waste, biodiversity, land use, and water usage; as well as Social and Governance Themes.

Recognising that ESG considerations vary by industry, an internal proprietary materiality map was created to determine the relevant ESG issues for each industry based on input from the investment teams. The materiality map seeks to rank the importance of each issue. The issue assessments are designed to quantify each of the 14 ESG issues for each company in the universe. These quantitative results are then aggregated with the materiality map into one quantitative ESG measure. Finally, where applicable, public equity and credit analysts may use the toolkit to inform their overall view, including their ESG assessment. Throughout 2024, Public Markets Investing has continued to roll out the internal sustainability measurement toolkit, by embedding it into the Fluent research platform.

[42] The sustainability measurement toolkit was developed for Public Markets Investing and is subject to internal information barrier restrictions. The toolkit was designed to cover corporate public equities and fixed income securities, but is subject to data availability and subject to change at any time.

GS Alternatives[43]

GS Alternatives' approach to climate-related risk assessment, mitigation, and identification of opportunities starts with collecting data. GS Alternatives periodically collects and aggregates data from a number of its portfolio companies and third-party sources, where possible, to help understand climate-related risks across its portfolios and find opportunities to drive value creation.

Climate Data Collection

Recognising the need for decision-useful data and analytics, GS Alternatives has developed a biannual data collection process to collect primary ESG data, including climate-related metrics, from select portfolio companies across Private Equity, Infrastructure, Growth Equity, and SIG. During 2023, GS Alternatives rolled out a software tool to enhance ESG data collection efforts across select equity portfolio companies in its Private Equity, Infrastructure, Growth Equity, and SIG strategies, and to gather and analyse ESG and impact data. Portfolio companies can access their historical submissions and access an ESG metric library that is aligned with industry and regulatory frameworks. Additionally, portfolio companies can compare their ESG performance to universal benchmarks and over 200 sector-specific benchmarks for reporting periods post-2022. Throughout 2023, the S&I team, in conjunction with team members from the ESG data collection tool, provided guidance and trainings to portfolio companies in scope for the data collection process. These portfolio companies benefitted from numerous discussions with the S&I team on how to collect data, as well as detailed customised analysis of the data provided. This customised analysis suggested areas for improvement and an overview of a company's ESG maturity relative to peers. Suggested areas for improvement included onboarding a suitable GHG accounting tool, assessing supply chain management, improving energy efficiency, evaluating physical climate risk, and other resiliency recommendations.

The Real Estate team undertook a separate, dedicated ESG data collection process in 2023, using a combination of an in-house proprietary tracker and third-party software. The software helps collect and collate the energy, water, and waste data of certain assets, allowing the Real Estate investment teams to track operational GHG emissions. The Real Estate team provides management teams of the assets with detailed analysis of the data and suggested areas for improvement, including energy audits, decarbonisation plans, and renewable energy sourcing.

Since 2021, GS Alternatives has also received climate data through its participation in the ESG Data Convergence Initiative (EDCI), which aligns general partners and limited partners to standardise ESG data collection for alternatives, including climate-related data. As part of this effort, GS Alternatives has received anonymised benchmark data on GHG emissions and renewable energy for alternatives. Given the relative scarcity of ESG data for alternatives, this information is helpful for GS Alternatives to understand how these companies are performing as compared to their industry peers.

GHG Measurement: Guiding Decarbonisation Opportunities with Data

Since 2021, the S&I team within GS Alternatives has partnered with a third-party vendor to deliver GHG emissions accounting services to select portfolio companies within GS Alternatives' equity portfolios.[44] In response to regulatory, fund, and investor commitments, the S&I team began footprinting GS Alternatives' business at scale in 2022, covering in-scope portfolio companies with either primary measurement support or third-party estimations.[45] In 2023, GS Alternatives focused on expanding this programme to help participating portfolio companies from measurement through to the first steps of decarbonisation to enhance company value or realise fund requirements.

Through the negotiated base agreement with the vendor, portfolio companies can conduct Scope 1 and 2 GHG emissions measurement as well as Scope 3 spend-based estimations. Since high-quality data is the basis for sound decision-making, this custom offering co-developed with GS Alternatives in 2023 includes inventory management planning tools and recommendations for improving the quality and actionability of GHG footprint data. Based on

[43] As part of the investment process, GS Alternatives may integrate ESG factors alongside traditional factors. The identification of a risk related to an ESG factor will not necessarily exclude a particular investment that, in the view of GS Alternatives, is otherwise suitable and attractively priced for investment, and GS Alternatives may invest in an issuer without integrating ESG factors or considerations into the investment process. Moreover, ESG information, whether from an external and/or internal source, is, by nature and in many instances, based on a qualitative and subjective assessment. An element of subjectivity and discretion is, therefore, inherent to the interpretation and use of ESG data. The relevance and weightings of specific ESG factors to or within the investment process vary across asset classes, sectors, and strategies, and no one factor or consideration is determinative. GS Alternatives in its sole discretion and without notice may periodically update or change the process for conducting its ESG assessments and implementation of its ESG views in portfolios, including the format and content of such analysis and the tools and/or data used to perform such analysis. Accordingly, the type of assessments depicted here may not be performed for every portfolio holding. The process for conducting ESG assessments and implementation of ESG views in portfolios, including the format and content of such analysis and the tools and/or data used to perform such analysis, may also vary among portfolio management teams.

[44] This includes the Private Equity, Infrastructure, and SIG strategies. GS Alternatives collected reported GHG emissions data for all companies where equity ownership was greater than 25%. For investments with less than 25% ownership, GS Alternatives collects data on a "best efforts" basis.

[45] This refers to portfolio companies in scope of UK TCFD reporting, including those within GS Alternatives strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. As above, this includes assets within certain Private Equity, Infrastructure, and SIG strategies where all companies' equity ownership was greater than 25%. For investments with less than 25% ownership, GS Alternatives collects data on a "best efforts" basis.

footprint results, the provider also shares high-level decarbonisation recommendations with portfolio companies, allowing them to consider the next best action to decarbonise their operations. Companies can also choose to set up an enhanced, custom package of services that unlocks target-setting, upstream Scope 3 supplier analytics, and decarbonisation planning tools. The importance of sound measurement for downstream business value was highlighted in October 2023 in an executive-level seminar attended by over 40 portfolio company representatives, led by GS Alternatives' Chief Sustainability Officer, Head of Climate Strategy, and the vendor. This webinar was followed by a deep-dive session on inventory management planning to help improve data quality.

In 2023, select portfolio companies[46] participated in the primary footprinting programme, allowing GS Alternatives to accelerate deeper decarbonisation planning pilots with select companies. Data from 2022 footprints was combined with financial data and outputs from the ESG data collection to determine fund-level decarbonisation opportunities and identify opportunities for strategic value creation at a portfolio company level. GS Alternatives continues to expand coverage for its footprinting programme and engages actively with portfolio companies and vendors to improve portfolio company data quality, enhance data validation and controls, and provide more actionable insights to companies across all three GHG emissions' scopes.

In Real Estate, third-party appointed managers and developers of Real Estate investments and borrowers are expected to track climate-related data via a proprietary survey platform developed by Goldman Sachs. This survey platform tracks a variety of metrics, including GHG emissions intensity, embodied carbon, and renewable energy procurement for associated Real Estate investments. For stabilised equity investments, the Real Estate team collects more granular data on how investments are improving energy efficiency and reducing GHG emissions and tracks operational GHG emissions through a third-party software solution.[47] The ESG Business Leads for Real Estate review climate and ESG data for quality and completeness. Data is leveraged to benchmark performance where relevant: For example, by comparing energy-use intensity against Carbon Risk Real Estate Monitor (CRREM); by identifying engagement opportunities for underperforming assets; or by performing quality control where data appears incomplete or inaccurate.

[46] Twenty-eight portfolio companies (approximately 33% of companies in scope for ESG data collection) participated in the primary footprinting programme. GS Alternatives collected ESG data, including reported GHG emissions data for recent investments where equity ownership was greater than 25% in Private Equity and Infrastructure. Additionally, all SIG investments were required to report GHG emissions data for 2023.

[47] This Real Estate ESG platform aggregates energy, water, and waste data on an asset (or even metre) level, including the use of electricity, natural gas, diesel, fuels, and district heating & cooling, from primary utility data sources. Both landlord energy consumption (generally Scope 1 and 2) and tenant energy consumption (generally Scope 3) are tracked through this platform.

Private Wealth Management

HIGHLIGHT

Portfolio Diagnostic Tool

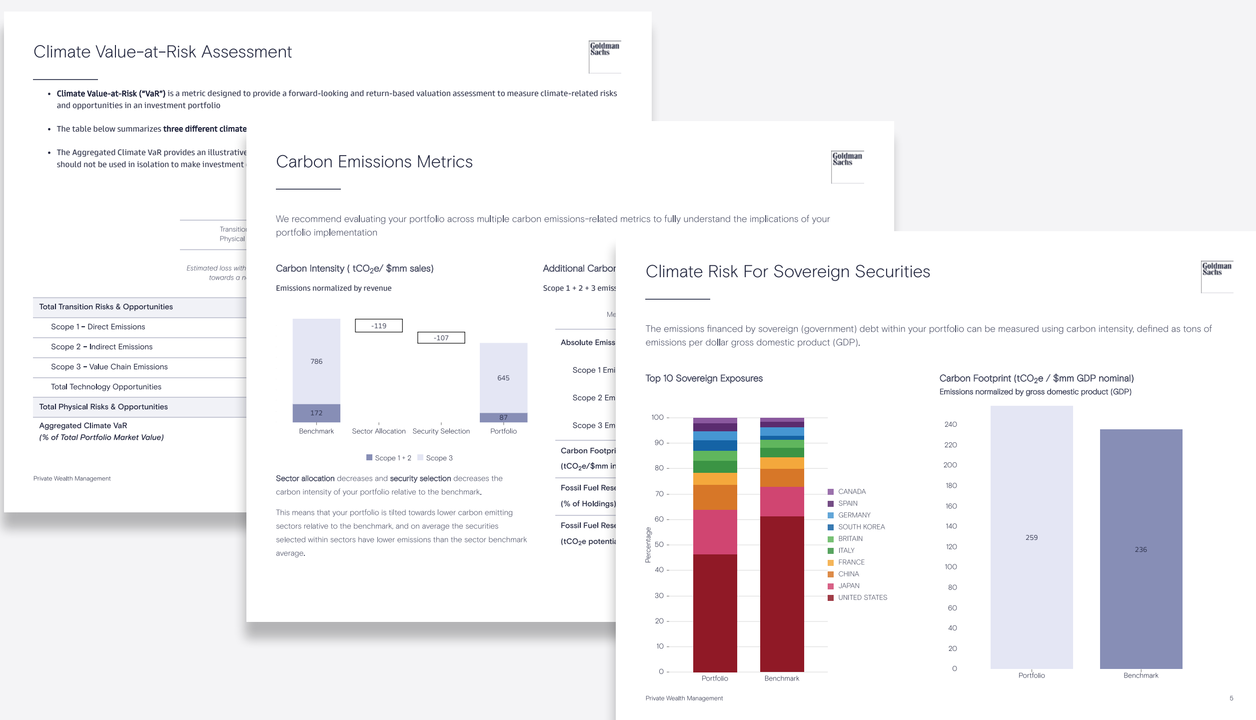
Private Wealth Management clients can leverage the public markets Portfolio Diagnostic Tool to help them articulate, refine, and work towards their long-term sustainable investing goals. Clients can leverage curated metrics relevant to climate transition and inclusive growth factors to assist with risk management, transparency, and engagement around climate and sustainability objectives. The tool provides a deeper dive into a portfolio's financed GHG emissions, helps investors explore exposure to specific business activities, and tracks a portfolio's alignment with the UN Sustainable Development Goals (SDGs).

Over the last year, the tool was enhanced to align with TCFD recommendations and provide additional GHG emissions analytics to Private Wealth Management clients. The tool now provides detailed Scope 1, 2, and 3 GHG emissions metrics, carbon intensity attribution analysis, exposure to climate transition business activities, climate risk for sovereign securities, and a climate value-at-risk assessment.

The tool provides both a portfolio- and strategy-level view of GHG emissions metrics, allowing clients to identify which strategies are contributing to or detracting from their portfolio's representative GHG emissions.

SSG continues to regularly evaluate potential enhancements to the Portfolio Diagnostic Tool and partners with Public Markets Investing teams to ensure alignment of metrics and methodology across business lines.

Figure 4: Example Outputs from the Portfolio Diagnostic Tool[48]



[48] Source: Private Wealth Management. As of June 2024. For illustrative purposes only.

Unlock Potential Value through the Management of Climate-Related Risks, Opportunities, and Impact

Manage and Mitigate Climate-Related Risks

Our efforts to understand climate-related risks across the investment process help to unlock potential long-term returns for our clients.[49] Through these efforts, we aim to help clients make climate-related decisions, unlock potential value, and mobilise capital to deliver on their objectives.

Within this section, we first detail the relevant climate-related risks and opportunities for our business lines before describing the capabilities and strategies, including climate scenario analysis, deployed across our business lines, asset classes, and investment strategies to manage and mitigate physical and transition risk exposures.

Description of Relevant Climate-Related Risks and Opportunities

Within AWM, the time horizons for considering climate-related risks and opportunities vary across business lines, asset classes, and investment strategies.[50] We consider climate-related risks to our business as an asset and wealth manager as well as our portfolio companies and investment assets.

Risks to Our Business

The sub-sections within **"Description of Relevant Climate-Related Risks and Opportunities"** describe the potential climate-related risks and opportunities, across different time horizons, which could pose a material financial impact to the different business lines in AWM. The assessment process to identify these risks and opportunities is qualitative in nature and based on the risks and opportunities identified by individual business lines, within different stages of their typical investment life cycles.

Risks to Our Portfolio Companies

As an investor, we are primarily focused on the impact of transition and physical risks on our portfolio companies and investment assets. We use both quantitative and qualitative methods, as appropriate, to identify and assess climate-related risks within our investments, as discussed in the **"Approaches and Capabilities for Managing and Mitigating Climate-Related Risks"** section.

[49] The portfolio risk management process includes an effort to monitor and manage risk but does not imply low risk.
[50] We follow the definitions of transition and physical risk as set out in our firmwide risk taxonomy framework. See **"Climate-Related Risk Categorisation"** section for more details.

Public Markets Investing Climate-Related Risks and Opportunities

Public Markets Investing considers the following short-, medium-, and long-term horizons relevant for the effective evaluation of climate-related risks and opportunities.[51] These time horizons were selected to reflect a combination of horizons over which physical and transition risks may materialise in the investment process. These time horizons aim to reflect typical holding periods of the Public Markets Investing business; however, Public Markets Investing recognises that these time frames may change depending on, for example, asset class and client preferences.

Short-term: (1–3 years) Aligned with portfolio construction, development, and initial investment holding period. Specific examples may include valuation movements resulting from increased regulation directed at addressing climate change.

Medium-term: (5–10 years) Aligned with capital appreciation of portfolios and longer-term investment research assessing how an investment may evolve over the next 3, 5, and 10 years. During this time, certain portfolio companies and issuers may be engaged on climate topics. Specific examples may be changes in consumer spending habits following changes in technology, such as the uptake in electric vehicles or a reduction in overseas travel. During this time, certain portfolio companies and issuers may be engaged on climate topics.

Long-term: (10+ years) Reflects time horizons for long-term strategic planning, changing perceptions of Public Markets Investing response to the climate transition, and the anticipated impacts of chronic climate-related risks. Specific examples may include physical damage to real assets as a result rising sea levels for coastal properties or infrastructure assets.

Topic	Risk or Opportunity	Time Horizon	Impact
Product-related Risk	Risk	Short- and medium-term	Changes in client preferences as they pertain to climate topics may affect the demand for products and strategies offered by Public Markets Investing. There is a risk that the products offered by Public Markets Investing do not successfully meet client's climate needs, which may expose reputational risk and the associated costs.
Reputational Risk	Risk	Short- and medium-term	Reputational risk could arise if the market perceives Public Markets Investing's response to climate matters to be ineffective, delayed, or inappropriate. Reputational risk could adversely impact client relationships, cause sales reductions, and subject Public Markets Investing to costly litigation.
Regulatory and Legal Risk	Risk	Short- and medium-term	The regulatory landscape for climate topics is evolving. There is a risk that changes to current or emerging climate regulation impacting Public Markets Investing's own products or operations, or those of portfolio companies, could increase compliance costs or alter business and portfolio management activities.
Market Risk	Risk	Short-, medium-, and long-term	Fluctuations in the value of assets due to climate-related risks could impact the value of Public Markets Investing's portfolios, and may also trigger the rebalancing or reallocation of portfolio assets.
Physical Risk/ Operations	Risk	Short-, medium-, and long-term	Adverse climate events or natural disasters could pose a risk to the physical assets on which Public Markets Investing depends. Public Markets Investing strives to prevent and protect any damage to firm assets through various comprehensive controls. Public Markets Investing also maintains business continuity plans to ensure that critical functions can continue to operate in the event of such disruption.
Physical Risk/ Investments	Risk	Short-, medium-, and long-term	Acute physical impacts such as extreme weather or climate events, and the chronic longer-term impacts of a changing climate, could decrease the value of Public Markets Investing's assets and increase capital expenditure and insurance costs.
Transition Risk/ Investments	Risk	Medium- and long-term	Certain industries and activities are at risk of becoming "stranded" in a long-term climate transition. Public Markets Investing may limit exposures to these asset types.
Transition Upside/ Products	Opportunity	Short-term and medium-term	Increasing demand from clients for climate-focused products and solutions presents an opportunity for Public Markets Investing to meet demand by investing in transformative climate solutions that provide positive returns to investors and the broader economy.
Transition Upside/ Products	Opportunity	Short-term and medium-term	Increasing demand from clients for tailored solutions, specific to their climate and investment objectives, presents an opportunity for Public Markets Investing to leverage a platform and co-create strategies and solutions to meet client needs.

[51] The portfolio risk management process includes an effort to monitor and manage risk but does not imply low risk.

GS Alternatives Climate-Related Risks and Opportunities

GS Alternatives defined the following short-, medium-, and long-term horizons, which are generally relevant for the evaluation of climate-related risks and opportunities. These time horizons were selected to reflect a combination of horizons over which transition and physical risks are generally relevant to the investment process, typical investment holding periods, and longer-term impacts on the positioning of GS Alternatives. GS Alternatives recognises some of these risks and opportunities are subject to change over time and this is not an exhaustive list.

Short-term: (1–5 years) Reflects the time horizon for fund development, investment due diligence, and the selection of future assets. Also reflects the anticipated exit and liquidation for the majority of current assets and funds.

Medium-term: (5–10 years) Reflects continued fundraising and product development, and the anticipated exit and liquidation of next generation future investments.

Long-term: (10+ years) Aligned with long-term fund raising, product development, risk analysis, and market positioning.

Topic	Risk or Opportunity	Time Horizon	Impact
Product-related Risk and Regulatory and Legal Risk Investments	Risk	Short-term	Potentially disruptive consumer demand, increased regulatory requirements, disruptive innovation, and reputational risks could negatively impact the value of higher-carbon, industrial, or conventional businesses.
Transition Risk/ Investments	Risk	Short-term	Inadequate management of carbon exposure in investments could lead to declining market share, higher compliance and operating costs, and lower investment returns.
Market Risk	Risk	Medium-term	Value or liquidity markdowns could occur, due to underperformance or under-reporting on climate issues relative to buyer expectations (e.g., public markets ESG funds).
Market Risk	Risk	Medium- and long-term	Investment risk could occur in earlier-stage climate innovations disrupted by a range of potential factors, including unforeseen technologies, market events, and shifts in consumer demand.
Physical Risk/ Investments	Risk	Short-, medium-, and long-term	Increasing likelihood of damages from physical risks to investments, which could impact valuations negatively. Even when this is beyond the investment time horizon for a company, this could still be “priced in” to exits.
Reputational Risk	Risk	Long-term	The performance of investments and the credibility of GS Alternatives climate-related risk management practices could impact future capital raises.
Transition Upside/ Investments	Opportunity	Short- and medium-term	Climate and environmental impact investments could see increasing market share relative to their higher-carbon, industrial, or conventional peers.
Value Creation/ Investments	Opportunity	Short- and medium-term	Decarbonisation and energy efficiency initiatives could lead to reductions in operating costs and the realisation of a green premium from consumers.
Value Creation/ Investments	Opportunity	Short- and medium-term	The implementation of adaptation measures could lead to increased resiliency in investments and decreased costs (e.g., through lower insurance premiums or climate loss avoidance).
Value Creation/ Investments	Opportunity	Medium- and long-term	Changes in the strategy or operations of portfolio companies and client assets to capitalise on the climate transition could lead to a lower cost of capital and higher valuations.
Value Creation/ Investments	Opportunity	Medium- and long-term	Decarbonisation initiatives could lead to improved cash flows and margins, resulting in a lower cost of capital and higher valuations.
Transition Upside/ Products	Opportunity	Long-term	A successful long-term track record on climate solutions investments, as well as value creation from decarbonisation initiatives and resiliency support within investments, could drive greater client demand as transition and physical risks increase.

Private Wealth Management Climate-Related Risks and Opportunities

Private Wealth Management relies on the climate-related risk management of other business lines in AWM for internal products and strategies and relies on XIG for external products and strategies. As such, Private Wealth Management follows the approach to climate-related risks and opportunities across time horizons as set forth by other business lines in AWM when accessing their products and strategies.

Approaches and Capabilities for Managing and Mitigating Climate-Related Risks

Public Markets Investing

Within Public Markets Investing, investment teams adopt different approaches to managing and mitigating climate-related risks, depending on the asset class, strategy, and client preferences, among other factors. While some investment teams assessed climate-related risks and opportunities for some individual investments, in 2023, Public Markets Investing did not assess the impact of climate-related risks and opportunities for all investment products and strategies.

HIGHLIGHT

Transition and Physical Risk Integration: Fixed Income

Within Public Markets Investing, Fixed Income may integrate transition and physical risk into the overall credit assessment process for select investments in Corporate Credit and Sovereign Bonds.[52]

Fixed Income leverages the proprietary Fluent tool when conducting research on specific corporate or sovereign debt issuers. The Fluent tool provides a variety of climate- and sustainability-related KPIs which are integrated into the assessment framework (see the **"Empower Decisions through Actionable Climate Intelligence"** section for more details).

Within Sovereign Bonds, Fixed Income has developed a proprietary internal ESG rating for benchmarking sovereign ESG performance, inclusive of climate, that allows investment teams to quantify and compare environmental factors across emerging and developed markets. The assessment framework underlying the rating leverages a dataset that connects climate physical risk exposure to a country's distribution of population, agricultural production, and overall GDP growth and development. Fixed Income further evaluates the transition risk of a country by evaluating the gap between current country GHG emissions and GHG emissions reduction targets (as described in Nationally Determined Contribution (NDC) plans that outline medium-term climate policies). Additionally, the assessment framework assesses each country in relation to four environmental themes: air pollution, water quality and scarcity, climate and energy, and biodiversity and habitat. Together, these indicators provide a deeper understanding of the environmental risks faced by individual sovereigns.

Within Corporate Credit, a proprietary internal ESG rating covers transition risks for relevant sectors and issuers. The assessment framework underlying the rating is leveraged by ESG Corporate Credit analysts to evaluate specific issuers using bottom-up, sector-based analysis, considering financially material ESG issues including, where material, issuers' GHG emissions intensity and green product and business opportunities. For example, the fundamental analysis of issuers in the energy sector closely examines companies' exposure to different energy sources, environmental and regulatory risks to their business activities, and their commitment and steps taken to diversify into lower-carbon sources of energy. This internal ESG rating assessment has been used as an input into overall credit ratings for select investments.

Starting in 2024, analysts will begin incorporating the Sustainability Measurement Toolkit to enhance fundamental analysis (the new Toolkit is described in further detail in the **"Empower Decisions Through Actionable Climate Intelligence"** section). With the adoption of the new Toolkit, Public Markets Investing aims to align ESG assessment approaches for Fixed Income and Fundamental Equity into a combined view for each company across investment teams.

[52] As part of the investment process, Fixed Income may integrate ESG factors alongside traditional factors. The identification of a risk related to an ESG factor will not necessarily exclude a particular investment that, in the view of the Fixed Income investment team, is otherwise suitable and attractively priced for investment, and Fixed Income may invest in an issuer without integrating ESG factors or considerations into the investment process. Moreover, ESG information, whether from an external and/or internal source, is, by nature and in many instances, based on a qualitative and subjective assessment. An element of subjectivity and discretion is, therefore, inherent to the interpretation and use of ESG data. The relevance and weightings of specific ESG factors to or within the investment process vary across asset classes, sectors, and strategies and no single factor or consideration is determinative. Sovereign Bonds are not included in the Public Markets Investing metrics calculations.

Approach to Climate Scenario Analysis

The development of climate scenario analysis capabilities is a valuable step in improving Public Markets Investing's understanding of exposure to climate-related risks and opportunities within its managed portfolios. At this time, Public Markets Investing assesses resilience to climate-related risks and opportunities as part of the investment process for individual portfolios and/or investment strategies rather than systematically conducting quantitative scenario analysis across the entire business line. For example, MAS has developed a proprietary climate change scenario analysis model to assess the impact of climate change scenarios on capital market return assumptions (see the **"Mobilise the Full Range of Our Resources to Meet Clients' Needs"** section for more details).

Public Markets Investing continues to review and evolve the framework to integrate physical and transition risks into the investment process, which includes the assessment of external vendors' climate scenario analysis tools and capabilities.

GS Alternatives

GS Alternatives seeks to invest in companies with resilient business models, including those better positioned to manage and mitigate climate-related risks. GS Alternatives assesses climate-related risks of select new investments, and actively monitors and manages these risks over the investment period.[53]

In 2023, GS Alternatives built on 2022 climate risk identification work to further develop a toolkit for identifying and quantifying physical climate and transition risk across portfolio exposures.[54] The toolkit has been designed to help investment teams raise questions on climate related-risks relevant to their businesses, understand exposures in quantitative terms, and assist them in calibrating the sensitivity of their investments to climate risk.

Climate risk analysis is complex, uncertain, and rapidly evolving. As GS Alternatives navigates and builds on this landscape, the following disclosure is intended solely to provide one perspective on climate risk and transparency into GS Alternatives' emerging practices. GS Alternatives is working with select deal teams to begin to embed its climate toolkit into diligence and risk management and acknowledges this process will evolve over multiple years. For details on the current integration of climate-related risks into the investment process for GS Alternatives, see the section **"Integration of Climate-Related Risks across the Investment Life Cycle"**. Approaches to climate risk are rapidly advancing and GS Alternatives plans to continuously learn from its pilot capabilities and implementation experience. As a result, GS Alternatives will continue to iterate on its climate risk analysis approach and explore additional methodologies as the program matures.

Approach to Climate Risk Assessment

GS Alternatives' approach to climate risk assessment is composed of a two-part toolkit for both transition and physical risk:

Vulnerability Assessments

Qualitative rating systems and questionnaires to identify the vulnerabilities of a business to transition or physical risks and their relevant mitigants.

Scenario Analysis

Quantitative, climate scenario-based tools to help assess the sensitivity of company financials to different climate outcomes and the potential materiality of climate-related risks.

[53] This section refers only to GS Alternatives strategies within the scope of this report where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes on new and existing investments within certain Private Equity, Infrastructure, Growth Equity, SIG, Private Credit, and Real Estate strategies.

[54] This analysis was undertaken for strategies within scope of this UK TCFD report, and includes certain assets within GS Alternatives' Private Equity, Infrastructure, Growth Equity, SIG, Private Credit, and Real Estate strategies.

Context on Vulnerability Assessments

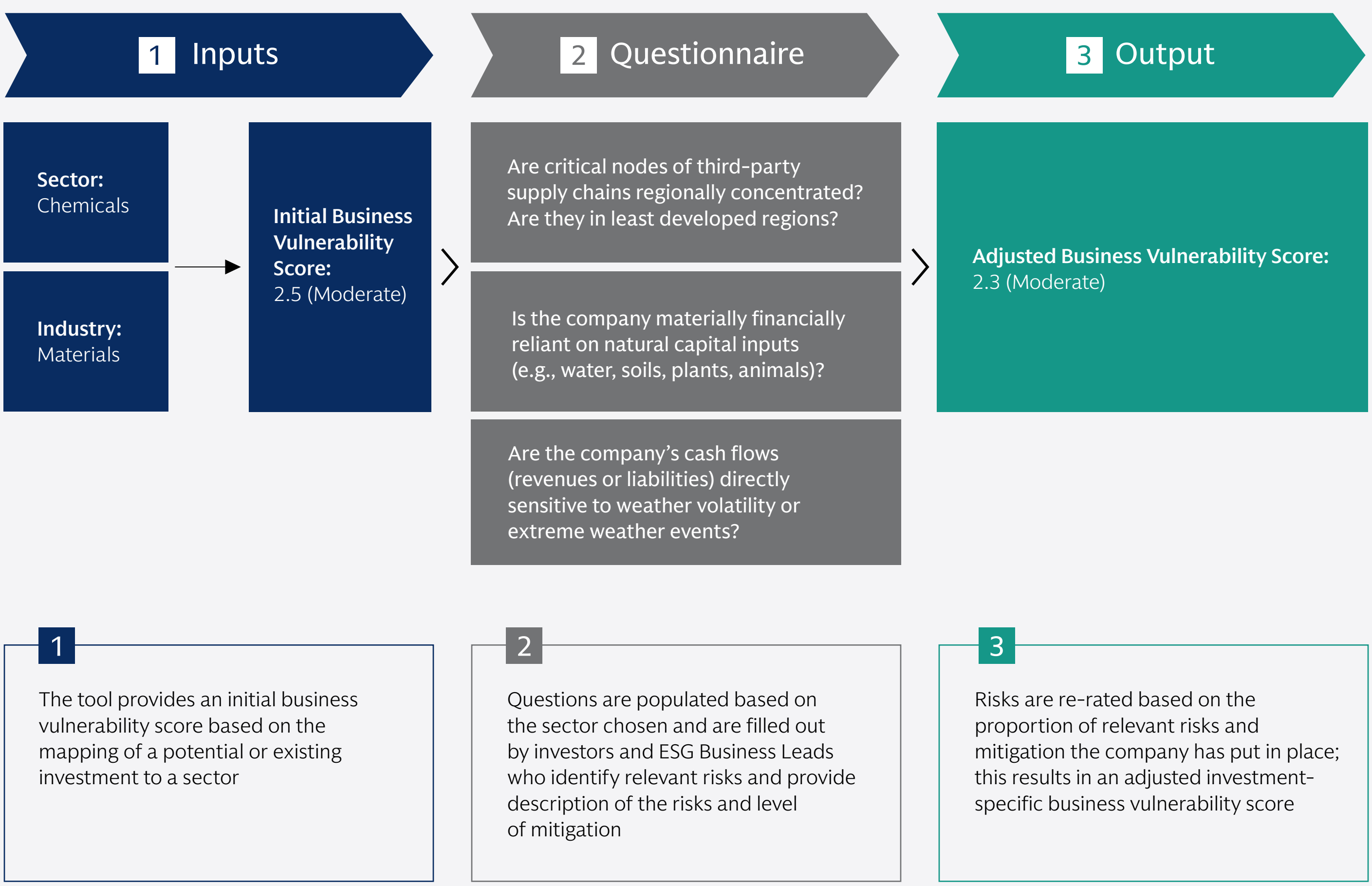
In 2023, GS Alternatives further developed its frameworks for assessing transition and physical risk vulnerabilities. The vulnerability assessment is intended to serve as an educational framework for deal teams, providing them with an additional lens for understanding the potential effects of climate risk on investments. This framework will evolve iteratively over time as new risks emerge and/or are identified by business users. The 2023 version of GS Alternatives' vulnerability assessment framework systematises the sector-based risk ratings developed and reported for FY22. The vulnerability assessment framework is based on industry risk ratings, informed by expert consultation and widely used market research on vulnerability to transition and physical risks.

The vulnerability assessment is a purely qualitative questionnaireto help identify the need for further evaluation of potential risks.

As a qualitative diligence questionnaire, deal team responses on mitigants and risk materiality are determined by their professional judgment and the information made available to them by portfolio companies and diligence support services; these limitations and practices are meant to be broadly in line with traditional investment diligence.

For example, in the transition risk vulnerability assessment framework, industry risk ratings are provided across a proprietary climate risk segmentation of over 50 industries, which are differentiated by their business vulnerabilities to climate risk. Since transition risk vulnerabilities can differ substantially by primary company operating activities, a sector-based framework helps investors focus on the most relevant risks.

Figure 5: Illustrative Transition Risk Vulnerability Assessment for the Chemicals Sector



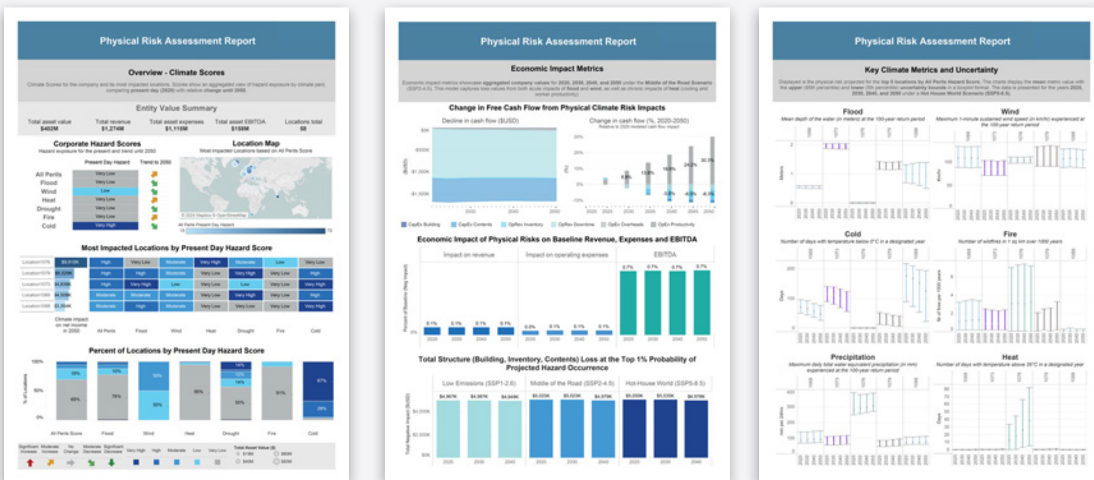
Context on Scenario Analysis

In 2023, GS Alternatives onboarded new capabilities for physical climate risk scenario analysis for portfolio monitoring.[55] Through an uplifted ESG Data Collection process, and a third-party vendor, GS Alternatives now collects the operating and owned locations of all companies in scope for TCFD reporting within the portfolio. These new processes for location collection and analysis allow GS Alternatives to understand risk in geospatial terms and identify potential concentrated climate risk exposures.

Following reviews of multiple vendors, GS Alternatives selected a vendor for portfolio-wide climate risk assessments. These capabilities help identify common climate-related risks, including flood, wind, fire, heat, and drought across multiple time horizons; assess the qualitative and quantitative impacts (e.g., to financial metrics); and determine CVaR.

Climate scenario tools were then customised for use by GS Alternatives through a series of workshops focusing on financial assumptions and data visualisation with deal teams, AWM Risk, Enterprise Risk, Operational Risk, and the S&I team. Based on these workshops, the vendor and the GS Alternatives S&I team developed dashboard reports for presenting company-level results to investors and portfolio companies, a how-to-guide for interpreting reports, and a post-processing workbook that can be used to adjust financial input assumptions to refine loss and damage estimates.

Figure 6: Physical Risk Assessment Company Reports



GS Alternatives has begun to focus on identifying opportunities for value uplifts associated with high-risk exposures early in diligence or during the investment holding period. For example, in 2023, the Real Estate team began this work with a pilot conducted by an engineering firm to identify resiliency and adaptation interventions for high-risk properties. The vendor leverages an expanded set of high granularity climate risk analysis tools and engineering judgment to validate risks and design asset-specific interventions to reduce potential economic damage from climate change.

In 2023, GS Alternatives also developed and piloted a climate scenario-based tool for transition risk impact quantification and sensitivity analysis across portfolio company exposures. This pilot scenario tool, leveraged for this year's reporting, combines portfolio company GHG emissions, financial metrics, climate scenarios, and market research to derive potential company revenue, earnings before interest, taxes, depreciation, and amortisation (EBITDA), and valuation impacts across a full range of current Network for Greening the Financial System (NGFS) scenarios.

The tool quantitatively assesses impacts from several sources relevant to the climate transition, including changes to revenue from the macroeconomic environment, changes in EBITDA from shadow carbon pricing imposed by regulation, and changes in revenue from market share and size shifts across transition-sensitive revenue segments. The newly developed pilot tool features differentiated capabilities to assess the potential to reduce loss by companies implementing economic abatement levers based on the *Carbonomics* cost curve.[56] The use of marginal abatement costs allows for a more direct link between transition risk assessments and investor evaluation of the potential financial value of developing decarbonisation plans.

As we continue to learn from and develop these piloted tools, GS Alternatives is focused on training and working with deal teams to embed these capabilities into company-level due diligence, portfolio reporting, and post-investment analysis across Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit.

55 This physical risk analysis was conducted on GS Alternatives strategies within the scope of this report including strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes new and existing investments within certain Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit strategies. Real Estate strategies conducted a separate physical risk analysis pilot, described later in this section.

56 Source: Goldman Sachs Global Investment Research. The *Carbonomics* cost curve takes account of the cost of technologies available at commercial scale and assumes economies of scale for those currently in the pilot phase. The cost curve is applied globally, across power generation, industry, transport, buildings, and agriculture.

Overview of Climate Risk Analysis Results

For 2023 TCFD reporting, GS Alternatives applied its new climate risk toolkit to a pilot portfolio analysis exercise.[57] The pilot exercise encompassed all Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit strategies in scope for UK FCA TCFD reporting, for which an output illustration is shown below. Figure 7 provides high-level results across in-scope funds, summarising the separate outputs of pilot vulnerability assessment and climate scenario analysis. In Figure 7, vulnerability scores offer a view of the qualitative risk presented by a business' operating model and can capture dimensions of risk that are not easily quantified. In Figure 7, CVaR summarises the relative results of GS Alternatives' climate scenario analysis across relevant segments. CVaR is generally defined as the percentage of asset value that may be lost under a defined climate scenario. As described further in the rest of this sub-section, these values are the results of quantitative modelling from available financial, operational, economic, and climate inputs. Together, these two outputs, which may not be directionally aligned, more fully contextualise a company's or segment's potential risk by providing complementary information. The illustrative results are relative assessments across select in-scope funds in GS Alternatives and the shown positive exposures are due to portfolio skew.

Figure 7: Overview of Climate Scenario Analysis Results[58,59]

CVaR Legend Positive impact or opportunity · Adverse impact or risk

Climate Risk Segment	Transition Risk: Net Zero 2050 CVaR	Transition Risk: Vulnerability Score	Physical Risk: Hot House World CVaR	Physical Risk: Vulnerability Score
Communication Services		Low		Low
Consumer Discretionary		Low		Moderate
Consumer Staples		Moderate		Moderate
Financials		Low		Low
Health Care		Low		Moderate
Industrials		Moderate		Moderate
Information Technology		Low		Low
Materials		Moderate		Moderate
Utilities		Low		Moderate
Carbon Intensive		Moderate		Moderate
Not Carbon Intensive		Low		Moderate
United States		Moderate		Moderate
Europe		Moderate		Moderate
Asia		Moderate		Moderate
United Kingdom		Low		Moderate
Rest of World		Low		Moderate
Overall		Moderate		Moderate

Vulnerability Score Legend	
1.00	Low
1.20	Low
1.40	Low
1.60	Moderate
1.80	Moderate
2.00	Moderate
2.20	Moderate
2.40	Moderate
2.60	High
2.80	High
3.00	High
3.20	High
3.40	High
3.60	Very High
3.80	Very High
4.00	Very High

Vulnerability Scores

In Figure 7, the vulnerability scores summarise the potential for a portfolio company to experience impacts from transition or physical risk if these risks emerge. Vulnerability scores are intended to be scenario-independent and summarise operational, strategic, and business model characteristics that raise the level of vulnerability for a portfolio company to climate risk. Scores are produced at a company-level and range from Low to Very High (continuously from 1 to 4); they reflect adjustments to a starting industry score based on risks and mitigants identified at a company-level.

A significant majority of the portfolio companies onboarded in 2023 with a Moderate industry risk rating (or above) were assessed through completion of the vulnerability assessment process described earlier in this section. This tool was completed by deal teams with support from the S&I team and select support from expert consultants. Exposures maintained from 2022 inherited the vulnerability score from the prior year.

GS Alternatives' vulnerability assessment evaluates both physical and transition risks posed to the portfolio and the mitigants that can reduce these risks. Investment teams may identify risks and assess the level of mitigation, which in turn informs risk scores. As shown in the charts below, the assessment is intended to help investment teams focus on unmitigated or partially mitigated climate risks identified across the portfolio and—in aggregate—may help investors evaluate the most prevalent risks posed to investments.

57 This pilot exercise included all GS Alternatives strategies within scope of this report, including strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes assets within certain Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit strategies; it does not include Real Estate strategies.

58 GS Alternatives has leveraged the IIGCC framework to define carbon intensive segments for ease-of-use for asset owner reporting and traceability.

59 As part of GS Alternatives' climate scenario analysis pilot assessment GS Alternatives developed proprietary CVaR metrics for both transition risk and physical risk. For transition risk, GS Alternatives assessed "Net Zero 2050 CVaR", an internally developed metric informed by NGFS, macro assumptions, and pro forma analysis. For physical risk, GS Alternatives adopted "Hot House World CVaR" from the vendor. Capabilities and assessments may differ from firmwide processes in terms of relevant monitoring and reporting thresholds.

New 2023 Exposure Climate Vulnerabilities Assessed

The vulnerability assessment is intended to help deal teams evaluate qualitative and hard-to-quantify company risk considerations. The assessment enables deeper insights into factors driving vulnerabilities to climate risks across investments and the extent to which these vulnerabilities are already mitigated, planned, and/or budgeted to be mitigated. This process allows select deal teams and climate risk experts to identify unmitigated climate-related risks at the time of assessment, with the intent of highlighting potentially relevant investment considerations and informing potential action.

Figure 8: Types of Physical Risk Vulnerabilities Identified[60]

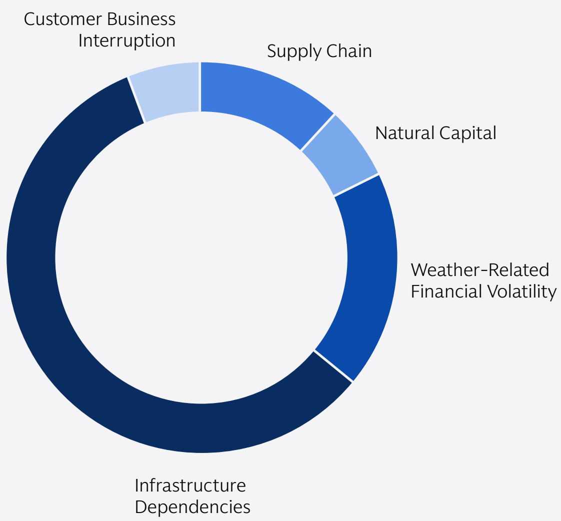
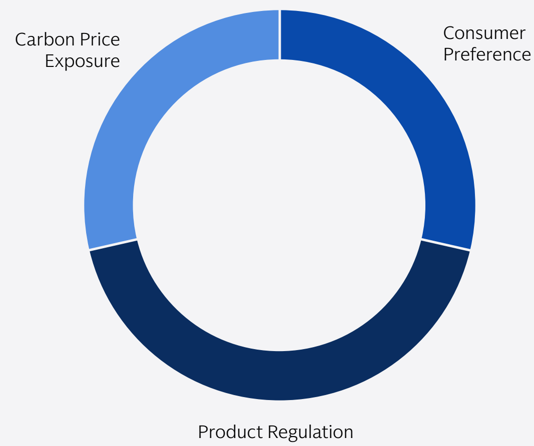


Figure 9: Types of Transition Risk Vulnerabilities Identified



As shown in Figure 8, most portfolio physical risk vulnerabilities were identified by investment teams as arising from infrastructure dependencies that can cause business interruption; this risk is currently difficult to quantify, but critical for companies to address through business continuity planning. As shown in Figure 9, relevant portfolio transition risk vulnerabilities included potential product and carbon pricing regulatory exposure, reflecting current and anticipated regional regulatory exposure.

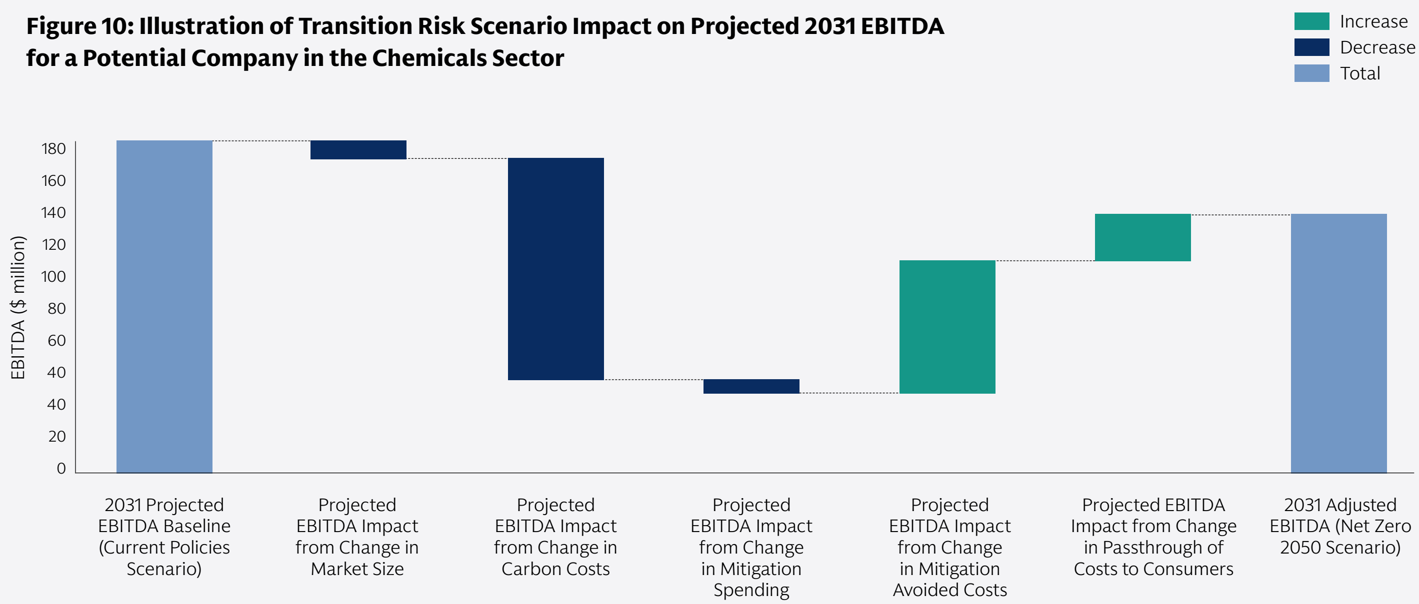
[60] These charts display a summary of risk vulnerabilities based on the assessment of investments added to the portfolio in 2023 across GS Alternatives strategies within scope of this report, including strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) in 2023. This includes assets within certain Private Equity, Growth Equity, Private Credit, and Infrastructure strategies.

Transition Risk Scenario Analysis

In Figure 7, GS Alternatives' pilot assessment of CVaR under a Net Zero 2050 scenario is shown, sourced from NGFS Phase IV.[61] For this assessment, GS Alternatives leveraged its newly developed proprietary transition risk tool with standard portfolio-wide assumptions.[62] The tool allows value-based assessment of both risks and opportunities. The segments in Figure 7 shown with green bars demonstrate exposure to opportunities, mainly in consumer discretionary and utilities segments, driven by portfolio exposure to electric vehicles (EV), battery storage, energy efficiency, and renewable energy-related businesses. Exposures to materials businesses, particularly in the chemicals sector and industrials businesses related to goods and people transport, drive the bulk of higher relative risk exposures. Impacts in these sectors to demand are compounded by sensitivity to carbon pricing, leading to higher cost exposures under regulatory carbon pricing schemes.

The transition risk tool allows for evaluation of drivers associated with the transition, including macro demand, positive and adverse exposure to transition sensitive revenue segments, the impacts of carbon pricing, and the potential for abatement. An illustration of how this affects a potential company in the Chemicals sector is shown in Figure 10.[63]

Figure 10: Illustration of Transition Risk Scenario Impact on Projected 2031 EBITDA for a Potential Company in the Chemicals Sector



Under a transition scenario (here, the Net Zero 2050 Scenario), companies experience macro demand impacts that may cause lower growth than in a baseline projection (here, the Current Policies Scenario), as consumers move away from vulnerable products and services. Companies are also exposed to carbon prices (or shadow carbon prices), which can reach $400–$450 per tonne under the NGFS scenario in the US and Europe by the early 2030s. Leveraging *Carbonomics*, GS Alternatives determines which costs can be economically abated over time, resulting in a combination of capital and operational expenditures as well as efficiency savings. Economic abatement in advance of regulation allows for companies to avoid some cost exposures, and a certain amount of these costs are passed through to consumers through inflated pricing. The resulting changes in EBITDA for the transition scenario over the projection period are converted into cash flows and assessed relative to a no-transition baseline to determine CVaR.

In GS Alternatives' portfolio, approximately half of climate-related value at risk under an orderly transition is due to changes in demand for portfolio company products and services, leading to reductions in revenue. The remainder of the impact comes from carbon costs, exposure to which is mitigated from projected economic decarbonisation measures adopted from the *Carbonomics* cost curve.

Use of the *Carbonomics* cost curve allows GS Alternatives to assess the potential for economic mitigation, and ultimately the value of mitigation to a business assuming particular climate scenarios. At any given carbon price, all actions at a lower marginal abatement cost create value for a company by reducing exposure to regulatory or shadow carbon prices. For example, in GS Alternatives' modelling, the Materials and Utilities sectors have the potential to avoid 10%–20% value losses through proactive transition planning, which depends on the scenario that is realised as well as the downstream company actions to mitigate. The *Carbonomics* cost curve unlocks the potential to link decarbonisation and risk assessment and enable tailored investment in decarbonisation based on economic opportunity.

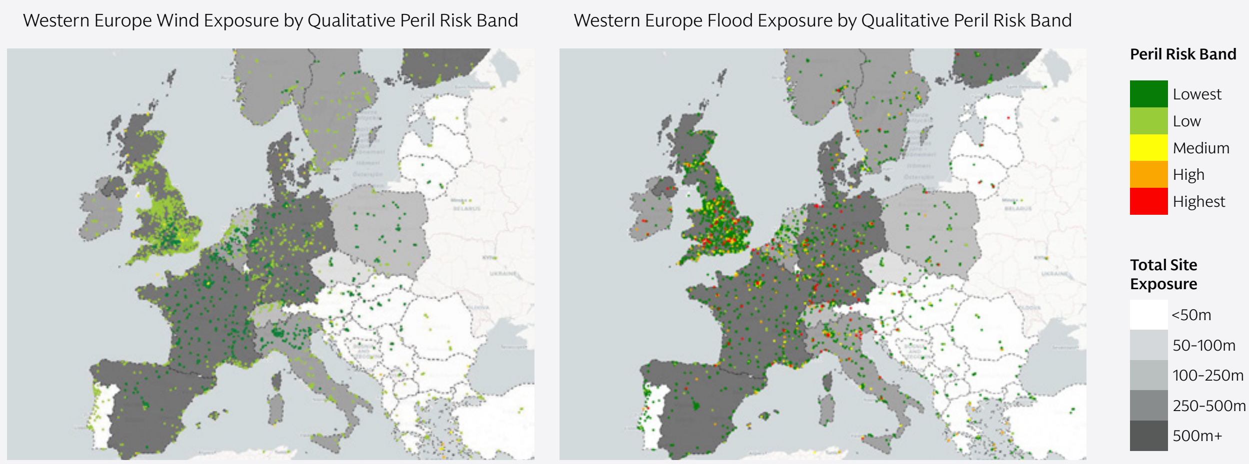
[61] This transition risk scenario analysis included certain GS Alternatives strategies within scope of this report, including strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes assets within certain Private Equity, Growth Equity, Private Credit, SIG, and Infrastructure strategies, and excludes Real Estate strategies.
[62] These standard assumptions include hold period, passthrough rates, growth rates, fixed costs, and discount rates, which may not be fully reflective of deal economics, but can be further customised by investment teams. The use of standard assumptions means projected portfolio outcomes may deviate from projections based on more granular, deal-specific inputs.
[63] The impacts shown in this figure are modelled outputs for an individual company based on NGFS scenario drivers.

Physical Risk Assessment

The pilot physical risk scenario analysis results build on work with vendors and investment teams over 2023 to assess CVaR. CVaR results reflect the application of hazard modelling from a multi-model ensemble of general circulation models (GCMs), as provided by a vendor, customised to assess private markets financial impacts with inputs from the business. Impacts from fire, wind, flood, and heat arising from insurance technical premium, building type, contents, inventory loss, productivity, and cooling costs are included in the CVaR, which reflects the discounted cumulative damages from these perils over a ten-year period.

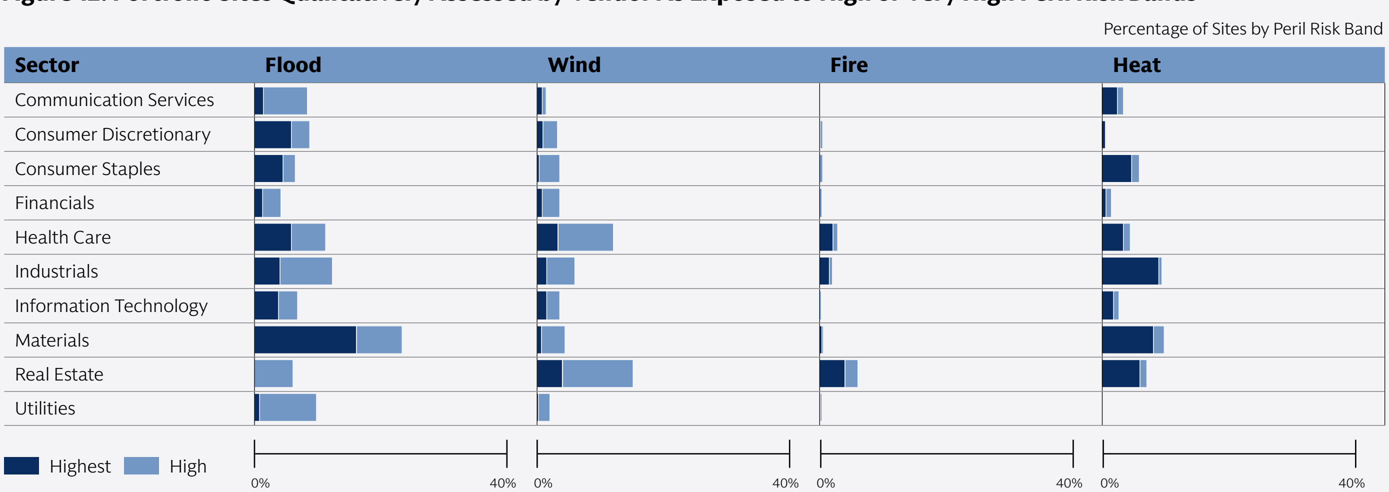
Hazard modelling covers the significant majority of owned and operated assets within Private Equity, Infrastructure, Growth Equity, SIG, Private Credit, and Real Estate strategies.[64] Hazard modelling data allows GS Alternatives to identify the most pressing risks and target potential outlier exposure. Each peril is banded by a risk tier allowing identification of geospatial hazards and assessment of the risk distribution across the portfolio. These perils can also be converted into maps at a business unit and portfolio-wide level (for the asset classes outlined previously) to identify assets at highest risk globally (as shown in Figure 11 for select peril and region combinations). These visualisations are produced directly from vendor data to show qualitative peril distributions for select exposures, these visuals do not represent and are not intended to imply financial losses or CVaR impact across our portfolio.

Figure 11: Company and Real Estate Operating, Owned, and Collateral Assets by Qualitative Peril Risk Band and Exposure



As shown in Figure 12, across the mapped portfolio, only a minority of assets were assessed by the vendor as exposed to high or very high climate-related risks. In the context of certain corporate portfolio companies (as opposed to Infrastructure or Real Estate), many of these exposures may be diversified across thousands of sites and/or represent operating locations with rented space or limited operations exposure, making true financial interpretation difficult without deep research and insight.

Figure 12: Portfolio Sites Qualitatively Assessed by Vendor As Exposed to High or Very High Peril Risk Bands[65]



[64] This physical risk scenario analysis covers certain GS Alternatives strategies within scope of this report, including strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes assets within certain Private Equity, Infrastructure, Growth Equity, SIG, Private Credit, and Real Estate strategies.

[65] The following perils show relative risk given underlying geospatial portfolio distributions. Perils are to be considered individually and do not correspond to an absolute level of risk, loss, or damage that can be directly compared across hazard types. Categorisation of risk levels is inherited from vendor capabilities and may differ from firmwide processes in terms of relevant monitoring and reporting thresholds.

In some cases, however, a small proportion of sites can be exposed to more extreme hazards. At the tails of the probability distribution, climate-related risks can display extreme behaviour as shown in Figure 13. A minority of sites can be exposed to once-in-a-100-year wind-speeds, for example those exceeding 250 kilometers/hour.

Figure 13: 2020 Wind Speed by Number of Sites[66]

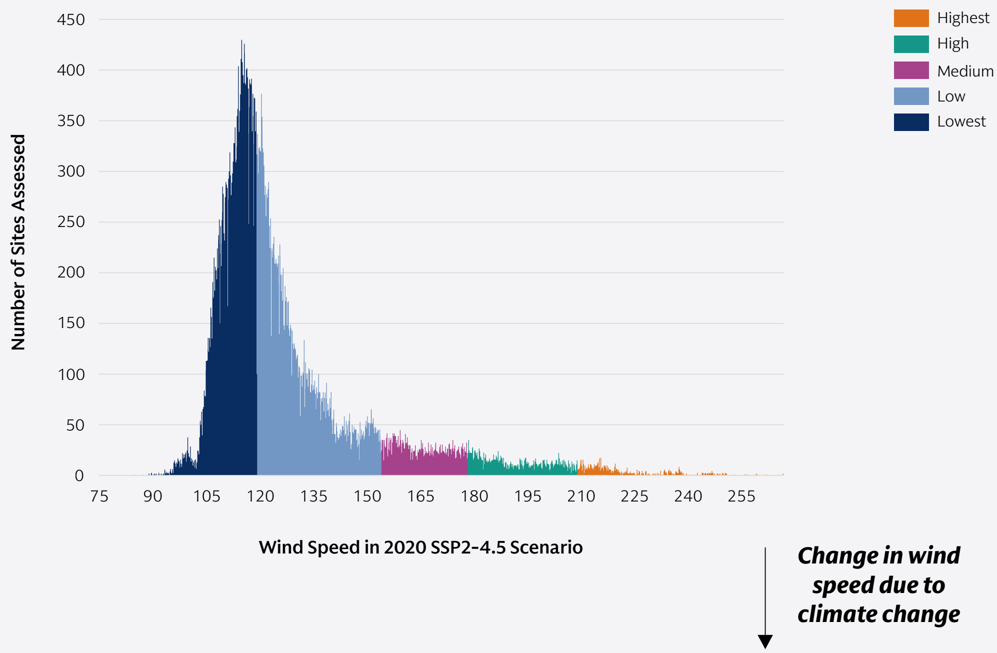


Figure 14: Change in Wind Speed from 2020 to 2050 by Number of Sites

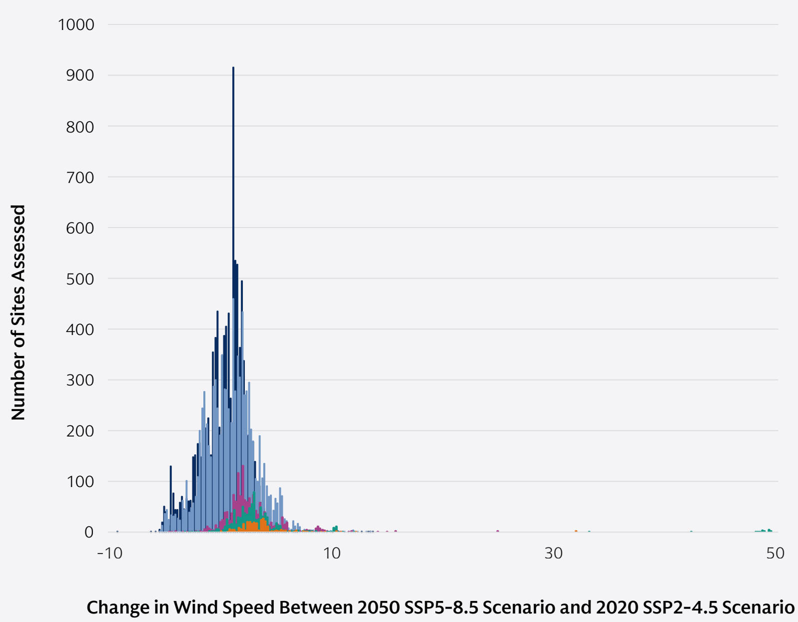


Figure 14 provides an illustration of how risks change over time: Sites with higher current risk exposure also have a propensity to increase in risk over time with some outlying shifts expected by 2050 under a Hot House World Scenario (2050 SSP5-8.5 Scenario). Assessment of hazards, and their potential financial impacts can allow investment teams to target and address the tails that may present the potential for operational losses.

For details on the integration of climate-related risks into the investment process for GS Alternatives, see the **"Integration of Climate-Related Risks across the Investment Life Cycle"** section.

66 2020 is provided as an illustrative baseline year based on available data from the vendor, which provides outputs in five-year timesteps.

Private Wealth Management

For clients who express interest in climate- and sustainability-related investment products and strategies, Private Wealth Management offers solutions, which may incorporate climate-related screens and provide lower exposure to carbon-intensive companies across a portfolio. Similar to 2022, Private Wealth Management did not assess the impact of climate-related risks and opportunities for all investment products and strategies. Private Wealth Management's assessment and integration of climate-related risks into its investment decision-making is primarily dependent on the climate-related risk management, engagement, and stewardship capabilities of AWM business units (when sourcing products and strategies from within AWM), and from external managers (when sourcing products and strategies from outside Goldman Sachs).

Approach to Climate Scenario Analysis

Private Wealth Management has an ongoing relationship with an established third-party data vendor to enhance its climate scenario analysis capabilities. Within its Portfolio Diagnostic Tool, Private Wealth Management offers analysis of climate risk for sovereign securities as well as climate value-at-risk assessments leveraging data and analysis from the third-party vendor. These insights and analysis are offered for individual client portfolios and available on an on-demand basis.

Help Portfolio Companies and Client Assets Navigate and Benefit from the Climate Transition

Public Markets Investing

Given the scale and complexity of the global climate transition, managing climate-related risks and opportunities is integral to serving Public Markets Investing's diverse client base. Public Markets Investing sees this transition playing out across the real economy, the markets in which it transacts, investment portfolios, and client franchise. Climate change is an important and growing area of focus for many clients, both from a risk-return and an impact perspective. At the same time, it is increasingly affecting clients' investments through physical risk impacts to operations and challenges navigating the transition to a lower-carbon economy.

How Public Markets Investing Engages on Climate-Related Issues

The Global Stewardship Team collaborates with the Fundamental Equity and Fixed Income Investment teams to engage with companies across its portfolios on material climate-related risks and opportunities across three key objectives.

1 Disclose Data

Material data on GHG emissions can be a useful tool for the Public Markets Investing business to incorporate into its investment process and for clients who want to understand the material emissions associated with their investment portfolio.[67] Public Markets Investing has been engaging with companies on data disclosure since 2020. For each company, Public Markets Investing identifies the GHG emissions scopes it considers material under the Sustainability Accounting Standards Board (SASB) standards and seeks to engage with companies that are not disclosing all the material categories of GHG emissions.

2 Set Targets

For companies in industries where GHG emissions are material, Public Markets Investing believes disclosure of a GHG emissions reduction target can serve as an important data point for use in its investment analysis. Where GHG emissions are material, Public Markets Investing believes companies without targets may be less well-positioned in the climate transition. Since 2021, Public Markets Investing has sought to engage with certain companies whose GHG emissions are material under SASB, but which have no reduction targets.

3 Execute Strategy

Public Markets Investing conducts these engagements with companies in high-impact industries whose GHG emissions are material to their business. Public Markets Investing encourages these companies to implement a robust and quantifiable climate transition strategy. These engagements are guided by Public Markets Investing's Paris Alignment Lens.

[67] GHG emissions are divided into three categories based on how they are produced:
- Scope 1 GHG emissions are direct GHG emissions from owned or controlled sources.
- Scope 2 GHG emissions are indirect GHG emissions from the generation of purchased energy.
- Scope 3 GHG emissions are all indirect GHG emissions not included in Scope 2 that occur in the value chain of the reporting company. Scope 3 can be broken down into upstream GHG emissions (for example, the GHG emissions produced by a company's suppliers) and downstream GHG emissions (for example, the GHG emissions produced by the use of a company's sold products).

Please see ***Greenhouse Gas Protocol*** website for more information.

Overview | Climate Engagements in 2023[68]

Building on historical engagement initiatives, in 2023, Public Markets Investing expanded its engagement efforts by assessing companies representing 70% of its financed emissions against the criteria in its proprietary Paris Alignment Lens. Public Markets Investing used this analysis to identify companies for potential engagement.[69]

188

Engagements[70] in 2023 with

174

Issuers

Objective 1. Disclose Material Data

244

Issuers identified for engagement on this theme

78

Engagements conducted in 2023 with 75 issuers

Objective 2. Set Targets

62

Issuers identified for engagement on this theme

26

Engagements conducted in 2023 with 25 issuers

Objective 3. Execute Strategy

132

Issuers identified for engagement on this theme

93

Engagements conducted in 2023 with 83 issuers

[68] Source: Goldman Sachs Asset Management, as of December 2023. Each thematic climate engagement may cover more than one objective.
[69] Financed GHG emissions measures impact across a portfolio normalised by the size of the portfolio. To identify the companies accounting for 70% of its financed GHG emissions, Public Markets Investing leveraged the formula for Carbon Footprint (Scope 1 and 2), as recommended by PCAF (see the **"Executive Summary"** for the specific formula used).
[70] Source: Goldman Sachs Asset Management, as of December 2023. Each thematic climate engagement may cover more than one objective.

HIGHLIGHT

Climate Engagement[71]

Theme:
Climate—Execute Strategy

Country
India

Sector
Materials

In November 2023, members of the Global Stewardship Team engaged with the Investor Relations and Sustainability team at an Indian materials company to discuss the company's climate transition plan. Public Markets Investing had identified the company for engagement under the "Climate—Execute Strategy" engagement initiative in which Public Markets Investing seeks to engage with companies in high-impact industries on the implementation of a robust and quantifiable climate transition strategy. Based on its Paris Alignment Lens, Public Markets Investing identified the following areas for engagement: GHG emissions performance, decarbonisation strategy, and capital allocation strategy.

Public Markets Investing discussed the company's climate transition goals for its aluminium production to achieve net zero. The company has multiple 2025 targets but has not set its mid- to long-term targets. Public Markets Investing encouraged the company to consider establishing probable but ambitious pathways.

Public Markets Investing also discussed transition strategies in detail focusing on specific technologies such as recycling, hydrogen generation, and carbon capture and utilisation to better understand its transition roadmap.

In 2024 and beyond, Public Markets Investing will seek to continue engaging with the company on its climate transition plan.

[71] For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

Engaging on Biodiversity

Biodiversity loss can pose a key investment risk that can manifest itself in a company's operations or across its supply chain. Biodiversity has a role in ensuring the resilience and preservation of natural capital assets on which society and business depend. However, land use change, climate change, exploitation, and pollution are driving biodiversity and ecosystem loss creating risks and opportunities for society, business, and investors.[72]

Recognising this risk and understanding the regulatory landscape, Public Markets Investing seeks to engage with a targeted group of companies across its business portfolios to understand their approach to managing risks associated with nature and biodiversity and to promote accountability and best practices.

In 2023, Public Markets Investing focused its stewardship work related to biodiversity and nature to focus on two themes.

Plastics

Encouraging companies to disclose plastics packaging usage in line with the SASB standards for Fast Moving Consumer Goods (FMCG) companies.

Deforestation

Engaging with companies in sectors identified as being exposed to potentially material deforestation risk to understand their approach to addressing deforestation in their supply chains.

Plastics

The Public Markets Investing Global Stewardship Team has engaged with a number of the largest FMCG companies on how they are approaching key risks and opportunities related to plastics, packaging, and waste. Plastic packaging accounts for nearly half of all plastic waste globally, and much of it is thrown away within just a few minutes of its first use.[73]

Public Markets Investing seeks to engage with FMCG companies for whom plastic packaging represents a potentially materially investment risk to encourage the following disclosures of plastic packaging usage in line with SASB standards:

- Total weight of packaging in metric tonnes, by type
- Percentage of packaging made from recycled or renewable materials
- Percentage of packaging that is recyclable, reusable, and/or compostable

Deforestation

About two-thirds[74] of global deforestation in the past decade was driven by the production of a few agricultural forest risk commodities: palm oil, timber and paper products, soy, beef, and leather.[75]

In response, the Global Stewardship Team engages with companies with exposure to deforestation risks from these commodities. Public Markets Investing seeks to engage with companies that have not disclosed deforestation-reduction plans, are large holdings across Public Markets Investing business portfolios, and where those companies do not have publicly disclosed deforestation reduction plans. Discussion topics during these engagements include:

- Deforestation risk assessment
- Targets and strategies in place to mitigate deforestation risk
- Progress reporting
- Supply chain management

As data availability improves, Public Markets Investing aims to enhance its deforestation risk exposure analysis for its investee companies.

[72] https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues/environmental-issues/biodiversity.
[73] UNEP (2018). SINGLE-USE PLASTICS: A Roadmap for Sustainability (Rev. ed., pp. vi; 6).
[74] CLUA. (2014) Disrupting the global commodity business: How strange bedfellows are transforming a trillion-dollar industry to protect forests, benefit local communities, and slow global warming.
[75] Rautner, M., Leggett, M., and Davis, F. (2013) The Little Book of Big Deforestation Drivers, Global Canopy Programme; Oxford.

HIGHLIGHT

Biodiversity Engagement[76]

Theme:
Nature and Biodiversity—Deforestation

Country
South Africa

Sector
Consumer Discretionary

In December 2023, the Global Stewardship Team engaged with the Sustainability Officer and the Investor Relations team of a South African consumer discretionary company. Public Markets Investing had identified the company for engagement under its "Biodiversity and Nature—Deforestation" engagement initiative in which it seeks to engage with companies on their approach to key risks and opportunities related to deforestation.

The company has become a Forestry Council member and is working with its supply chain on deforestation and ensuring Tier 1 suppliers have Forestry Stewardship Council certification. The company does not have a deforestation policy. Public Markets Investing encouraged the company to consider publishing one to explain its approach to managing deforestation in its operations and supply chain.

Public Markets Investing will seek to continue engaging with the company to monitor its progress on raw material procurement and addressing deforestation risk.

Further information, including additional case studies covering both Deforestation and Plastics engagements can be found in the ***Goldman Sachs Asset Management Stewardship Report 2023***.

[76] For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

Proxy Voting on Climate-Related Issues

Investee Company Board Accountability

Public Markets Investing expects boards to be accountable for climate transition risk and may vote against board members for failure to disclose material climate data. In 2022, Public Markets Investing updated its proxy voting policy to vote against relevant directors at companies on its engagement list that had not made improvements to its material GHG emissions disclosures.

Climate Transition Plans

When evaluating climate transition plans for proxy voting purposes (such as in the context of "say on climate" proposals), the Global Stewardship Team seeks to conduct analysis based on the following framework. Public Markets Investing seeks to make decisions primarily based on its observations of the company's strategy relative to industry peers and best practices. In general, the Global Stewardship Team considers three key elements of a company's climate transition plan:

1 Disclose

Does the company currently disclose material scopes of emissions?

2 Targets

Does the company have reasonable GHG reduction targets?

3 Credibility

Has the company provided a credible strategy for implementing its plan?

In 2023, Public Markets Investing voted on 33 management-sponsored "say on climate" proposals, supporting 94%.[77] Public Markets Investing also voted on seven shareholder-sponsored "say on climate" proposals, supporting none.

[77] Source: Goldman Sachs Asset Management, ISS, as of December 2023.

GS Alternatives

As a lower carbon economic transition unfolds, GS Alternatives believes decarbonisation and risk mitigation efforts can be accretive to the value of portfolio companies. GS Alternatives also recognises the importance of partnering directly with portfolio companies on decarbonisation planning to meet the expectations of key stakeholders, including investors who may have their own climate goals.[78]

Pre-investment, GS Alternatives aims to integrate an assessment of climate- and sustainability-related risks into new investment decisions. This provides a foundation for evaluating climate-related risks and supports discussions on how to mitigate these risks and create value. Investment teams complete an ESG due diligence questionnaire, which is generally integrated into the Investment Committee memo.[79] Climate-related questions may include the company's GHG emissions and GHG emissions intensity, renewable energy usage, and carbon reduction initiatives. Furthermore, nonfinancial risks are summarised in the Investment Committee memo, which may include climate- and sustainability-related issues, where relevant, to highlight areas that may need to be addressed either before or after closing the investment.

Post-investment, for certain GS Alternatives' equity strategies,[80] investment teams may develop uplift plans in partnership with portfolio company management, and advisers and/or other co-investors, as appropriate. These plans may include increased engagement with portfolio company management to develop targeted mitigation actions for potential climate-related risks, evaluate how to best capitalise on identified opportunities, identify potential decarbonisation initiatives, and assess capital expenditures needed to decarbonise where required by a strategy's mandate, or to create value.

Goldman Sachs Value Accelerator

GS Alternatives supports a number of its portfolio companies by facilitating access to the wider Goldman Sachs network and its highly knowledgeable operating advisers and sector experts through the Goldman Sachs Value Accelerator (Value Accelerator). Focusing on equity investments, the Value Accelerator is a centralised platform that can work with portfolio companies to build enduring businesses and create incremental value. Working with select portfolio companies worldwide, the Value Accelerator delivers support to management teams. The Value Accelerator seeks to drive value for portfolio companies in five key areas:

1. Scaling Revenue
2. Operational Excellence
3. Technical, Digital, and Data Transformation
4. Talent and Organisational Strategy
5. Sustainability Optimisation

In 2023, GS Alternatives developed a framework for more deeply integrating climate-related support services into the Value Accelerator. Shared with portfolio companies in GS Alternatives' climate webinar series, this Value Acceleration Framework defines activities driving company climate programme maturity from Measurement to Planning & Strategy and Execution. The Value Acceleration Framework provides a roadmap for climate programme capability development and potential service offerings that may be made available through Value Accelerator advisers, vendor relationships, and in-house tools and resources.

Figure 15: Climate Platform Value Acceleration Framework[81]

Informs

Targets resources for

Measurement	Planning & Strategy	Execution
GHG Accounting Assess and report sources and drivers of GHG emissions	**Opportunity Assessment** Identify and prioritise projects to reduce GHG emissions	**Energy Efficiency** Reduce energy use
Inventory Management Improve GHG reporting and auditability	**Target-Setting** Set credible and achievable targets	**Clean Power** Purchase or directly invest in clean power
Life Cycle Assessment Understand and improve product impact	**Capacity Building** Allocate human capital and build management capacity	**Supply Chain Optimisation** Optimise supply chain for climate management
Risk Assessment Identify and address vulnerabilities to climate risk	**Capital Planning** Line up and quantify necessary financial resources	**Resilience and Adaptation** Reduce exposure to physical risks through engineering, insurance, and planning

78 In 2022, GS Alternatives developed internal approaches and processes for facilitating decarbonisation planning in portfolio companies. In 2023, decarbonisation planning with portfolio companies began. This section refers to GS Alternatives strategies within the scope of this report, where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes new investments and existing assets within certain Private Equity, Infrastructure, Growth Equity, and SIG strategies.

79 ESG due diligence questionnaires vary depending on the business unit in question, and in some cases were finalised in 2023.

80 This section refers to GS Alternatives strategies within the scope of this report, where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes assets within certain Private Equity, Infrastructure, Growth Equity, and SIG strategies.

81 For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

Decarbonisation Planning

In order to encourage the mitigation of climate risk within its portfolio, in 2023, GS Alternatives worked with third-party service providers to uplift the providers' capabilities to offer scalable decarbonisation services to portfolio companies. The decarbonisation planning programme is based on a value-first approach to the climate transition: Carbon is treated as a waste product and lower GHG emissions is considered a potential strategic value creation lever to increase market competitiveness or reduce transition risk. GS Alternatives' approach is differentiated in its orientation towards helping companies making informed decisions on decarbonisation and target-setting through enabling a deep analysis of value and costs.

GS Alternatives began designing its decarbonisation planning programme in 2023 with three separate support services.

1. For companies with less material GHG emissions footprints, in less complex operating environments, or where a company has its own internal resources to assess its approach to decarbonisation, GS Alternatives worked with a third party to begin drafting a decarbonisation playbook. When complete, this decarbonisation playbook is intended to provide an overview of the business case and process associated with decarbonisation as well as deep dives into decarbonisation planning exercises across common levers, such as fleet optimisation, building energy efficiency, and renewable procurement. The playbook generally draws on the broader expertise of Goldman Sachs, leveraging *Carbonomics*, GS Sustain, and other Global Investment Research reports and the differentiated expertise developed through the Real Estate team's value uplifts. Ultimately, the decarbonisation playbook will be made available on demand to portfolio companies through Value Accelerator advisers and resources.
2. For companies that need a customised plan supported by an external adviser, GS Alternatives developed and began piloting a decarbonisation planning cohort option in late 2023. The decarbonisation planning cohort is intended to bring together companies with similar decarbonisation needs to learn the approach to decarbonisation as a group. Through third-party support, companies then develop a customised decarbonisation plan around decarbonisation levers providing both net-zero and economic-lever-only decarbonisation pathways.
3. Some companies within the portfolio may require fully custom engagements due to a combination of fund requirements, significant business exposure to GHG emissions, or complex operating situations. To help match companies with vendors that can serve their unique needs, GS Alternatives launched a broad and detailed market RFP across decarbonisation services vendors ranging from engineering firms to strategy consultancies. RFP responses and an associated survey have helped GS Alternatives professionals match portfolio company needs with specific vendor capabilities. In 2023, GS Alternatives undertook an effort to prioritise select portfolio companies for decarbonisation pilots, and consequently for the group selected, began to launch company decarbonisation pilots.

HIGHLIGHT

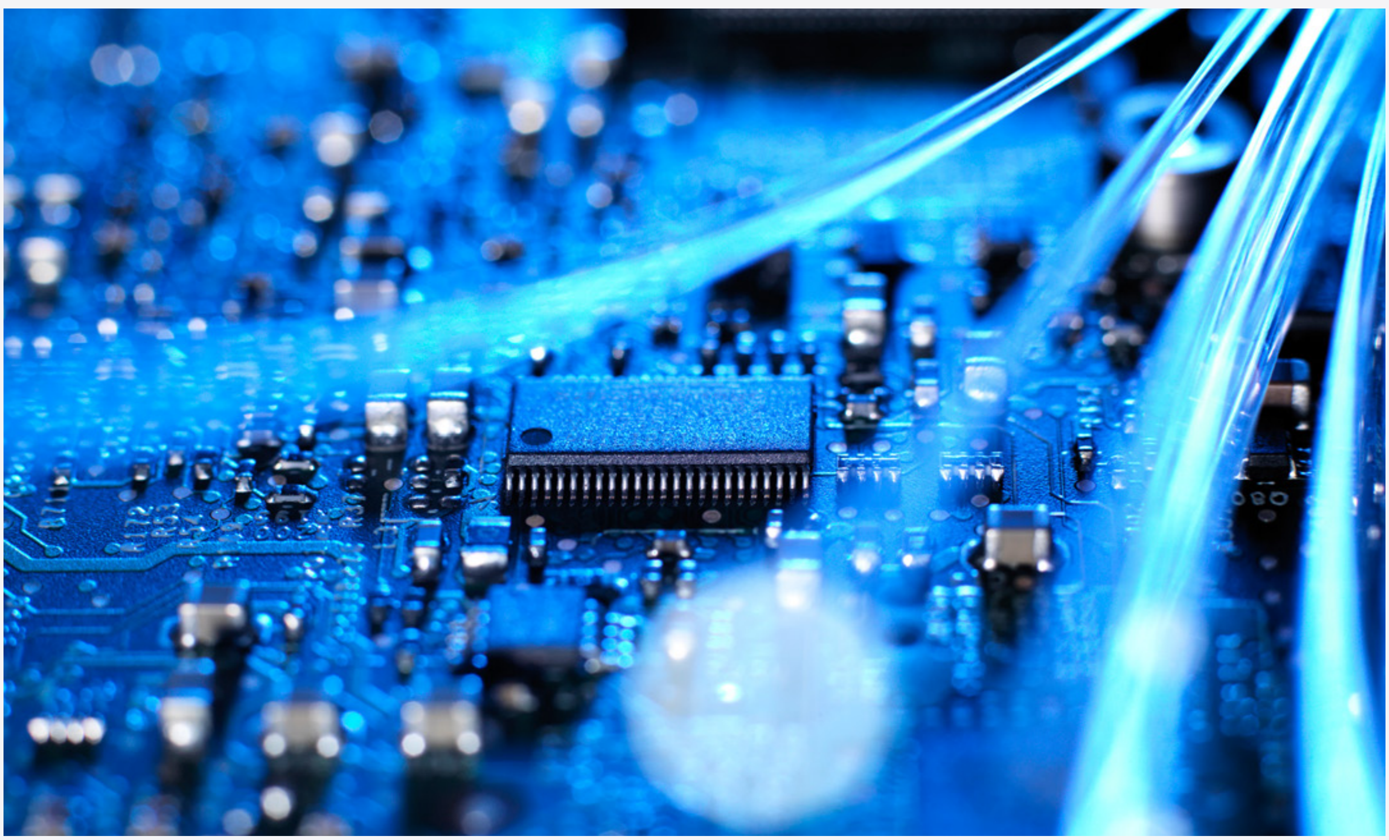
Enabling Cost Savings through Decarbonisation Planning for an Infrastructure Portfolio Company[82]

Infrastructure assets play a crucial role in enabling the global climate transition and the GS Alternatives Infrastructure team have committed to using commercially reasonable efforts to adopt decarbonisation plans for controlled portfolio companies within the West Street Infrastructure Partners (WSIP) IV fund.

For example, WSIP IV invested in a company in the telecommunications sector in 2022 and thereafter the Infrastructure team began to engage with the company on ESG topics, including in 2023, on the development of a decarbonisation plan. The engagement included the Infrastructure team meeting regularly with the company's senior management team and discussing the company's decarbonisation project at board meetings.

Once a vendor was selected to lead the company's decarbonisation programme, the company also appointed an individual to lead and partner with the vendor. As a part of the plan, the company began to review its renewable energy procurement options and fleet purchasing and leasing. The Infrastructure team received periodic updates at meetings to review the progress of the decarbonisation plan development. In 2023, the tonnes of carbon dioxide equivalent (tCO_2e) per passing (i.e., the premises to which an operator has capability to connect to in a service area) reduced 6.7% when compared to 2022, and the tCO_2e per subscriber reduced 12.2%. The company prioritised decarbonisation levers that maximised cost savings through 2030, based on change in discounted total cost of ownership. The implementation of these value-driven initiatives (as well as accounting for expected "greening" of the grid) is projected to enable a 34% emissions reduction for the company by 2030. In order to close the gap to achieve a 42% GHG emissions reduction by 2030, the company is considering utility-supplied renewable energy procurement options.

At the end of 2023, the company's management team finalised its decarbonisation plan, with the company's board expected to review and approve the plan in Q2 2024.



[82] Note: Any data provided in select case studies has been obtained from sources, including those publicly available, believed to be reliable, but no representation or warranty is made by GSI and GSAMI (or any other Goldman Sachs entity) as to the quality, completeness, accuracy, fitness for a particular purpose, or non-infringement of such information. GSI and GSAMI (or any other Goldman Sachs entity) has not assured, verified, or validated this third-party information and is not liable for the adequacy, accuracy, or completeness of such information. Data relied upon may be produced based on methodologies that are not transparent to GSI and GSAMI (or any other Goldman Sachs entity), and the data used and underlying methodologies are subject to change without notice.

Private Wealth Management

Private Wealth Management does not directly undertake traditional public markets shareholder engagement activities or engagement with portfolio companies and client assets in alternatives. Private Wealth Management clients benefit from the engagement and climate-related risk mitigation activities of both Public Markets Investing and GS Alternatives across internally managed assets.

For assets managed by external managers, Private Wealth Management benefits from the climate- and sustainability-related due diligence conducted by Imprint within XIG, including the assessment of external managers' approach to engagement.

Invest in Climate Opportunities

Public Markets Investing

Public Markets Investing has long acknowledged and operated under the view that the sustainable transformation of the global economy will be a complex, long-term process and require the involvement of companies across industries. To achieve real world climate progress, Public Markets Investing believes investment is needed in three key areas:

Transition: From a climate perspective, Public Markets Investing acknowledges that companies in today's high-intensity industries can play a large role in driving progress towards net zero and other environmental targets. Public Markets Investing also believes that there are potentially significant opportunities for investors to benefit from those companies that are improving their sustainability profiles.

Efficiency: A general drive for resource efficiency is being amplified by various levers (e.g., supply chain partners, regulators, investors), leading to potentially significant investment opportunities in companies that are more carbon efficient.

Solutions: Public Markets Investing expects growing revenue, profit, and market capitalisation to accrue to climate solutions that enable decarbonisation across the economy.

HIGHLIGHT

Goldman Sachs Global Environmental Transition Equity Strategy[83]

Public Markets Investing's Global Environmental Transition Equity Strategy was launched in November 2023 and is Public Markets Investing's first strategy dedicated to the transition from an emissions-intensive economy to one that is increasingly renewable energy-based and low carbon. As previously noted, Public Markets Investing believes that companies with a large GHG emissions footprint today can play a large role in driving progress towards net zero and other environmental targets, and that there are potentially significant opportunities for investors to benefit from exposure to companies that are improving their sustainability profiles.

Investing across the range of high-emitting sectors with the biggest impact on GHG emissions as well as water consumption and waste generation, the portfolio consists of predominantly high-quality, mature, value-orientated companies, which exhibit strong free-cash-flow yields, potentially attractive valuations, and are aligned with decarbonisation themes. The five key themes the strategy focuses on are extraction, power generation, manufacturing, transportation, and consumption.

Pre-investment—for all holdings—the environmental progress of the companies pertaining to core themes of the strategy (GHG emissions, water, and waste) are assessed by the portfolio teams. This assessment helps to determine expectations for each company's transition journey.

During investment, it is crucial that Public Markets Investing partners with the portfolio companies, to identify synergies, advance sustainability practices, and focus on shareholder value creation. The Global Stewardship team is critical to Public Markets Investing's process in its role as an active asset manager and can support the portfolio team to develop and set appropriate KPIs designed to continually monitor portfolio companies transition progress and engage directly with company management to give targeted feedback.

This strategy leverages Public Markets Investing's proprietary internal tools and systems; for example, the Paris Alignment Lens (see **"Empower Decisions through Actionable Climate Intelligence"**) to both qualitatively and quantitatively assess the environmental impact and transition plans of the companies in which they invest for clients.

[83] For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

HIGHLIGHT

Fixed Income Climate Transition Alignment Strategy

To align investments with clients' climate goals, Public Markets Investing's Fixed Income team collaborates closely with clients to understand their climate goals and design bespoke portfolios tailored to their unique objectives and constraints. As an example, one European client has set an ambition to transition its proprietary assets to net-zero GHG emissions by 2050, matching the objective to limit global warming. The client has also set intermediate targets for multiple portfolios against which progress and effectiveness are measured. Together with this client, Public Markets Investing co-created a tool that assesses alignment of issuers with the goals of the Paris Agreement and forms part of its broader Climate Transition Building Blocks (as described in the **"Mobilise the Full Range of Our Resources to Meet Clients' Needs"** section). Corporate issuers are assessed on their current decarbonisation efforts and forward-looking elements such as long-term ambition, short- and medium-term targets, decarbonisation strategy, and capital allocation plans, among others. This is in line with the framework set by the IIGCC. The tool is used in the portfolio construction process to align with the client's objectives.

HIGHLIGHT

Goldman Sachs Proprietary Green Bond Methodology

Financing a successful transition to a low-carbon economy will necessitate a significant amount of investment. Goldman Sachs Global Investment Research estimates that the cost of achieving 75% decarbonisation of the global economy will be in the region of $3.1 trillion per year.[84] In response, public and private investors are channelling capital towards innovative solutions in areas such as renewable energy, green infrastructure, sustainable water, and energy efficiency. The global bond market will be an important source of investment to drive this climate transition. Furthermore, the market for green bonds—which help finance these environmentally beneficial projects and programmes—has broadened and developed to include companies and governments across the globe seeking investment to drive their plans to reduce GHG emissions and guard against physical risks.

The dedicated Public Markets Investing Green, Social, and Impact Bonds team utilises a proprietary framework to help clients manage the risk from and capitalise on opportunities created by the transition to a more sustainable economy.

This proprietary framework for green bonds focuses on delivering impact on key performance indicators. These include annual GHG emissions avoided, energy efficiency savings, renewable energy output, and renewable energy capacity added, such as wind, solar, hydropower, and bioenergy. Clients are able to make investments to help achieve their climate ambitions through green bond screening covering: the types of projects being financed, how the projects are selected, the management of the proceeds, and what is being reported.

Public Markets Investing continues to leverage the complementary strengths of its existing investing teams to launch new sustainability-related strategies in line with clients' preferences.

[84] Source: Goldman Sachs ***Carbonomics*** 2022.

GS Alternatives

Climate Solutions Investments[85]

In GS Alternatives, the Horizon platform seeks to identify investments that have the potential to disrupt and positively transform industries through decarbonisation, risk mitigation,[86] and adaptation; especially across emerging trends such as growing clean energy demand, electrification, and decarbonised industrial processes. GS Alternatives also believes there are opportunities to invest in the transition, including energy transition infrastructure and strategies aimed at transforming higher carbon intensity companies into assets better-positioned for the climate transition.

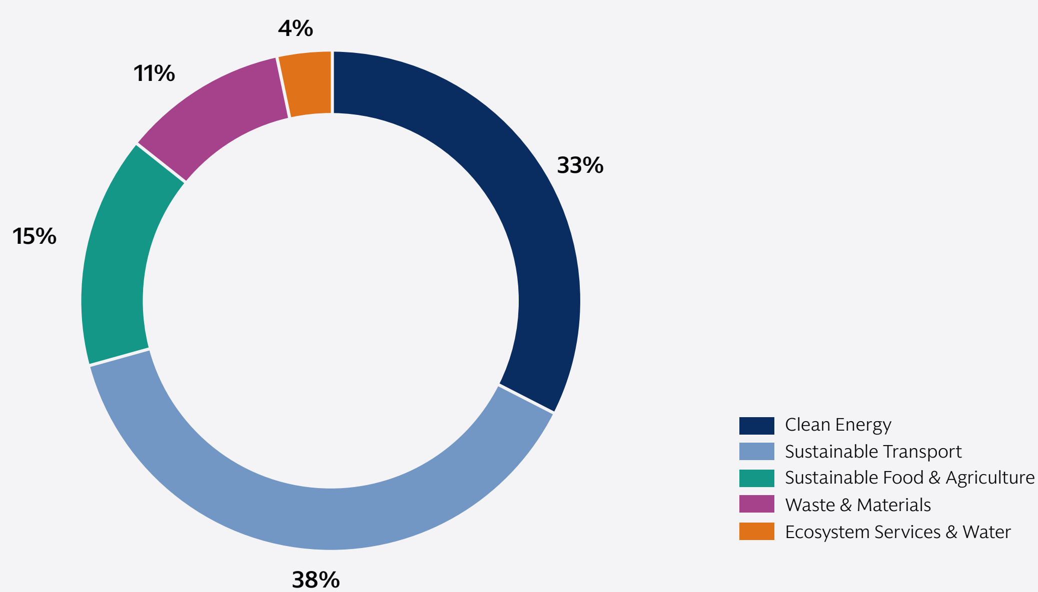
HIGHLIGHT

Horizon Environment & Climate Solutions Strategy[87]

The Horizon Environment & Climate Solutions Strategy invests in companies that offer solutions to address adverse environmental impact and advance the sustainable climate transition.

This strategy seeks to invest in sustainable solutions that address some of the highest-emitting sectors while also offering compelling commercial opportunities for GS Alternatives' investors. These global investments include leading manufacturers in lithium-ion batteries, sustainable packaging materials, high-quality recycled cotton fibres, businesses aiming to increase efficient water usage in agriculture, and businesses increasing energy efficiency in commercial and industrial buildings.

Figure 16: Horizon Environment & Climate Solutions Strategy—Breakdown of Assets under Supervision by Theme[88]



Percentages may not sum to 100% due to rounding

[85] Information in this section refers to the Horizon Environment & Climate Solutions strategy.
[86] Risk management processes include an effort to monitor and manage risk but should not imply low risk.
[87] For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.
[88] Breakdown as of 31 December 2023.

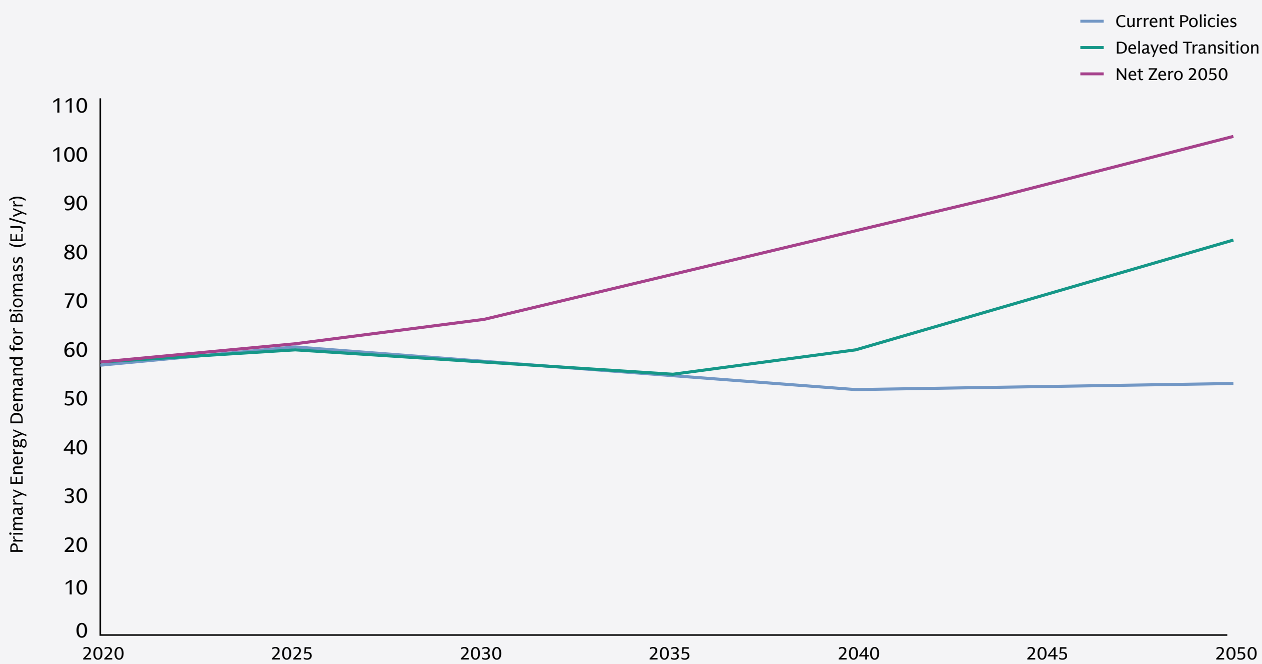
HIGHLIGHT

Range of Climate Solutions Investments across GS Alternatives[89]

Biomethane

As part of the ongoing transformation of the global energy supply, alternative biomass fuels such as biomethane—a low-carbon natural gas produced through the anaerobic digestion of organic waste—can serve an important role, as evidenced by strong demand for biomass fuels under NGFS scenarios.

Figure 17: Projected Demand for Biomass Fuels under NGFS Scenarios[90]



Biomethane is particularly relevant for Europe's decarbonisation and energy security plans given it provides the benefits of fossil fuel natural gas with lower life cycle GHG emissions, while being produced domestically and leveraging the extensive gas infrastructure already in place. In 2023, the Infrastructure team within GS Alternatives established a bioenergy company, a new business focused on developing, building, owning, and operating biomethane plants across Europe with the aim of deploying in excess of €1 billion over the next three to five years. The company already has a presence in Spain and Italy and is considering expanding to other European countries.

Additionally, in 2023, the Infrastructure team also invested in a bioenergy company in the US, deriving renewable natural gas (RNG) from pre-consumer organic waste. This process can provide dual benefits, helping businesses and municipalities reuse their organic waste and supplying the country's utilities with RNG, critical for reducing their carbon footprints.

89 Any data provided in select case studies has been obtained from sources, including those publicly available, believed to be reliable, but no representation or warranty is made by GSI and GSAMI (or any other Goldman Sachs entity) as to the quality, completeness, accuracy, fitness for a particular purpose, or non-infringement of such information. GSI and GSAMI (or any other Goldman Sachs entity) has not assured, verified, or validated this third-party information and is not liable for the adequacy, accuracy, or completeness of such information. Data relied upon may be produced based on methodologies that are not transparent to GSI and GSAMI (or any other Goldman Sachs entity), and the data used and underlying methodologies are subject to change without notice. For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

90 Scenarios from NGFS REMIND-MAgPIE 3.2-4.6 model.

Wetlands Restoration

Wetlands cover only 1% of the Earth's surface, but store 20% of the global organic ecosystem carbon; this disproportionate share is fuelled by high carbon sequestration rates per unit area and effective storage capacity, which greatly exceed those of oceanic and forest ecosystems.[91]

Since 2021, SIG has invested in a mitigation banking company, which provides developers of infrastructure projects (e.g., departments of transportation, manufacturers, miners, real estate developers) with a market-based mechanism to satisfy state and federal regulatory requirements to offset damage to aquatic ecosystems and other biologically sensitive habitats. When construction disrupts a local ecosystem, project owners can offset the ecological damage by buying mitigation credits from a nearby restoration project with similar ecological features to the one impacted. This company undertakes projects that drive the preservation and restoration of wetlands and streams, as well as threatened and endangered species habitats, and then sells the corresponding environmental credits to developers.

This process aims to mitigate net losses to the environment as a result of development. In 2023, the company made enhancements to its methodology for estimating carbon sequestration at its project sites, and to date, the company has restored or preserved a cumulative total project acreage of more than 22,000 acres.[92]

Electric Vehicle Battery Recycling

As demand for electric vehicles (EVs) rises, automakers face supply chain pressure in continuing to source the critical raw materials—including nickel, lithium, cobalt, and copper—required to create EV batteries. According to the EU, global demand for the lithium used to manufacture batteries for mobility and energy storage is expected to increase up to eighty-nine fold by 2050.[93]

In 2023, the Private Equity team invested in a company that is creating a circular EV battery supply chain in the US, by recycling on average 95% of the materials in the end-of-life EV batteries. According to the company's estimates, it will produce enough anode and cathode (battery electrodes) by 2025 that could power approximately one million EVs annually. This investment aligns with electrification and climate transition mega-trends, building upon GS Alternatives' expertise investing across the battery and EV value chain.

[91] Source: Recovering wetland biogeomorphic feedbacks to restore the world's biotic carbon hotspots, Science (2022) Vol 375, Issue 6593.

[92] Any data provided in select case studies has been obtained from sources, including those publicly available, believed to be reliable, but no representation or warranty is made by GSI and GSAMI (or any other Goldman Sachs entity) as to the quality, completeness, accuracy, fitness for a particular purpose, or non-infringement of such information. GSI and GSAMI (or any other Goldman Sachs entity) has not assured, verified, or validated this third-party information and is not liable for the adequacy, accuracy, or completeness of such information. Data relied upon may be produced based on methodologies that are not transparent to GSI and GSAMI (or any other Goldman Sachs entity), and the data used and underlying methodologies are subject to change without notice. For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

[93] Source: Regulation of the European Parliament and of the Council establishing a framework for ensuring a secure and sustainable supply of critical raw materials and amending Regulations (EU) 168/2013, (EU) 2018/858, 2018/1724, and (EU) 2019/1020, Explanatory Memorandum.

Private Wealth Management

Private Wealth Management offers clients a range of climate-related investment opportunities across its platform. The platform provides access to a variety of Goldman Sachs products, including Fixed Income, Fundamental Equity, Quantitative Investment Strategies, and SIG within AWM. Clients also have access to a wide range of mutual funds and an Exchange-Traded Funds (ETF) platform sourced by XIG. XIG has a dedicated team that performs due diligence on both private and public market climate, sustainability, and impact strategies. Through this platform, Private Wealth Management can currently implement sustainable strategies (inclusive of climate and in fund or separate account format) across approximately 85% of a portfolio with a moderate-risk model asset allocation.[94] The Portfolio Management Group curates these strategies and optimises asset allocation to offer EMEA clients dedicated ESG multi-asset class portfolios.

Private Wealth Management regularly collaborates with investment teams within AWM and with XIG for external managers. This collaboration is used to determine which investment strategies are suited for clients' specific investment and climate objectives, including where clients have expressed interest in monitoring and addressing climate-related risks and opportunities.

Climate- and sustainability-related strategies available to clients on the Private Wealth Management platform include:

- **Screening Strategies:** Strategies that apply rules based on defined criteria that determine whether an investment is permissible. Screening Strategies are most often achieved via passive, public market strategies.
- **Integration Strategies:** Strategies that have ongoing consideration of ESG factors within the investment analysis and decision-making process with the aim to improve risk-adjusted returns. Integration Strategies are most commonly pursued via active, public market strategies.
- **Thematic Strategies:** Strategies that select assets to access specified climate transition and/or inclusive growth opportunities. Similar to Integration Strategies, Thematic Strategies are most commonly pursued via active, public market strategies.
- **Impact Investments:** Strategies that invest with the intention to generate positive, measurable social and/or environmental impact alongside a financial return. Impact Investing is most commonly applied to alternatives.

Private Wealth Management can also provide access to strategies based on clients' preferences that screen out holdings in sensitive industries or mitigate exposure to key long-term risks like climate change.

The Private Wealth Management business provides clients with access to impact investment opportunities for alternatives. Private Wealth Management continues to expand its platform to include a broader range of climate-related commingled alternative funds, single managers, and direct investments.

[94] The gaps may arise from sub-asset classes that lack robust sustainability strategies, such as hedge funds and high-yield municipals. In cases where a client wants a 100% sustainable portfolio, changes can be made to their custom asset allocation that avoid these sub-asset classes and subsequently re-weight in a manner that maintains the integrity of their elected risk/return profile.

HIGHLIGHT

Private Wealth Management Model Portfolio

For clients who express an interest, Private Wealth Management has developed a proprietary ESG-focused model portfolio implementation.

The model portfolio implementation utilises the strategic asset allocation from Private Wealth Management's Investment Strategy Group[95] and leverages sustainable investing strategies.

When a moderate risk portfolio using this implementation approach is analysed utilising the Private Wealth Management Portfolio Diagnostic Tool, the portfolio has generally shown a lower GHG emissions intensity and lower exposure to carbon reserves than the comparative portfolio benchmark.

HIGHLIGHT

Three New Green Bond Fund Offerings on Private Wealth Management Platform

In 2023, Private Wealth Management began to offer three new green bond funds for clients. Green bonds are any type of bond instruments where the proceeds will be applied to finance or refinance in part or in full new and/or existing projects that are intended to be beneficial to the environment. These bonds are mainly issued by supranationals, sub-sovereigns, agencies, and corporates pursuing policies of sustainable development while observing ESG principles. The selection process involves green bond analysis, traditional credit analysis, and ESG analysis, which may be limited by the quality and availability of the data disclosed by issuers or provided by third parties.[96]

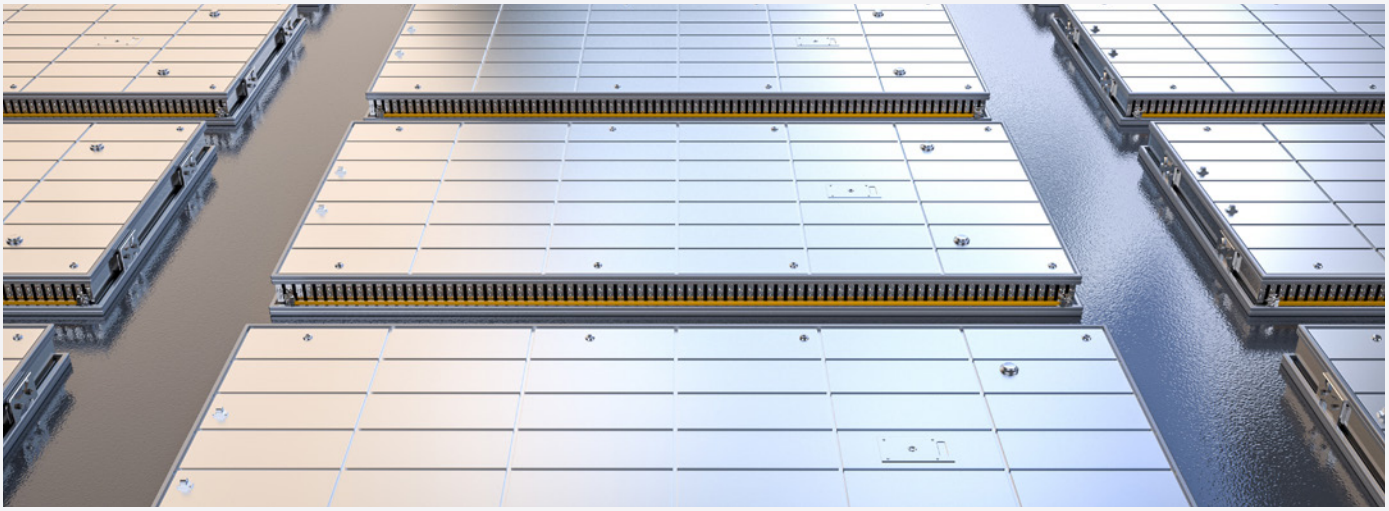
The dedicated Green, Social, and Impact Bond team embedded in the Investment Grade Credit team in Public Markets Investing manages the funds leveraging the proprietary Green Bond framework (see the Public Markets Investing sub-section of **"Invest in Climate Opportunities"** for more information).

HIGHLIGHT

Series D Capital Raise for a Sustainable Battery Materials Manufacturer[97]

Private Wealth Management introduces certain eligible clients to private placement opportunities through the Goldman Sachs Global Banking & Markets segment.

One such opportunity during the reporting period related to a Series D Capital raise of a company that is engaged in the sustainable, closed-loop battery materials solutions space. Its proprietary technology results in reduced production costs, improved performance, and lowered GHG emissions.



[95] The Investment Strategy Group, part of the AWM, focuses on asset allocation strategy formation and market analysis for Private Wealth Management.
[96] Source: Goldman Sachs Asset Management Prospectus Goldman Sachs Funds III.
[97] For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

Mobilise the Full Range of Our Resources to Meet Clients' Needs

Our platform allows us to provide our clients with a wide range of climate investment solutions across capital markets. We also support clients with portfolio construction tools and work with clients to co-create strategies that will meet their climate and investment objectives.

In this section, we outline various case studies highlighting our work with clients in this area.

Public Markets Investing

Fixed Income: Bespoke Portfolio Approaches[98]

In partnership with its clients, Fixed Income designs bespoke portfolios with unique objectives and constraints, including the integration of climate characteristics alongside traditional bond features such as duration, volatility, sector, and fundamental risk.[99] These tailored solutions use proprietary tools and analytics, and focus on engagement with portfolio companies.

Fixed Income uses several key building blocks as the foundation for a customisable framework that utilises forward-looking indicators in pursuit of GHG emissions reductions. Each building block can then be tailored in consideration of the client's climate and investment objectives, including the portfolio's risk-return objectives and its starting point. This approach sits alongside Fixed Income's fundamental credit selection process, which remains the core driver of portfolio positioning.

Climate Transition Building Blocks

Net-Zero Investment Strategy Objectives	Climate Transition Building Block	Baseline Approach[100]
Decarbonise investment portfolios	**GHG Emissions** (Backward-looking)	• Starting point for decarbonisation strategy • Utilises a **bottom-up sector specific** approach to define a pathway • GHG emissions data is refreshed annually (often for the previous financial year) and is **backward-looking**
	Alignment (Forward-looking)	• **Forward-looking** measure evaluating companies' alignment with net zero • Companies assessed using Public Markets Investing's proprietary **Paris Alignment Lens**
	Engagement (Forward-looking)	• Focused engagement is critical to build a **forward-looking** understanding of companies and to **support alignment**, to facilitate real-world GHG emissions reductions
	Exclusions	• **Exclusions are used as a last resort** • Exclusions may be considered for companies whose primary activity is not consistent with a credible pathway towards net zero
Increase investment in the range of 'climate solutions'	**Climate Solutions**	• Invest in green bonds with positive environmental impact (see the **"Invest in Climate Opportunities"** section for more details) • Identify companies making a positive environmental contribution

98 For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

99 As part of the investment process, Public Markets Investing may integrate ESG factors alongside traditional factors. The identification of a risk related to an ESG factor will not necessarily exclude a particular investment that, in the view of Public Markets Investing, is otherwise suitable and attractively priced for investment, and Public Markets Investing may invest in an issuer without integrating ESG factors or considerations into the investment process. Moreover, ESG information, whether from an external and/or internal source, is, by nature and in many instances, based on a qualitative and subjective assessment. An element of subjectivity and discretion is therefore inherent to the interpretation and use of ESG data. The relevance and weightings of specific ESG factors to or within the investment process vary across asset classes, sectors, and strategies and no one factor, or consideration is determinative. Public Markets Investing in its sole discretion and without notice may periodically update or change the process for conducting its ESG assessments and implementation of its ESG views in portfolios, including the format and content of such analysis and the tools and/or data used to perform such analysis. Accordingly, the type of assessments depicted here may not be performed for every portfolio holding. The process for conducting ESG assessments and implementation of ESG views in portfolios, including the format and content of such analysis and the tools and/or data used to perform such analysis, may also vary among portfolio management teams.

100 Note: Building blocks can be customised based on clients' unique investment and climate objectives.

HIGHLIGHT

Defining a Net-Zero Pathway

As part of the 'GHG Emissions' building block of the bespoke Climate Transition Building Blocks, Public Markets Investing utilises a Sectoral Decarbonisation Approach (SDA), leveraging the One Earth Climate Model[101] to set portfolio-level GHG emissions reduction targets and determine a net-zero pathway.

Sector specific pathways provide tailored decarbonisation targets through time for each of the high emitting industry sectors, in line with achieving net zero by 2050. The pathways describe a decarbonisation route, which is aligned with the Paris Agreement.

HIGHLIGHT

Multi-Asset Solutions: Climate Capital Markets Assumptions (Climate CMA) Model

In collaboration with a third-party vendor, the MAS team has developed a proprietary climate change scenario analysis model to assess the impact of climate change scenarios on capital market return assumptions.

This model uses a wide range of inputs, such as carbon prices, abatement costs, energy prices, and the sector-level impacts of the pace of technological disruption and the associated capital expenditure needs to reach climate targets. These variables are overlaid on macroeconomic indicators, such as GDP growth, inflation, and policy rates, which then feed into financial returns projections across a broad range of asset classes.

For certain client portfolios, MAS uses the Climate CMA Model to integrate climate risk considerations to monitor the impact of climate-related risk within their portfolios, perform climate stress testing, and respond to requests for climate reporting.

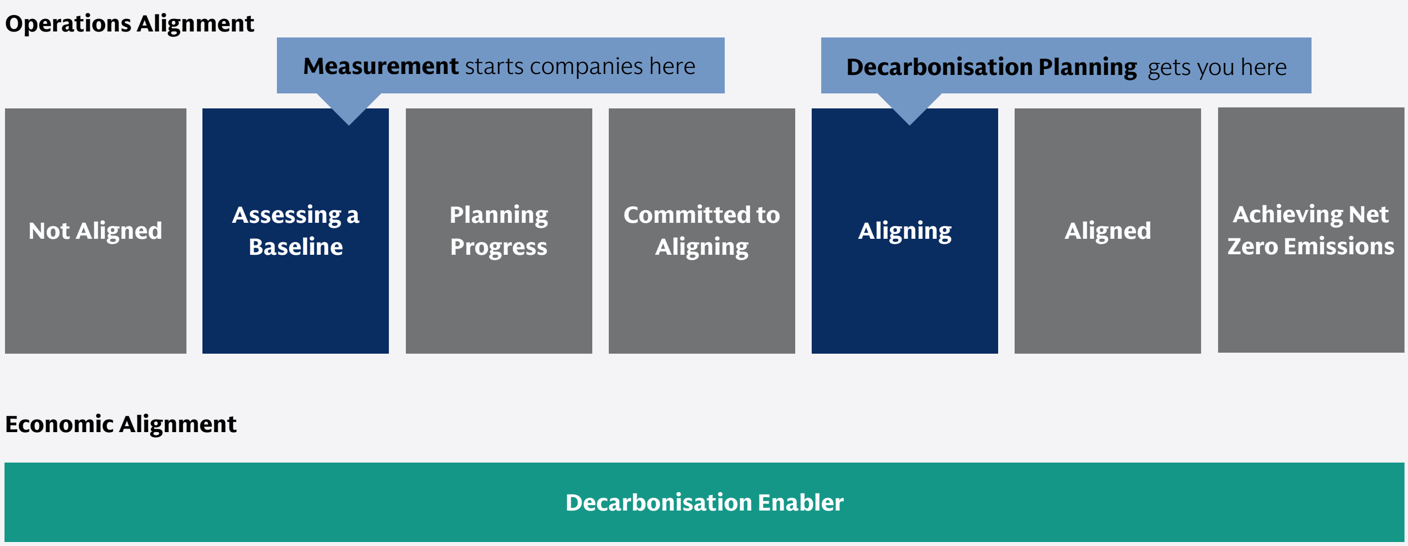
[101] The One Earth Climate Model (OECM) started as a research project supported by One Earth and the latest model OECM 2.0 was commissioned by the UN-convened Net-Zero Asset Owner Alliance (NZAOA).

GS Alternatives

Supporting Clients' Decarbonisation Transparency for GS Alternatives Clients[102]

GS Alternatives responded to client feedback within certain strategies relating to transparency on asset-level decarbonisation progress. GS Alternatives developed a Climate Transition Maturity Framework to help track progress of company practices against the transition. The Climate Transition Maturity Framework allows investment teams and clients to assess and track the maturity of borrowers or portfolio companies within certain strategies against operational and strategic practices to measure, plan, set, and achieve GHG emissions reductions goals for themselves and their clients. Informed by industry standard practices promoted by IIGCC's Net Zero Investment Framework and Sustainable Markets Initiative's Private Equity Task Force's Private Markets Decarbonisation Roadmap (PMDR), the Climate Transition Maturity Framework has been customised by GS Alternatives to reflect its programme's initiatives and the ways in which GS Alternatives can support portfolio companies advance the transition.

Figure 18: Climate Transition Maturity Framework



The framework emphasises that climate solutions, GHG measurement, and decarbonisation planning through a lens of value creation are fundamental to the company journey. By utilising measurement and decarbonisation planning services structured by GS Alternatives, companies can achieve the "Aligning" category defined through the framework, providing a direct link between programme value creation services and alignment measurement.

Understanding the ESG Business Case in Real Estate

In 2023, GS Alternatives conducted research to better understand the business case for ESG within its global Real Estate business. The ESG Business Leads for Real Estate built a dataset comprised of global research, as well as insights into the ESG practices of peers, buyers, occupiers, and investors. This research included analysis on green premiums within the global real estate market, net-zero targets, and regional trends in target-setting and decarbonisation.

In 2023, the Real Estate team leveraged this research to pilot an uplift to underwriting processes, taking into consideration how the ESG credentials of an investment can impact its performance indicators such as liquidity, net operating income, leasing velocity, and value at exit through sensitivity analysis.

[102] For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

Private Wealth Management

Private Wealth Management's tailored approach to portfolio construction begins with determining the appropriate asset allocation for a client, based on their risk-return objectives. Private Wealth Management believes climate-related considerations are more relevant in the analysis of specific products and investment strategies once strategic asset allocation is set. As such, climate-related considerations are not incorporated into strategic asset allocation. Instead, once the asset allocation is determined, specific products and strategies for each asset class are implemented to optimise for the client's climate goals, based on each individual client's expressed interests. For clients who have expressed interest in the climate impacts of their portfolios, Private Wealth Management has a framework to incorporate these and other sustainability-related themes into the selection of products and investment strategies.

Private Wealth Management continues to maintain a close collaboration with Public Markets Investing and GS Alternatives to help inform the types of sustainable investing products offered to clients.

Private Wealth Management's Framework for Assisting Clients in the Development of Their Individual Sustainable Investing Strategies:

For illustrative purposes only

Framework Element	Description	Global Examples of Private Wealth Management Framework in Practice
1 Educate	Private Wealth Management believes a successful sustainable investing strategy starts with a strong baseline understanding of the unique challenges and opportunities that ESG and impact investing present.	Private Wealth Management hosted inaugural Climate Investment Forums in London and San Francisco and convened clients to learn from impact investing experts and each other.
2 Clarify	Private Wealth Management works with clients to understand their impact and ESG values, alongside their investment objectives such as risk tolerance, time horizon, spending, and liquidity needs.	Private Wealth Management worked with a client to help support the modification of their family foundation's Investment Policy Statement to reflect specific screens in line with the climate-oriented mission of the foundation.
3 Implement	Private Wealth Management helps each client achieve both their financial and sustainability goals through bespoke implementation; there is no "one-size-fits-all" approach to sustainable investing.	For an individual client, Private Wealth Management tailored their public equity portfolio via additional investments in thematic equity funds, focused on climate solution providers.
4 Report	Private Wealth Management provides custom ESG portfolio analytics to show the relative impact of implementation decisions made in client portfolios.	For a charity client, Private Wealth Management used the Portfolio Diagnostic Tool to measure the GHG emissions of the portfolio; identify strategies that were the largest contributors to Scope 1, 2, and 3 GHG emissions; and undertake a historical comparison.
5 Evolve	Private Wealth Management performs ongoing monitoring of client portfolios to ensure values-alignment and performance objectives are met and to address any new ESG-related risks that may arise.	Private Wealth Management's Portfolio Management Group regularly analyses the ESG model portfolio offering to ensure it reflects the most appropriate strategies for clients to meet their sustainability objectives.

SECTION 05

Risk Management

In This Chapter

Identifying and Assessing Climate-Related Risks

AWM uses Goldman Sachs firmwide climate-related risks definitions as a foundation when identifying and assessing climate-related risks, adapted for each business line.

Firmwide Climate-Related and Environmental Risk Management Programme

As detailed in the ***Goldman Sachs 2023 TCFD report***, Goldman Sachs has continued to integrate climate-related and environmental risk into broader business and risk management practices.

As a global financial institution, Goldman Sachs is exposed to climate-related risks that manifest in different ways across our businesses. To identify, mitigate, and adapt to these climate-related risks, we are committed to advancing our climate risk management capabilities, building on the firm's deep risk management culture.

Where applicable, AWM leverages Goldman Sachs' firmwide risk taxonomy and climate-related risk management processes, building on the firm's risk management practices. In particular, the firmwide risk and control functions monitor the firm's on-balance sheet alternative assets within AWM, and apply firmwide risk tools, including quantitative climate scenario analysis tools.

Climate-Related Risk Categorisation

As described in the **"Definition of Climate-Related Risks"** section, Goldman Sachs categorises climate-related risks into **physical risk** and **transition risk**. These risks are incorporated into the firmwide risk taxonomy, which includes both financial and nonfinancial risks.[103] The firmwide risk taxonomy, which has recently been updated to capture climate-related risks more comprehensively as stand-alone risks, also recognises that climate-related risks may materialise through existing risk categories (e.g., credit risk, market risk, operational risk).

Physical risk is further broken down into acute and chronic risks while transition risk is broken down into technological change risks, policy and regulation risks, liability and legal risks, and market sentiment risks, in line with common industry categories. Considering the potential drivers of climate-related risks that may arise across our businesses, both physical and transition risks may have multiple drivers, including, for example, biodiversity for physical risk (as detailed below). Physical and transition risks may also have meaningful impacts in the short-, medium-, and long-term.

Categorisation of Climate-Related Risks

Physical Risk Drivers

Drivers	Driver Examples
Acute Physical Risk	Floods (Coastal and Non-Coastal)
	Hurricanes/Typhoons
	Wildfires
Chronic Physical Risk	Frequency of Extreme Temperatures
	Heat Stress
	Long-Term Sea Level Rise
	Increase in Energy Demand for Cooling Purpose
Environmental Risk (Including Biodiversity)	Seismic Activity and Earthquake Risk
	Water Stress and Drought

Transition Risk Drivers

Drivers	Driver Examples
Technological Change	Technology Improvements or Innovations
Policy & Regulation	Carbon Prices and Other GHG Emissions Regulations
	Global Trade Policies
	Regulations on Use of Products and Services
	Enhanced Reporting Requirements
Liability & Legal	Climate-Related Litigation
	Investor Pressures
	Reputational Risk
Market Sentiment	Changing Consumer Sentiment
	Market Value Volatility
	Materials Scarcity

[103] The firmwide risk taxonomy covers on-balance sheet alternative assets within AWM in addition to our clients' assets.

Asset & Wealth Management Climate-Related Risk Management

Climate-related risks are an increasingly important consideration of our risk management approach. Our sustainable investing philosophy considers climate- and sustainability-related factors that can impact the risk profile and performance of our investments and may also result in operational and reputational risks. We continue to develop and evolve our internal approaches in which to identify, assess, and manage climate-related risks alongside other financial and nonfinancial risks, in line with clients' preferences and objectives.

The following sections provide further detail on AWM's climate-related risk management practices across business lines, business units, strategies, and products. This report focuses on climate-related risk identification, assessment, and management at the entity level, but also includes select descriptions of climate-related risk management practices for individual investment products and strategies in scope for this report.

AWM's risk management framework, aligned with the firmwide approach, consists of several key processes including risk identification and assessment, risk reporting and monitoring, and risk decision-making. Our risk management framework is based on a "three lines of defence" framework, which covers financial and nonfinancial risks, including climate-related risks.

The climate-related risks identification and assessment approach for Private Wealth Management is evolving and, as such, the approaches outlined below may not apply across the entirety of Private Wealth Management.

Private Wealth Management integrates climate-related risks into its investment decision-making by primarily relying on the climate-related risk management, engagement, and stewardship capabilities of AWM business units (when sourcing products and strategies from within AWM), and from external managers (when sourcing products and strategies from outside Goldman Sachs) through XIG as consistent with what was reported for 2022. As such, Private Wealth Management does not directly undertake traditional public markets shareholder engagement activities or engagement with portfolio companies and client assets in alternatives.

First Line

Investment teams are considered the first line of defence and are accountable for outcomes of risk-generating activities, as well as for assessing and managing those risks, including climate-related risks, within clients' risk appetite and the firm's risk appetite.

Second Line

Independent risk oversight and control functions are considered the second line of defence. There are both AWM-specific and firmwide risk and control functions that contribute to second line risk management activities for AWM, including independent assessment, oversight, and challenge of the risks taken by the first line of defence. As part of these broader risk management activities, parts of the second line oversee climate-related risks.

Third Line

Internal Audit is the third line of defence and provides independent assessments and opinions of the firm's overall control environment, risk management controls and governance processes, including activities performed by GSI and GSAMI. Internal Audit reports to the Goldman Sachs Audit Committee. Additionally, Internal Audit reports results of GSI and GSAMI entity coverage to the GSI Audit Committee and the GSAMI Board, respectively.

Climate-Related Risk Identification and Assessment

Across Public Markets Investing and GS Alternatives, we recognise the importance of a detailed understanding of the climate-related risks that can impact our business and clients. We are committed to developing our approach further to quantify these risks and potential financial impacts. At present, we consider climate-related risks and opportunities alongside other financial and nonfinancial risks for certain investment products and strategies. We currently take a largely qualitative approach when determining the relative significance of climate-related risks in relation to other risks, which may differ across business lines. Below are additional details on how each business line conducts these determinations.

Public Markets Investing

Public Markets Investing continues to formalise and develop its approach to identifying and measuring climate-related risk that could have material financial impact on investment portfolios.

For the first line of defence, in 2023, climate-related risks were predominantly assessed through a qualitative lens but complemented with quantitative approaches developed within specific investment teams. For example, the Fixed Income, Corporate Credit, and Sovereign Bond investment teams utilise quantitative transition and physical risk assessment tools (for example, Fluent and Sustainability Measurement Toolkit) when assessing certain prospective investments.

The implementation of Public Markets Investing's risk governance structures and risk management processes are overseen by the Asset Management Public Global Risk team (AM Public Risk), which operates independently of the investment teams, and reports to Asset Management Public Market's CRO.

While sustainability risk, including climate-related risk integration, plays an important part in its investment approach, Public Markets Investing considers sustainability risks alongside the other risks relevant to the portfolios and take a holistic view on the composition of a portfolio or the holding of specific investments from a risk perspective. In line with existing risk management processes, Public Markets Investing takes steps to mitigate and manage that risk as assessed on a case-by-case basis.

As noted in the **"Incorporating Climate-Related Risk into Overall Risk Management"** section, over the last year, AM Public Risk has continued the development and implementation of a sustainable risk framework including the enhancement of risk systems to incorporate climate-related scenarios with relation to certain asset classes.

The GSAMI Risk Appetite Statement, which articulates GSAMI's approach to risk taking, includes additional detail on how climate and environmental financial risks are evaluated and monitored.

The AM Public Risk team includes a dedicated team of risk managers aligned to ESG who carry out risk management activities across the global Public Markets Investing platform, including areas within the scope of this report. The AM Public Risk team's ESG-aligned risk managers continue to build out GSAMI's climate-related risk management framework.

GS Alternatives

Within GS Alternatives, the goal is to identify, measure, and manage climate-related risks that could have a material financial impact on investments and client portfolios. As noted in the **"Manage and Mitigate Climate-Related Risks"** sub-section, investment teams and external advisers assessed the exposure of sectors and select individual investments to physical and transition risks.[104] This provides GS Alternatives with a view of the percentage of assets under supervision (for portfolio management activities) qualitatively vulnerable to transition and physical risks. The vulnerability assessment for transition and physical risks was leveraged for portfolio-wide risk ratings based on 2023 company exposure data and for newly onboarded exposures in 2023, meeting a threshold sector risk of Moderate or above.

At a portfolio level, tools that began development in 2023 were used to evaluate the potential materiality of financial impacts to portfolio companies under various climate scenarios. These sensitivity analyses are not intended to provide a revised financial outlook for investments but provide a "what-if" analysis of potential company sensitivity to transition and physical risks under different potential climate scenarios and guide related conversations across relevant investment teams. Although NGFS scenarios are currently used for this analysis, GS Alternatives does not ascribe probability to these scenarios. They represent a range of potential outcomes (under a particular set of assumptions that may or may not be realised). As GS Alternatives leverages third-party climate scenarios, reliance on these tools is inherently limited by scenario assumptions and economic and scientific modelling capabilities that may not reflect GS Alternatives investment assumptions.

In Real Estate, internal and external qualitative climate-related risks assessment tools are used to analyse physical risk exposure for all new equity and credit investments as described further in the next section.

[104] This refers to GS Alternatives strategies within the scope of this report where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes assets within certain Private Equity, Infrastructure, Growth Equity, SIG, Private Credit, and Real Estate strategies.

Integration of Climate-Related Risks across the Investment Life Cycle

Within Public Markets Investing and GS Alternatives, we manage climate-related risks by integrating climate considerations into the investment life cycle for select products and strategies. Although business lines differ in how climate-related risk management activities are integrated, each business line prioritises climate-related risks in a largely qualitative manner and determines the financial materiality of those risks as part of its approach to managing climate-related risks.

Public Markets Investing

Within Public Markets Investing, investment teams follow a standardised risk management framework, while integrating climate-related risks into their investment decisions, company engagement, and product development processes in a manner consistent with their specific strategies and client preferences. Climate-related risks may be considered from a "top-down" perspective (i.e., in the construction of portfolios and overall risk management), or "bottom-up" (i.e., at an individual investment level), as described in the case studies within this report.

Investment Decision-Making

The following example approaches are taken by investment teams to incorporate climate-related risk considerations into their investment processes; these may evolve over time in response to regulatory requirements and market developments.

- The use of climate- and sustainability-related risk analysis to inform the selection process for companies, issuers, and portfolio management processes, and to make investment decisions based on these evaluations.
- Tilting portfolios towards climate- and sustainability-related factors and selecting companies that Public Markets Investing considers to have less climate-related risk exposure, based on metrics such as carbon intensity and other KPIs. These factors can be combined into an overall ESG score, using either external vendor or internal proprietary models, to aid portfolio construction and to compare scores across factors and relative to the relevant benchmarks.
- The use of screens on companies or sectors, via guideline management processes, that do not meet certain climate- and sustainability-related criteria. This can include screening companies with more than a prescribed percentage of revenue derived from certain products or activities where climate-related risks are deemed financially material (which may include certain fossil fuels), or screening companies in particular industries with elevated climate-related risks.[105]

Several of the climate-related risk measurement and management approaches in individual Public Markets Investing business units are included as follows. In the future, with the continued roll out of the Sustainability Measurement Toolkit and other tools described in the **"Strategy"** section, Public Markets Investing expects these measurement and management processes to continue to evolve.

Fixed Income

The Fixed Income investment team incorporates climate-related risk assessments (inclusive of physical and transition risk) in investment decisions for certain investment strategies. Public Markets Investing's portfolio management systems provide investment teams and portfolio managers access to information on key climate-related exposures at the portfolio-level and relevant benchmark information. These include carbon intensity, financed GHG emissions, carbon footprint, and alignment to net zero. Investment teams can use this information to understand and manage financially material climate-related risks impacting portfolios. For further details on how the Corporate Credit and Sovereign Bond teams incorporate climate-related risks, refer to the **"Manage and Mitigate Climate-Related Risks"** section.

Fundamental Equity

The Fundamental Equity investment team conducts ongoing monitoring of financially material climate-related factors at the individual stock and portfolio level for certain investment products and strategies. As part of their investment dashboard tool, investment teams have access to GHG emissions metrics, such as carbon footprint and carbon intensity, which are also captured in daily risk monitoring. This allows investment teams to monitor the carbon exposure of portfolios and individual holdings across Scope 1, 2, and 3 GHG emissions, providing visibility into the contribution of individual positions to portfolio-level metrics. It also allows teams to simulate the impact of potential trades on overall climate metrics, enabling them to incorporate carbon exposure into risk management decisions and daily risk monitoring.

[105] See the firm's ***"Environmental & Social Due Diligence Guidelines"*** for more information.

QIS

The Equity Alpha business unit within QIS manages equity portfolios using data-driven investment models that aim to evaluate public companies globally through fundamentals-based and economically motivated investment themes. Within Equity Alpha, climate- and sustainability-related considerations are expressed through the Climate Transition Framework, which leverages proprietary metrics to help measure and limit climate risk against a reference benchmark[106] and the Alpha Model, which integrates short- to medium-term "alpha" drivers into the equity investment model. These drivers include a factor relating to a company's environmental impact.

Imprint

The Imprint team within XIG engages with partner external managers across key sustainability themes, including climate change. As part of the due diligence process, Imprint assesses external managers on the extent to which ESG-related factors (inclusive of climate) are integrated into managers' investment processes and risk management practices.

Company Engagement

As part of ongoing stewardship efforts, Public Markets Investing engages with portfolio companies on climate-related risk topics, such as GHG emissions and biodiversity, disclosure of financially material climate-related risk data, setting of targets, and monitoring execution against climate-related risks mitigation and adaptation initiatives (refer to the **"Help Portfolio Companies and Client Assets Navigate and Benefit from the Climate Transition"** section for more details).

Product Development Process

Climate-related risks have the potential to materially impact investment strategies and outcomes for Public Markets Investing's clients. Climate-related risks, where relevant, have been integrated into the product development process and associated product governance forums. The key governance bodies involved in considering climate-related risks in product development are outlined in the **"AWM-Specific Governance"** section, which includes the Product & Distribution Working Group for Public Markets Investing.

[106] The reference portfolio/benchmark is not an ESG benchmark, and the portfolios are not managed in the view of achieving the long-term global warming objectives of the Paris Agreement.

GS Alternatives

In GS Alternatives, climate-related risks are assessed alongside other financial and nonfinancial risks when evaluating the viability and risk-return profile of investments, as applicable.

Investment Life Cycle Climate and Sustainability Integration

1 Sourcing and Due Diligence

Climate-related risks are integrated into investment due diligence, where applicable.[107] As noted previously, investment teams are required to complete an ESG questionnaire for select prospective investments, which summarises climate- and sustainability-related issues identified through diligence. These findings are then generally included in the Investment Committee Memo.

Investment teams may also work with ESG Business Leads,[108] and any second line of defence groups, such as Legal, Compliance, the Operational Risk Environmental team, and Enterprise Risk team, who are climate-related risks specialists, to determine material nonfinancial and environmental health and safety risks, which may include climate-related risks when reviewing opportunities.

Furthermore, beginning in the second half of 2023, ESG Business Leads in Private Equity and Private Credit piloted the use of GS Alternatives Transition Risk Vulnerability Assessment tool, incorporating its outputs into due diligence findings across certain strategies that are presented as a part of the Investment Committee memo.[109] As mentioned above in the **"Approaches and Capabilities for Managing and Mitigating Climate-Related Risks"** section, these tools are intended to be further rolled out across broader portions of the Private Equity and Private Credit business units; as well as piloted in Infrastructure, Growth Equity, and SIG.

As an example, in certain Private Credit strategies, investments go through a due diligence process that incorporates factors ranging from macroeconomic and industry factors to company, asset, and structure-specific considerations. All potential investments are cross-referenced with firmwide and fund-level industry exclusions lists. Investments in ESG-focused funds are evaluated through a proprietary ESG Profile, which generates an ESG score used to assess potential investments' ESG performance, risk level, and eligibility for the fund. Both the ESG Profile and score take into account the GHG emissions intensity of each investment, helping Private Credit to assess risk and understand whether existing GHG emissions reductions initiatives implemented are having a measurable impact. Certain strategies also factor the prospective borrower's energy savings and environmental incidents into the ESG Profile and score.

2 Holding Period

Once an investment is made, investment teams monitor the portfolio company or investment asset and maintain an ongoing dialogue with management.[110] GS Alternatives engages proactively with select portfolio companies to identify and manage climate-related risks. Furthermore, GS Alternatives supports management teams from select portfolio companies to consider—where appropriate and financially material—post-closing uplift plans to help address physical and transition risk, through adaptation and mitigation measures, over the ownership period. Additionally, in order to encourage the mitigation of climate risk within GS Alternatives' portfolio, companies can be provided with resources to support decarbonisation planning. These are further detailed in **"Help Portfolio Companies and Client Assets Navigate and Benefit from the Climate Transition"** section above.

3 Exit

GS Alternatives considers risk and mitigants throughout ownership (including climate-related risks for select portfolio companies) and is focused on positioning portfolio companies and assets for success at exit (whether through public or private markets).

[107] This process relates to GS Alternatives strategies within the scope of this report where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes assets within certain Private Equity, Infrastructure, Growth Equity, SIG, Private Credit, and Real Estate strategies.
[108] Note: There are ESG Business Leads embedded within the Private Equity, Infrastructure, SIG, Private Credit, and Real Estate business units, but not Growth Equity.
[109] In H2 2023, this included within certain Private Equity strategies; and within Private Credit strategies, this included all direct lending and hybrid capital deals in scope of this report.
[110] For illustrative purposes only. For example, levels of engagement vary across equity and credit strategies.

HIGHLIGHT

Physical Risk Assessment in Real Estate[111]

Real Estate assesses the impact of physical climate-related risks on potential assets across all new equity and credit investments. During the initial underwriting process, the Real Estate team works with third-party vendors to assess physical risks at an asset-level using a high GHG emissions scenario (IPCC RCP 8.5) across multiple time horizons, which can trigger additional due diligence on higher risk investments. The firm also utilises a proprietary tool for Real Estate investments that provides risk scores for wildfires, hurricanes, water stress, sea level rise, and flooding at present day and in 2050 according to a moderate (IPCC RCP 4.5) and high (IPCC RCP 8.5) GHG emissions scenario. This process informs resiliency adaptations that can protect and enhance asset value as physical climate risks become more severe.

Before being presented to the Investment Committee, all investments are assessed for physical climate risk along with suggested measures for resilience and adaptation for the asset, where necessary. The assessment assigns risk scores for potential future climate impacts such as heat and water stress, extreme weather, and sea level rise. To support identification of potential adaptation and mitigation strategies, the Real Estate team has developed an internal tool to translate risk scores and asset physical conditions into practical solutions. The team uses this tool alongside the risk assessment to make recommendations for various design, construction, and retrofits that will prevent damage or mitigate risk. In addition, in 2023, new screening analytics were also piloted across debt and equity portfolios to assess physical risk. This small-scale pilot was launched and completed with a risk engineering firm to identify and financially assess site-level adaptation and resiliency investments to reduce damage at potentially highly impacted properties.

Post-investment, the Real Estate team generally continues to assess the physical risk of assets and prioritises areas for the assessment and development of physical risk mitigation and adaptation measures.

[111] For illustrative purposes only. Performance results vary depending on the client's investment goals, objectives, and constraints. There can be no assurance that the same or similar results to those presented above can or will be achieved.

Incorporating Climate-Related Risks into Overall Risk Management

We consider climate-related risks as part of the broader portfolio of financial and nonfinancial risks that we need to manage on an ongoing basis. We improved our climate-related risk measurement and management capabilities during 2023 and further integrated climate-related risks into existing risk management frameworks and processes, including the second line of defence.[112]

Public Markets Investing

The approach to climate-related risk management and integration into the independent AM Public Risk processes has evolved over the past several years.

The AM Public Risk team uses a set of proprietary risk management tools, developed to support risk managers' needs and objectives. These tools continue to be adapted and developed so that they can be deployed for the purpose of managing climate-related risks.

Examples of recent developments include the implementation in Public Markets Investing's systems of an approach to monitor 1.5°C, 2°C, and 3°C climate shocks at the issuer and portfolio level. AM Public Risk continues to develop and evolve its approach to climate scenario analysis, including the development of a monitoring framework with alerts and thresholds to assess the performance impacts considering different climate scenarios.

During 2023, AM Public Risk also implemented a framework, to monitor the sustainable risk-related activities in connection with the European Union's Sustainable Finance Disclosure Regulation (SFDR) commitments made in Public Markets Investing funds, which include climate-related components. All threshold breaches are communicated to the AM Public Risk team leadership on a weekly basis, including the AM Public CRO and the GSAMI CRO, and communicated to the relevant Portfolio Managers where appropriate.

The AM Public Risk team participates in various Public Markets Investing forums—in addition to engaging with investment teams—on both a formal and informal basis, as part of the business-as-usual risk management oversight and monitoring framework. In line with the evolution of the overall risk management approach, these interactions increasingly include discussions on climate-related risks.

Senior members of the AM Public Risk team also participate in the relevant sustainable investing and GSAMI governance and oversight forums, as detailed in the **"Governance"** section of this document.

GS Alternatives

There is a mechanism for climate-related risks for portfolio companies and assets to be elevated for review by the GS Alternatives Risk team. Where relevant, this Risk team escalates financially material climate-related risks to the GS Alternatives CRO, who then assesses the climate-related risk and determines whether the matter should be further escalated to the relevant Investment Committee to discuss how to mitigate the risk. Alternatively, the GS Alternatives CRO can also escalate the relevant climate-related risk to the Risk Council if the risk is relevant for the broader portfolio.

Since 2022, as part of planned enhancements to the suite climate risk tools, GS Alternatives created a cross-functional risk group, comprising of members from Enterprise Risk, AWM Risk, Operational Risk, Environmental, Health, and Safety (EHS), investment teams, ESG Business Leads, and the S&I team. In 2023, this group convened discussions on GS Alternatives' physical risk framework and design of the methodology and reports for portfolio company risk assessments.

In 2023, GS Alternatives developed a proposed framework for formally integrating and escalating climate-related risk into diligence processes using the vulnerability assessment and sensitivity analysis tools being developed. Portions of the framework are planned for roll out in 2024.

[112] The incorporation of climate-related risks into overall risk management for Private Wealth Management is still evolving and, as such, the approaches outlined below may not apply across the entirety of Private Wealth Management.

Climate-Related Regulatory Response

Public Markets Investing

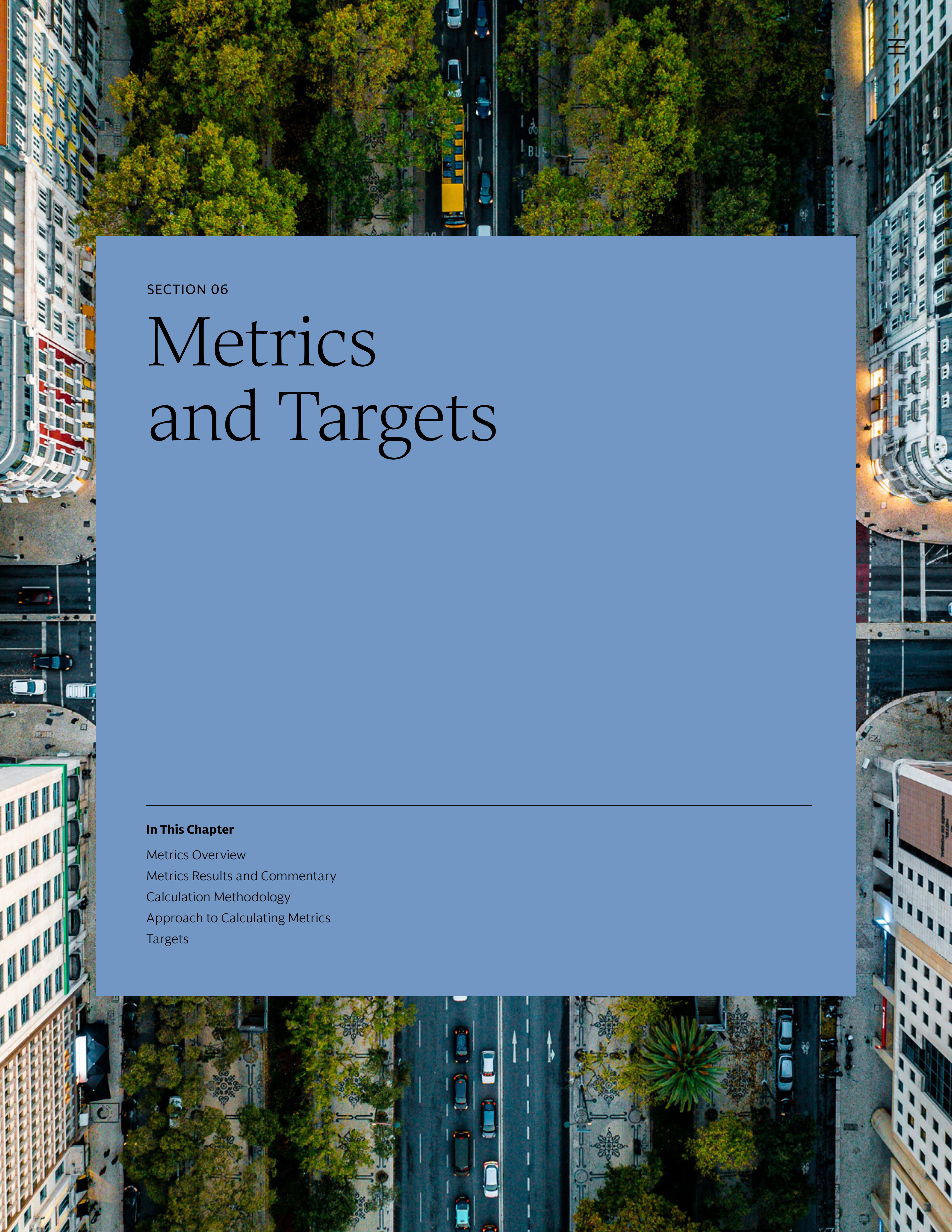
Within Public Markets Investing, the Sustainable Investing Platform (supported by Legal, Risk, Compliance, Controllers, and Office of Government & Regulatory Affairs) is responsible for monitoring existing and emerging climate-related regulations and assessing their potential impact on the business. For more details on regulatory governance responsibilities, see the **"AWM-Specific Governance"** section.

GS Alternatives

Within GS Alternatives, the Sustainability & Impact team (supported by Legal, Risk, Compliance, Controllers, and Office of Government & Regulatory Affairs) is responsible for monitoring existing and emerging climate-related regulations and assessing their potential impact on the business. For more details on regulatory governance responsibilities, see the **"AWM-Specific Governance"** section.

Private Wealth Management

Within Private Wealth Management, the Sustainable Solutions Group (supported by Legal, Compliance, Office of Government & Regulatory Affairs, and other internal PWM teams) is responsible for monitoring climate-related regulations and assessing their impact on the business. For more details on regulatory governance responsibilities, see the **"AWM-Specific Governance"** section.



SECTION 06

Metrics and Targets

In This Chapter

Metrics Overview

Decision-useful data is a critical enabler for our climate strategy; it can help us measure and understand climate-related risks, opportunities, and the potential impact of the climate transition on investment performance. Since the publication of our AWM UK TCFD 2022 Report, we have made a concerted effort to continue building out our climate data capabilities and to integrate climate data into our investment activities (as described in further detail in the **"Strategy"** section).

Metrics to Assess Climate-Related Risks and Opportunities

We use a variety of metrics to assess climate-related risks and opportunities across specific products and investment strategies. Within this report, we have provided select examples of metrics that specific investment teams may consider in their investment decisions and monitoring. Within the **"Manage and Mitigate Climate-Related Risks"** section, we have also included the outputs of quantitative sensitivity analyses performed for GS Alternatives asset classes (i.e., climate scenario analysis metrics). However, investment teams across the entirety of AWM are not systematically conducting climate scenario analysis or measuring the extent to which assets under supervision, and products and strategies are aligned with a well below 2°C scenario.[113]

Furthermore, this entity-level report does not provide a comprehensive description of all metrics used for each product and investment strategy in scope for the AWM report. Details on metrics for individual products and investment strategies will be included in individual product-level reports that are made available to clients (on request).

GHG Emissions and Associated Metrics

Within this section, we have disclosed the carbon footprinting metrics for GHG emissions within our investment products and strategies at the business line level, with separate disclosures for Public Markets Investing, GS Alternatives, and Private Wealth Management.[114,115,116] The scope and calculation methodologies of reported climate metrics may change with evolving industry standards and the development of our climate capabilities. Within this 2023 report, we have highlighted the key methodological changes compared to 2022, which have resulted in substantive changes to reported metrics.

GHG Emissions Re-Baselining Process

Consistent with the GHG Protocol, and Goldman Sachs corporate practice, AWM reviews and restates previously reported metrics when appropriate. This re-baselining process may be triggered by significant changes to the calculation methodology, historical data, organisational structure (e.g., mergers and acquisitions), or material errors. For the purposes of this report, we have re-baselined GHG emissions metrics for GS Alternatives as described in the **"Metrics Results and Commentary"** section.

Key Updates Compared to the AWM UK TCFD 2022 Report

Scope 3

In line with the UK FCA guidance, we have expanded our climate reporting to include Scope 3 GHG emissions for Absolute Financed GHG Emissions, Carbon Footprint, and Weighted Average Carbon Intensity (WACI) metrics within Public Markets Investing, GS Alternatives, and Private Wealth Management.

Sovereign Debt

For Public Markets Investing and Private Wealth Management, we have expanded the asset classes in scope for reporting to include Sovereign Debt, for which we report a production-based WACI metric.

Real Estate

For GS Alternatives, we have expanded the asset classes in scope for reporting to include Real Estate, for which we report Absolute Financed GHG Emissions, Carbon Footprint, and WACI metrics.

Re-Baselining

For GS Alternatives, 2022 GHG emissions metrics have been revised due to enhancements to our methodology and improvements to data governance processes.

[113] AWM does not yet conduct a systematic, business-segment wide assessment of the alignment of assets under supervision with a well below 2°C scenario.
[114] Both Public Markets Investing and GS Alternatives now operate within GSAMI as GS Alternatives moved from GSI to GSAMI, effective 1 April 2023. However, there is no aggregation of metrics across the two business lines in the GSAMI UK TCFD report given the different types of business performed within the business lines and the different recommended calculation methodology for the alternative assets managed by GS Alternatives. The GSI legal entity report only covers in-scope assets for Private Wealth Management. Hence, the business line- and entity-level reports align for GSI.
[115] In addition, we measure and report various GHG emissions and carbon footprinting metrics within select investment products and strategies, as noted throughout the **"Strategy"** section of this report.
[116] This excludes third-party managed portfolios and alternative holdings through XIG given challenges in data transparency and quality.

Overview of GHG Emissions Metrics Disclosed

For the specific scope of assets included in the metrics calculation, see **"Appendix E: Additional Details on Metrics"**. The GHG emissions and carbon footprinting metrics disclosed below specifically include business activities within the UK legal entities (GSAMI and GSI), but do not comprehensively include all AWM's global business activities across other legal entities.

Metric	Relevant Asset Class	Units	Strengths	Limitations	Use Cases
Absolute Financed GHG Emissions	GS Alternatives: Private Equity, Infrastructure, Growth Equity, SIG, Private Credit Public Markets Investing and Private Wealth Management: Listed Equities and Corporate Bonds	tCO_2e	• Provides an absolute GHG emissions measurement attributed to AWM based on its share in an asset's capital base	• Increases with portfolio or asset size, making comparisons difficult across companies and asset classes/portfolios • Relies on metrics[117] to 'attribute' GHG emissions, which may not reflect influence or ownership share and may be affected by volatility	• Track a measure of absolute GHG emissions attributed to portfolios over time
	GS Alternatives: Real Estate	$kgCO_2e$/\$million invested			
Total Carbon Footprint	GS Alternatives: Private Equity, Infrastructure, Growth Equity, SIG, Private Credit Public Markets Investing and Private Wealth Management: Listed Equities and Corporate Bonds	tCO_2e/\$million invested	• Facilitates comparison of GHG emissions over time, between asset classes and portfolios • Normalises for portfolio size and size of the asset's capital base	• Potentially volatile, particularly due to market fluctuations in market value, which may be unrelated to changes in GHG emissions • Less directly links to company activities or property characteristics	• Measure the carbon efficiency of the portfolio/ asset class
WACI	GS Alternatives: Private Equity, Infrastructure, Growth Equity, SIG, Private Credit Public Markets Investing and Private Wealth Management: Listed Equities and Corporate Bonds	tCO_2e/\$million revenue	• Facilitates comparison of GHG emissions over time, between asset classes and portfolios • Normalises for portfolio size and magnitude of the company's sales or property's revenues	• Potentially volatile due to year-to-year revenue performance and the inflation of sales values, which may be unrelated to changes in GHG emissions • Normalisation on revenue is less direct than using sector-specific activity metrics	• Measure exposure of portfolio/asset classes to carbon intensive companies or properties • Provide a common normalised measure of fund GHG emissions performance
	Public Markets Investing and Private Wealth Management: Sovereign Debt	tCO_2e/\$million GDP-PPP (Production)	• Facilitates comparison of GHG emissions over time, between asset classes and portfolio • Normalises for portfolio size and magnitude of countries' economic output • Avoids limitations related to consumption-based metrics (e.g., difficulty in allocating GHG emissions along supply chain, assumptions around input-output models)	• Potentially volatile due to fluctuations in countries' economic activity, which may be unrelated to changes in GHG emissions • Does not fully account for a country's collective GHG emissions demand, which may understate GHG emissions for countries with significant imports of goods with high embedded GHG emissions	• Measure exposure of portfolio/asset classes to carbon intensive countries • Focus on countries' domestic GHG emissions from sources within the country and exported goods and services
	GS Alternatives: Real Estate	$kgCO_2e/metres^2$	• Facilitates comparison of GHG emissions over time, between asset classes and portfolios • Normalises for property size, while avoiding potential volatility associated with year-over-year revenue changes	• Does not normalise for the size of the capital base	• Measure exposure of portfolio/asset classes to carbon- intensive properties • Provide a common normalised measure of fund GHG emissions performance

[117] EVIC (Enterprise Value Including Cash) for non-Real Estate, issuer equity and debt for equity Real Estate funds, and property value at origination for credit Real Estate funds.

Metrics Results and Commentary

The tables in this section detail the GHG emissions metrics for GSI and GSAMI in-scope AUS for 2023. We have referenced the guidance on calculating metrics set forth by the Partnership for Carbon Accounting Financials Global GHG Accounting Standard (PCAF Standard)[118] and TCFD, where applicable.

Public Markets Investing

For the purposes of this UK TCFD report, the scope of Public Markets Investing disclosures includes Listed Equities, Corporate Bonds, and Sovereign Debt assets within the legal entity scope described in **"Appendix A: In-Scope Asset & Wealth Management Assets"**. Refer to the **"Approach to Calculating Metrics"** section for further information on data gaps, challenges, and limitations.

Listed Equities and Corporate Bonds

Metric	Scope	2022	2023	Units
Absolute Financed GHG Emissions	Scope 1	6,083,057	9,661,293	tCO_2e
	Scope 2	1,443,564	2,086,930	
	Scope 3[119]	-	61,613,586	
	Scope 1 and 2	7,526,621	11,748,036	
	Scope 1, 2, and 3	-	73,361,622	
Total Carbon Footprint	Scope 1 and 2	41.8	60.0	tCO_2e/$million invested
	Scope 1, 2, and 3	-	374.5	
WACI	Scope 1 and 2	144.5	158.8	tCO_2e/$million sales
	Scope 1, 2, and 3	-	809.8	

Commentary on Changes from 2022 to 2023

For Scope 1 and 2, Absolute Financed GHG Emissions increased from 2022 to 2023 due to several factors. One factor contributing to this increase in Absolute Financed GHG Emissions was an increase in the size of in-scope assets from 2022 to 2023 driven by increases in the valuation of in-scope assets, additional client fundraising, and, to a lesser extent, changes to the calculation methodology.[120] However, the predominant factor contributing to the increase was a shift in financing within sectors to higher intensity companies. This shift was concentrated in a limited number of sectors where total sectoral GHG emissions increased at a higher proportional rate compared to changes in the investment value for the sector. The shifts in financing within sectors to higher intensity companies is also the primary driver of increases in Scope 1 and 2 Carbon Footprint from 2022 to 2023.

Other potential factors were determined to be less material. The overall sectoral breakdown did not shift significantly and, as such, shifts in financing between sectors is likely not a material contributor to increases in Scope 1 and 2 Absolute Financed GHG Emissions. Similarly, within existing companies, overall company-level GHG emissions (before the determination of financing and attribution towards Public Markets Investing)[121] did not materially change. As such, increases in GHG emissions across in-scope assets (holding financing constant) is not a likely material contributor to increases in Scope 1 and 2 Absolute Financed GHG Emissions.

For Scope 1 and 2, increases in WACI from 2022 to 2023 were driven by decreases in company revenues from 2022 to 2023 as well as the addition of new in-scope companies with higher GHG emissions intensity relative to the average intensity from 2022.

[118] PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition.
[119] This includes all Scope 3 categories (1-15), as estimated by third-party data vendor.
[120] In 2022, Public Markets Investing used the market value when calculating the financed emissions attribution factor for Corporate Bonds. In 2023, in line with PCAF guidance, Public Markets Investing has amended the attribution factor for Corporate Bonds to use book value rather than market value.
[121] This refers to aggregate GHG emissions for companies before applying an attribution factor to account for the level of financing from Public Markets Investing.

Data Coverage

In 2023, the Scope 1 and 2 Absolute Financed GHG Emissions and Carbon Footprint metrics for Public Markets Investing cover 64% of AUS for in-scope Listed Equities and Corporate Bonds (previously 72% in 2022), while the Scope 1 and 2 WACI metric covers 72% of AUS for in-scope Listed Equities and Corporate Bonds (previously 87% in 2022). Data coverage for Scope 3 metrics is 64% for Scope 3 Absolute Financed GHG Emissions and Carbon Footprint and 72% for Scope 3 WACI. From 2022 to 2023, the data coverage has decreased across Scope 1 and 2 Absolute Financed GHG Emissions, Carbon Footprint, and WACI primarily due to an increase in holdings which could not be matched to issuers within the third-party vendor's database and data quality issues with some external holdings. Refer to the **"Approach to Calculating Metrics"** section for further information on data gaps, challenges, and limitations.

Note, the data coverage for the WACI metrics remains higher than for the other disclosed metrics, given that there are holdings for which the third-party vendor does not provide EVIC data but does provide GHG emissions and sales data.

The remaining holdings, which do not have the requisite data needed to calculate a metric provided by the third-party vendor, have been excluded from the calculation of the relevant metric and the weights of the remaining in-scope holdings have been normalised accordingly. This approach is in line with the methodology employed by the third-party vendor.

Public Markets Investing relies on the GHG emissions data provided by a third-party vendor. This vendor provides GHG emissions from reported company disclosures as well as GHG emissions estimated by the third-party vendor using their internal methodology. Public Markets Investing prioritises data sources based on the data hierarchy within the PCAF Standard and have calculated weighted data quality scores in accordance with the PCAF Standard (Score 1 = highest data quality; Score 5 = lowest data quality).

Data Quality Scores (Weighted Average)	2023	
Asset Classes	Scope 1	Scope 2
Listed Equities and Corporate Bonds	2.1	2.1

Sovereign Debt

Metric	Scope 1	2023	Units
WACI	Scope 1 (excluding LULUCF, including exports)	218.4	tCO_2e/$million GDP-PPP

The disclosure of Sovereign Debt metrics for 2023 coincides with the publication of PCAF's first sovereign debt-financed GHG emissions methodology in December 2022.[122] Based on this methodology, Public Markets Investing has reported Scope 1 GHG emissions for Sovereign Debt in line with the definition of production GHG emissions.[123] Public Markets Investing has also followed the PCAF methodology in using GDP-PPP to attribute production GHG emissions. Given the nascency of methodologies for Sovereign Debt, Public Markets Investing anticipates that disclosed metrics will evolve for future disclosures as industry consensus is established.

Public Markets Investing also relies on a third-party vendor for Sovereign Debt GHG emissions data. The PCAF Standard weighted data quality scores for in-scope Sovereign Debt assets are included in the following table (Score 1 = highest data quality; Score 5 = lowest data quality).

Data Quality Scores (Weighted Average)	2023
Asset Classes	Scope 1
Sovereign Debt	4.0

[122] PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition.
[123] Production GHG emissions are GHG emissions attributable to GHG emissions produced domestically and include domestic consumption and exports. This definition follows the territorial GHG emissions approach adopted by UNFCCC for annual national inventories and is typically referenced by sovereigns in their Nationally Determined Contributions (NDCs).

GS Alternatives

For the purposes of this UK TCFD report, the scope of GS Alternatives disclosures includes all Corporate and Infrastructure assets (which is comprised of assets within Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit strategies), and Real Estate investment holdings in funds where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) in 2023. Given the scope of reporting, GSAMI-entity exposure may not be representative of overall GS Alternatives exposure or related fund family exposures, which are reported in on-demand product-level reports. The reporting below includes all Corporate, Infrastructure, and Real Estate exposure with active GHG emissions, investment holdings, and revenue within these bounds.

Metrics for Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit[124]

Metric	Scope	2022 (Restated)	2023	Units
Absolute Financed GHG Emissions	Scope 1	116,355	145,193	tCO_2e
	Scope 2[125]	64,014	73,529	
	Scope 3[126]	-	717,193	
	Scope 1 and 2	180,370	218,722	
	Scope 1, 2, and 3	-	935,915	
Total Carbon Footprint	Scope 1 and 2	24.3	20.0	tCO_2e/$million invested
	Scope 1, 2, and 3	-	85.8	
WACI	Scope 1 and 2	64.4	43.7	tCO_2e/$million revenue
	Scope 1, 2, and 3	-	373.9	

Restatement of 2022 Metrics for Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit

GHG emissions metrics for 2022 have been restated following improvements to GS Alternatives' GHG emissions methodology and governance controls.

- **Methodology enhancements:** To improve the quality and accuracy of 2023 reporting and beyond, GS Alternatives used an updated GHG emissions factor methodology from its vendor. The 2023 and 2022 metrics now leverage the Comprehensive Environmental Data Archive (CEDA) rather than the US Environmentally-Extended Input-Output (EEIO) model. The change to the CEDA GHG emissions factor model generally improved GHG emissions reporting accuracy, by providing a more contemporary set of GHG emissions factors that reflect multi-regional dynamics. CEDA also allows GHG emissions modelling to reflect trade flows and dynamics from the source country. As a result, CEDA generally produces higher GHG emissions estimates and contributed to an overall increase in the 2022 restated GHG emissions compared to the 2022 GHG emissions reported in last year's report.
- **Improvements to data governance processes:** Additional data governance processes were conducted for 2023 reporting, including a detailed comparison of year-over-year changes at a company-level for both financial data and company self-reported GHG emissions data. This review allowed GS Alternatives to surface and correct anomalies impacting GHG emissions estimates for previously reported 2022 metrics for a minority of the portfolio.

[124] Apex Companies LLC, (Apex) was engaged to conduct an independent verification of the GHG emissions reported by GS Alternatives (specifically, within Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit investments subject to UK FCA TCFD requirements) for the period 1 January 2023 to 31 December 2023. GS Alternatives was provided a Limited Assurance verification opinion by Apex, details are available ***here***.

[125] GS Alternatives' Scope 2 GHG emissions reporting privileges the use of market-based accounting methods over location-based estimates when portfolio companies directly report footprints. When market-based accounting methods are not used, estimated, or reported, footprints are based on location-based methods.

[126] GS Alternatives cannot guarantee the completeness of Scope 3 estimates across all categories when directly reported or publicly disclosed by portfolio companies. When calculated by GS Alternatives' recommended GHG accounting provider, Scope 3 categories, which are defined by the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, have been included based wholly on vendor and company determination of relevance and materiality. When financial estimates were calculated by this service provider, Scope 3 categories 13-15 were excluded from estimations at the determination of the vendor based on methodological considerations. See the **"Approach to Calculating Metrics"** section for further details.

Commentary on Changes from 2022 to 2023

When comparing 2022 re-baselined and 2023 numbers, Scope 1 and 2 Absolute Financed GHG Emissions for the Corporate and Infrastructure asset classes increased primarily due to investments in new companies and increased exposure to existing companies: Overall, in-scope portfolio exposures increased by 47% from 2022 to 2023. When controlling for these year-on-year exposure changes, Absolute Financed GHG Emissions across existing exposures declined from 2022 to 2023 for both Scope 1 and 2.

Scope 1 and 2 WACI declined for Corporate and Infrastructure asset classes from 2022 to 2023, primarily driven by decreases in Scope 1 and 2 WACI for existing companies. Declines in WACI resulted from increases in revenue and declines in GHG emissions, particularly for Scope 2. Declines in WACI across existing company exposures were partially offset by new exposures to companies and increased investment in existing companies with higher GHG emissions relative to the 2022 portfolio average.

Portfolio and Target Coverage

GS Alternatives continued to make progress collecting and estimating GHG emissions data in 2023, allowing GS Alternatives to provide improved transparency to investors. As detailed further in the **"Empower Decisions through Actionable Climate Intelligence"** section, GS Alternatives expanded its carbon footprinting programme and worked directly with its third-party vendor to develop recommendations for improving the quality and actionability of GHG footprint data.

GS Alternatives engages directly with select portfolio companies to collect and review GHG emissions data, and works with partners to provide estimates, offer carbon footprinting services aligned with the GHG Protocol, and aggregate existing public disclosures. In 2023, GS Alternatives directly supported 28 companies in developing primary GHG emissions footprints. As a result of these efforts, 69% of GS Alternatives' financed GHG emissions exposure currently comes from direct company disclosures to GS Alternatives or through public channels. The following weighted data quality scores have been calculated in accordance with the PCAF Standard (Score 1 = highest data quality; Score 5 = lowest data quality).

Data Quality Scores (Weighted Average)	2023	
Asset Classes	Scope 1	Scope 2
Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit	2.8	2.8

In future years, GS Alternatives will continue supporting portfolio companies in providing enhanced disclosures based on higher quality data. Reliance on third parties for the accuracy of estimates and disclosures will continue, and limitations in reporting quality may contribute to variance from actual footprints due to portfolio company assumptions, vendor assumptions, and methodology decisions. Refer to the **"Approach to Calculating Metrics"** section for further information on data gaps, challenges, and limitations.

Within the reporting parameters, 28% of financed GHG emissions portfolio exposure is to companies with commitments to set a Science Based Targets Initiative (SBTi) target or with a validated target by SBTi. An additional 8% of exposure is to companies that report having set an alternative net-zero target or plan to set one within the next two years.

Real Estate Metrics[127]

Metric	Scope	2023	Units
Absolute Financed GHG Emissions	Scope 1	712,248	$kgCO_2e$
	Scope 2	3,110,642	
	Scope 3	75,878,856	
	Scope 1 and 2	3,822,890	
	Scope 1, 2, and 3	79,701,746	
Total Carbon Footprint	Scope 1 and 2	841.4	$kgCO_2e$/$million invested
	Scope 1, 2, and 3	17,542.7	
WACI (Physical Intensity-based)	Scope 1 and 2	4.4	$kgCO_2e/metres^2$
	Scope 1, 2, and 3	60.8	

Commentary on Real Estate Metrics

The interpretation of financial metrics in normalisation and weighting varies significantly between Real Estate strategies and other business units. While Corporate metrics often focus on revenue and profit margins, Real Estate metrics must consider factors such as floor area and construction activities. This necessitates a tailored approach to normalisation and weighting, reflecting the physical and economic attributes of the properties themselves.

Landlord-tenant dynamics also present unique challenges in Real Estate, particularly concerning energy-related data. Landlords may have limited visibility into tenant energy use, which makes it difficult to collect accurate data for reporting. To aid the process, the Real Estate team has onboarded a third-party GHG accounting software solution that collects and analyses utility data including energy, water, and waste data. A full-time consultant from the third-party vendor has been appointed to drive the data collection approach across the Real Estate global portfolio.

Additionally, the materiality of Scope 3 categories and the capabilities for reporting these categories vary widely. In Real Estate, certain Scope 3 categories, such as tenant energy use and upstream construction GHG emissions, are particularly significant. The ability to report accurately on these categories depends heavily on data availability and quality, which can be challenging to obtain compared to direct GHG emissions data from GS Alternatives' other investing strategies.

As a result, GHG emissions metrics for Real Estate include GHG emissions from both credit and equity investments with differing Scope 3 categories included due to data availability and materiality. For equity and credit investments, GHG emissions from Capital Goods (Category 2) and Downstream Leased Assets (Category 13) were determined to be material. Given differences in operational and financial control, proxies were required to estimate the breakdown of GHG emissions between landlord vs. tenant sources for credit investments.

[127] This data includes GS Alternatives Real Estate strategies within the scope of this report, where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023 or at asset disposition. Where the assets underlying these strategies were also investments in other GS Alternatives Real Estate strategies not in scope of this report, financed GHG emissions data are reported on behalf of all relevant GS Alternatives Real Estate strategies. This is because data captured is at an asset level for GS Alternatives Real Estate investments. Note this data does not include GHG emissions data from the operating companies within the Real Estate strategies within scope of this report. While the data has been reviewed, GS Alternatives has relied on third-party vendors to produce and/or review the data and therefore it may be subject to limitations and GS Alternatives makes no representation or warranty as to the accuracy, consistency, or completeness of this information. GS Alternatives cannot guarantee that data provided in the future will be provided in the same format as this data. GS Alternatives continues to develop its ESG data collecting and reporting framework, and data provided in the future may differ in terms of content and format from this data.

Private Wealth Management

For the purposes of this UK TCFD report, the scope of Private Wealth Management disclosures includes Listed Equities, Corporate Bonds, and Sovereign Debt assets within the legal entity scope described in **"Appendix A: In-Scope Asset & Wealth Management Assets"**. Refer to the **"Approach to Calculating Metrics"** section for further information on data gaps, challenges, and limitations.

Listed Equities and Corporate Bonds

Metric	Scope	2022	2023	Units
Absolute Financed GHG Emissions	Scope 1	146,529	175,781	tCO_2e
	Scope 2	42,975	42,866	
	Scope 1 and 2	189,504	218,642	
	Scope 3[128]	-	1,655,179	
	Scope 1, 2, and 3	-	1,873,822	
Total Carbon Footprint	Scope 1 and 2	29.6	31.7	tCO_2e/$million invested
	Scope 1, 2, and 3	-	271.5	
WACI	Scope 1 and 2	121.0	124.2	tCO_2e/$million sales
	Scope 1, 2, and 3	-	670.2	

Commentary on Changes from 2022 to 2023

Scope 1 and 2 Absolute Financed GHG Emissions increased from 2022 to 2023 primarily due to an increase in the overall size of in-scope assets for this report. The size of in-scope assets grew due to increases in the valuation of in-scope assets and additional client fundraising. To a lesser extent, the increase in Absolute Financed GHG Emissions was also driven by changes to the calculation methodology[129] and shifts in financing to higher intensity sectors and to higher intensity companies within sectors. The increase in Carbon Footprint and WACI for Scope 1 and 2 can also largely be attributed to the aforementioned factors.

[128] This includes all Scope 3 categories (1-15), as estimated by third-party data vendor.

[129] In 2022, Private Wealth Management used the market value when calculating the financed emissions attribution factor for Corporate Bonds. In 2023, in line with PCAF guidance, Private Wealth Management has amended the attribution factor for Corporate Bonds to use book value rather than market value.

Data Coverage

In 2023, the Scope 1 and 2 Absolute Financed GHG Emissions and Carbon Footprint metrics for Private Wealth Management cover 88% of AUS for in-scope Listed Equities and Corporate Bonds (previously 90% in 2022), while the WACI metric covers 93% of AUS for in-scope Listed Equities and Corporate Bonds (previously 97% in 2022). Data coverage for Scope 3 metrics is 88% for Scope 3 Absolute Financed GHG Emissions and Carbon Footprint and 93% for Scope 3 WACI. Compared to last year's report, data coverage has slightly decreased for Scope 1 and 2 Absolute Financed GHG Emissions, Carbon Footprint, and WACI metrics primarily due to an increase in holdings which could not be matched to issuers within the third-party vendor's database and data quality issues with some external holdings. Refer to the **"Approach to Calculating Metrics"** section for further information on data gaps, challenges, and limitations.

Note, the data coverage for the WACI metric remains higher than for the other disclosed metrics, given that there are holdings for which the third-party vendor does not provide EVIC data but does provide GHG emissions and sales data.

The remaining holdings, which do not have the requisite data needed to calculate a metric provided by the third-party vendor, have been excluded from the calculation of the relevant metric and the weights of the remaining in-scope holdings have been normalised accordingly. This approach is in line with the methodology employed by the third-party vendor.

Private Wealth Management relies on a third-party vendor for GHG emissions data and has calculated weighted data quality scores for in-scope Listed Equities and Corporate Bonds assets according to the PCAF Standard in the following table (Score 1 = highest data quality; Score 5 = lowest data quality).

Data Quality Scores (Weighted Average)	2023	
Asset Classes	Scope 1	Scope 2
Listed Equities and Corporate Bonds	2.1	2.1

Sovereign Debt

Metric	Scope	2023	Units
WACI	Scope 1 (excluding LULUCF, including exports)	188.1	tCO_2e/$million GDP-PPP

The disclosure of Sovereign Debt metrics for 2023 coincides with the publication of PCAF's first sovereign debt financed GHG emissions methodology in December 2022.[130] Based on this methodology, Private Wealth Management has reported Scope 1 GHG emissions for Sovereign Debt in line with the definition of production GHG emissions.[131] Private Wealth Management has also followed the PCAF methodology in using GDP-PPP to attribute production GHG emissions. Given the nascency of methodologies for Sovereign Debt, Private Wealth Management anticipates that disclosed metrics will evolve for future disclosures as industry consensus is established.

Private Wealth Management relies on a third-party vendor for GHG emissions data and has provided PCAF Standard weighted data quality scores in the following table (Score 1 = highest data quality; Score 5 = lowest data quality).

Data Quality Scores (Weighted Average)	2023
Asset Classes	Scope 1
Sovereign Debt	4.0

[130] PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition.
[131] Production GHG emissions are GHG emissions attributable to GHG emissions produced domestically and include domestic consumption and exports. This definition follows the territorial GHG emissions approach adopted by UNFCCC for annual national inventories and is typically referenced by sovereigns in their Nationally Determined Contributions (NDCs).

Calculation Methodology

Public Markets Investing, GS Alternatives, and Private Wealth Management calculated GHG emissions per the formulas below, which reference the formulas provided by the TCFD Annex, supplemented by the PCAF Standard.

Formulas covering: Listed Equities and Corporate Bonds (Public Markets Investing and Private Wealth Management) and Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit (GS Alternatives)

Absolute Financed GHG Emissions[132]

$$\sum \frac{\text{Current value of investment}}{\text{Issuer EVIC}} \times \text{Issuer GHG emissions } (tCO_2e)$$

Also written as

$$\sum \frac{\text{Outstanding amount}}{\text{Company EVIC}} \times \text{Company GHG emissions } (tCO_2e)$$

Carbon Footprint

$$\frac{\sum \frac{\text{Current value of investment}}{\text{Issuer EVIC}} \times \text{Issuer GHG emissions } (tCO_2e)}{\text{Current value of all in scope investments (\$million)}}$$

Also written as

$$\frac{\sum \frac{\text{Current value of investment}}{\text{Company EVIC}} \times \text{Company GHG emissions } (tCO_2e)}{\text{Current value of all in scope investments (\$million)}}$$

WACI

$$\sum \frac{\text{Current value of investment}}{\text{Current value of all in scope investments}} \times \frac{\text{Issuer GHG emissions } (tCO_2e)}{\text{Issuer Revenue or Sales (\$million)}}$$

Also written as

$$\sum \frac{\text{Current value of investment}}{\text{Current value of all in scope investments}} \times \frac{\text{Company GHG emissions } (tCO_2e)}{\text{Company Revenue or Sales (\$million)}}$$

[132] GS Alternatives defines EVIC as market value of equity and the book value of debt for the purposes of these calculations. Current value of investment is defined as disbursed debt net of repayments plus Goldman Sachs' ownership share times total company equity market value.

Formulas covering: Sovereign Debt (Public Markets Investing and Private Wealth Management)

WACI—Production-based (Scope 1 excluding LULUCF intensity)

$$\sum \frac{\text{Current value of investment}}{\text{Current Portfolio Value}} \times \frac{\text{Sovereign Scope 1 (excluding LULUCF intensity) GHG emissions}}{\text{Sovereign PPP Adjusted GDP (\$million)}}$$

Formulas covering: Real Estate (GS Alternatives)

Absolute Financed GHG Emissions—Equity Funds

$$\sum \frac{\text{Current value of investment}}{\text{Total Issuer's equity \& debt}} \times \text{Issuer GHG emissions}$$

Absolute Financed GHG Emissions—Credit Funds

$$\sum \frac{\text{Outstanding amount}}{\text{Property value at origination}} \times \text{Issuer GHG emissions}$$

Carbon Footprint—Equity Fund

$$\frac{\sum \frac{\text{Current value of investment}}{\text{Total Issuer's equity \& debt}} \times \text{Issuer GHG emissions}}{\text{Current Portfolio Value}}$$

Carbon Footprint—Credit Fund

$$\frac{\sum \frac{\text{Outstanding amount}}{\text{Property value at origination}} \times \text{Issuer GHG emissions}}{\text{Current Portfolio Value}}$$

WACI (physical intensity)—Equity Fund

$$\sum \frac{\text{Current value of investment}}{\text{Current Portfolio Value}} \times \frac{\text{Issuer GHG emissions}}{\text{Asset m}^2}$$

WACI (physical intensity)—Credit Fund

$$\sum \frac{\text{Outstanding amount}}{\text{Current Portfolio Value}} \times \frac{\text{Issuer GHG emissions}}{\text{Asset m}^2}$$

Approach to Calculating Metrics

Across Public Markets Investing, GS Alternatives, and Private Wealth Management, data quality and coverage continue to improve as climate data reporting and estimation methodologies improve and evolve. However, industry-wide challenges remain, related to data coverage, nascent estimation methodologies, financial volatility and inflation, and other factors. Additionally, year-end reporting of financial and GHG emissions-related data can stretch well into the subsequent year, leading to condensed timelines for data to undergo internal and vendor-processes for the purposes of UK TCFD reporting. As a result, we acknowledge that financial and GHG emissions-related data may change for future reporting.

Data Gaps, Challenges, and Limitations across Asset and Wealth Management

- **Limitations related to financial volatility and inflation:** GHG estimates and all TCFD reporting metrics rely on financial data for normalisation and/or estimation. Enterprise value, revenues, and sales may vary due to volatility, exchange rates, and inflationary pressures. Metrics using these financial values for estimation, attribution, or normalisation may display differences from year-to-year that do not necessarily reflect changes in real world GHG emissions.
- **Limitations related to aggregating primary and proxy data:** When aggregating GHG estimates based on business activities with GHG emissions estimates based on financials, the data quality and reliability of estimates may vary across asset classes and strategies.
- **Limitations related to reporting timelines:** To execute on UK FCA TCFD reporting timelines, processes related to data collection will, in some cases, precede companies' or assets' reporting of finalised financial metrics and GHG metrics. In these cases, this requires AWM business lines and vendors to rely on older reported or estimated figures (e.g., from the prior quarter or year) in order to produce GHG emissions metrics. As a result, adjustments and corrections may be made to reported GHG emissions metrics and financial normalisations based on changes to companies' and asset's reported financial and operational data after the reporting period is closed.

Public Markets Investing and Private Wealth Management: Approach to Calculating Metrics

Data Sources and Collection Process

Public Markets Investing and Private Wealth Management use a third-party vendor as the primary market data provider for portfolio companies' GHG emissions (Scope 1, 2, and 3), sovereign GHG emissions (Scope 1, 2, and 3), financial data (EVIC and sales), and sovereign economic output (GDP-PPP) for metric calculation. Data providers, including the third-party vendor, continue to rely on estimates and proxies where there is a gap in reported GHG emissions data. This report's metric calculations include the reported data published by the portfolio company or country where available, or the estimated data, both sourced from the third-party vendor. Public Markets Investing and Private Wealth Management acknowledge that changes in the third-party vendor's coverage of portfolio company data and their data estimation methodologies may have a significant impact on the calculations of financed GHG emissions resulting in either higher or lower values; as such, Public Markets Investing and Private Wealth Management will continue to monitor the impact to previously reported GHG emissions for the purpose of future reporting.

Data Gaps, Challenges, and Limitations in Public Markets Investing and Private Wealth Management

- **Data gaps related to external and alternative holdings:** Data transparency and quality continue to be a challenge for third-party managed portfolios and alternative holdings. As such, these holdings are excluded from the scope of assets for this report's metric calculation.
- **Data quality issues in external accounts:** In preparation for 2023 metrics reporting, Public Markets Investing and Private Wealth Management identified data quality issues impacting some third-party managed holdings within Goldman Sachs Asset Management funds. Some of these holdings had previously been in scope for 2022 metrics. As a result of the identified issues in underlying data, these holdings are excluded from the scope of assets for this report's 2023 metrics calculation.

- **Limitations related to data coverage:** Public Markets Investing and Private Wealth Management rely on a third-party vendor for portfolio company and sovereign data, and the coverage universe may contain gaps for certain issuers, securities, or sovereigns, such as those recently matured or expired. Where there are data gaps, a normalisation process is applied to increase the weights of holdings in the portfolio for which there is data coverage. Future improvements in data coverage may have a significant impact on the calculations of financed GHG emissions resulting in either higher or lower values; as such, Public Markets Investing and Private Wealth Management will continue to monitor the impact to future reports.
- **Limitations related to financial and GHG emissions data:** EVIC data available for select issuers in the third-party vendor's coverage universe may be too outdated to be usable for meaningful metric calculation; to ensure metrics provided in this report are timely and relevant, Public Markets Investing and Private Wealth Management have primarily used the latest data available up to March 2024 that is no earlier than 2022 for metric calculations. Where data is not available for 2022 or later, a normalisation process is applied to increase the weights of holdings in the portfolio for which there is data coverage. Nonetheless, the reporting period for EVIC, sales, and/or GHG emissions data for select issuers in the third-party vendor's coverage universe may not be aligned due to differences in timing between financial and climate reporting.
- **Limitations related to estimation methodologies:** Public Markets Investing and Private Wealth Management rely on the third-party vendor's GHG emissions estimation methodologies. Evolving updates to methodologies may have a significant impact on the calculations of financed GHG emissions; as such Public Markets Investing and Private Wealth Management will continue to monitor the impact to historical and future reports. This is particularly relevant for Sovereign Debt and Scope 3 GHG emissions, where methodologies are still nascent and may evolve for future reporting.
- **Limitations related to influence for sovereign debt issuers:** In contrast to GHG emissions metrics for companies—where investment in a company provides ownership within the company and potential influence in the operations of the company—investment in sovereign debt doesn't provide potential influence in the operations of a sovereign nation. As such, Public Markets Investing and Private Wealth Management do not have the ability to influence the GHG emissions intensity of their individual Sovereign Debt holdings, given there is no influence over the GHG emissions within a sovereign nation.
- **Limitations related to GDP-PPP:** The use of PPP-adjusted GDP within the attribution factor for Sovereign Debt metrics favours countries with larger GDP output. Additionally, as noted by PCAF, there is less of a straightforward relationship between GDP and a financial institution's purchase of a sovereign's outstanding debt. However, empirical evidence suggests that a country's output production is more closely linked to the generated GHG emissions than sovereign debt.[133]
- **Double counting:** Private Wealth Management invests in funds managed by Public Markets Investing. As a result, there will be double counting of GHG emissions if aggregated between the two business lines; as such, they are reported separately. Furthermore, GHG emissions metrics for Sovereign Debt are calculated to include all public and private enterprise activity within a sovereign's territory. As a result, Sovereign Debt metrics must be reported separately, to avoid double counting the GHG emissions associated with private companies operating within their country.

Forward-Looking Focus

Going forward, the main areas of focus for Public Markets Investing and Private Wealth Management continue to include:

- **Data availability and quality:** Public Markets Investing and Private Wealth Management will continue to engage with third-party vendors to seek to improve the coverage and quality of data for its holdings. In 2023, both business lines have expanded data coverage for GHG emissions metrics to include Scope 3 and Sovereign Debt.
- **Coverage of external holdings:** Public Markets Investing and Private Wealth Management will seek to improve the transparency and coverage of third-party managed portfolios and holdings, in order to improve the overall portfolio coverage.
- **Improvements to calculation and estimation methodologies:** Public Markets Investing and Private Wealth Management will continue to monitor changes to calculation and estimation methodologies and evaluate their potential impact on future GHG emissions disclosures. In 2023, changes were made to the calculation methodology to use the book value of debt rather than the market value of debt in calculating financed GHG emissions for Corporate Bonds in Public Markets Investing and Private Wealth Management.

[133] PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition.

GS Alternatives: Approach to Calculating Metrics

Data Sources and Collection Process

ESG Data Collection for Corporate and Infrastructure Asset Classes[134]

GS Alternatives monitors select portfolio companies' climate- and sustainability-related progress by engaging in a biannual ESG data collection exercise throughout the investment holding period. In 2023, to streamline the process and improve the quality of ESG metrics reported, GS Alternatives selected a software tool to enhance ESG data collection and analysis efforts. In launching the new platform partnership, GS Alternatives provided select portfolio companies with trainings on best practices for rigorous and transparent reporting. The data collection platform has built-in data validation capabilities, and access to historical submissions and sector-specific benchmarks from an ESG metric library aligned with industry and regulatory frameworks. This enables portfolio companies and the GS Alternatives sustainability team to review data, track progress on sustainability initiatives, inform business-specific decision making, and derive data-driven sustainability performance insights. Metrics reported include a variety of ESG topics, including metrics relevant for climate-related risk management and GHG emissions reductions.

Through the data collection process, GS Alternatives maintains dialogues with portfolio companies and management teams and may seek enhanced disclosure of ESG factors and risks, particularly where GS Alternatives believes that such information could meaningfully impact the value of investments.

GHG Emissions Data Collection for Corporate and Infrastructure Asset Classes[135]

GS Alternatives references the PCAF Standard in prioritising sources of data in the following order of precedence: reported GHG emissions, physical activity-based GHG emissions estimates, and economic activity-based (financial) GHG emissions estimates. GS Alternatives acknowledges that the quality of data increases as more portfolio companies directly report GHG emissions and is committed to reducing reliance on economic/financial estimates of GHG emissions over time.

In 2023, GS Alternatives collected company reported GHG emissions data for recent investments where equity ownership was greater than 25%[136] in Private Equity, Infrastructure, and Growth Equity. Additionally, all SIG investments were required to report GHG emissions data for 2023. Although no specific tool or process is required, GS Alternatives encourages companies with no established method to engage with GS Alternatives' recommended GHG accounting provider. These portfolio companies submit GHG emissions data on the ESG data software tool and/or through the GHG accounting provider, together with other ESG metrics. While filling out the report on the ESG data portal, GS Alternatives requests that the portfolio company's Chief Financial Officer reviews and attests to the accuracy of this data before submitting the data.

Regardless of these efforts, reported GHG emissions accuracy ultimately relies on the reporting portfolio company and quality of underlying accounting methods.

For portfolio companies that did not submit reported GHG emissions data through the ESG data tool, GS Alternatives relies on publicly available information or third party GHG emissions estimates from a GHG accounting provider based on financials and operating characteristics, including a combination of the portfolio company's country, BEA[137] industry, employee count, square footage, and financials as available. GHG emissions factors vary by region and were verified by a third party engaged in June 2024 to independently validate the calculation methodology for Scope 1, 2, and 3 GHG emissions. For select asset classes, as an alternative to using 2023 GHG emissions proxies based on financial data, GS Alternatives established waterfall logic to privilege prior year primary data as an estimate for the current fiscal year.

Where there are concerns or questions about data quality or accuracy, GS Alternatives engages with the GHG accounting provider to review the data for data quality and drivers of GHG emissions sources. Regardless of these checks, GS Alternatives ultimately relies on its vendors and the quality of source data for the accuracy of reported GHG emissions and GHG emissions estimates.

[134] Apex Companies LLC, (Apex) was engaged to conduct an independent verification of the GHG emissions reported by GS Alternatives (specifically, within Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit investments subject to UK FCA TCFD requirements) for the period 1 January 2023 to 31 December 2023. GS Alternatives was provided a Limited Assurance verification opinion by Apex, details are available ***here***.

[135] This statement applies to certain GS Alternatives strategies within scope of this report, including strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes assets within certain Private Equity, Infrastructure, Growth Equity, and SIG strategies.

[136] This statement applies to certain GS Alternatives strategies within scope of this report, including strategies where GSAMI carried out portfolio management activities (whether on a direct or delegated basis) as of 31 December 2023. This includes assets within certain Private Equity, Infrastructure, Growth Equity, and SIG strategies.

[137] The North American Industry Classification System.

ESG and GHG Emissions Data Collection for Real Estate[138]

During due diligence, as part of the Real Estate ESG framework that was expanded and consolidated in 2022, GS Alternatives evaluates how GHG emissions performance impacts risk management, energy consumption, and the attraction and retention of tenants, through the lens of growing and/or preserving an asset's value.

As well as collecting and assessing GHG emissions as part of due diligence, GS Alternatives considers GHG emissions factors as part of ongoing portfolio management processes. As part of the Real Estate ESG Framework, managers of stabilised Real Estate equity investments are generally expected to track ESG data via a combination of an in-house proprietary ESG survey as well as a third-party software solution.

- **ESG survey:** The ESG survey is completed on a biannual basis for the majority of the Real Estate portfolio,[139] enabling us to monitor performance over time for the same set of metrics evaluated during due diligence. As part of the ESG survey, managers (e.g., third-party asset managers, property managers, operating partners) of Real Estate investments are asked to share information related to energy use intensity; upfront embodied carbon from construction, where applicable; use of carbon offsets, where relevant; among other metrics. Although the Real Estate team has collected ESG data on its assets for many years, this data collection process was significantly expanded, consolidated, and relaunched for the Q4 2022 data collection period.
- **Software solution:** The third-party software solution is a utility data collection platform for energy, water, and waste data on an asset level, including the use of electricity, natural gas, diesel, fuels, and district heating and cooling. Both landlord energy consumption (typically Scope 1 and 2 GHG emissions) and tenant energy consumption (typically Scope 3 GHG emissions) are collected on this platform. The ESG Real Estate Team regularly reviews this information, with the intent to identify opportunities to improve data quality and data completeness, as well as to benchmark performance and identify decarbonisation-related engagement opportunities for assets.

Data Gaps, Challenges, and Limitations for GS Alternatives

There are various limitations associated with climate-related metrics due to emerging methodologies and data gaps.

- **Limitations related to proxy data and estimates:** For portfolio companies in scope for the ESG data collection programme that are not required or are not able to report GHG emissions (typically investments where GS Alternatives have minority stakes), GS Alternatives used proxy data. For Real Estate assets, proxy data might be used where actual data could not be accessed. GS Alternatives has relied on third parties to gather this proxy data and has not verified, edited, or amended this data in any way.
- **Limitations related to reliance on primary data:** While GS Alternatives has recommended a preferred GHG accounting provider for Corporate and Infrastructure asset classes, portfolio companies in scope for ESG data collection are able to select a different method or tool/service to calculate and report activity-based GHG emissions. As a result, portfolio companies may use different methodologies, primary data sources, and assumptions to calculate their GHG emissions. This could result in differences in data quality and reliability, as GS Alternatives does not verify, audit, or amend this data. When aggregating GHG emissions calculated and directly reported by portfolio companies, the data quality and reliability of these aggregations may vary. Further, as estimations, attribution factors, and GHG emissions normalisations are derived from financial and operating data provided by companies, GS Alternatives relies on the accuracy of company representations to provide correct inputs into these fields. Even when data is collected and executed by the preferred GHG accounting provider, GS Alternatives (including Real Estate) cannot obtain full transparency on calculation flows, GHG emissions factor sources, and activity source data to guarantee accuracy of GHG emissions outputs.
- **Limitations related to Scope 3 data accuracy and availability:** To report on Scope 3 GHG emissions, companies must either collect activity-based data of their suppliers, customers, and other value chain constituents or provide financial ledger data for spend-based estimations. Due to company maturity and size, Corporate and Infrastructure portfolio companies in GS Alternatives may not yet have the data environment, operational capabilities, or value chain relationships to accurately collect and report on data required to calculate Scope 3 GHG emissions. As a result, Scope 3 GHG emissions may be of limited utility to investors as outside-in estimation methodologies for Scope 3 are ultimately based on industry benchmarks for some sub-categories. The accuracy of industry benchmarks is also subject to the data quality of reported information, which may not be sufficient for accurate representations of Scope 3 GHG emissions. In 2023, GS Alternatives engaged its GHG accounting provider to provide methodologies for Scope 3 estimates across categories. The provider, however, was unable to develop estimation methods for Categories 13–15 due to challenges in underlying data collection.

[138] While the data has been reviewed, GS Alternatives has relied on third-party vendors to produce and/or review the data and therefore it may be subject to limitations and GS Alternatives makes no representation or warranty as to the accuracy, consistency, or completeness of this information. GS Alternatives cannot guarantee that data provided in the future will be provided in the same format as this data. GS Alternatives continues to develop its ESG data collecting and reporting framework, and data provided in the future may differ in terms of content and format from this data.
[139] Exclusions: Non-real estate assets, assets under litigation or relationship issues, land without design or with design that won't move forward, or pending sale within one to two months from scope of reporting.

Forward-Looking Focus

Going forward, GS Alternatives' main areas of focus include:

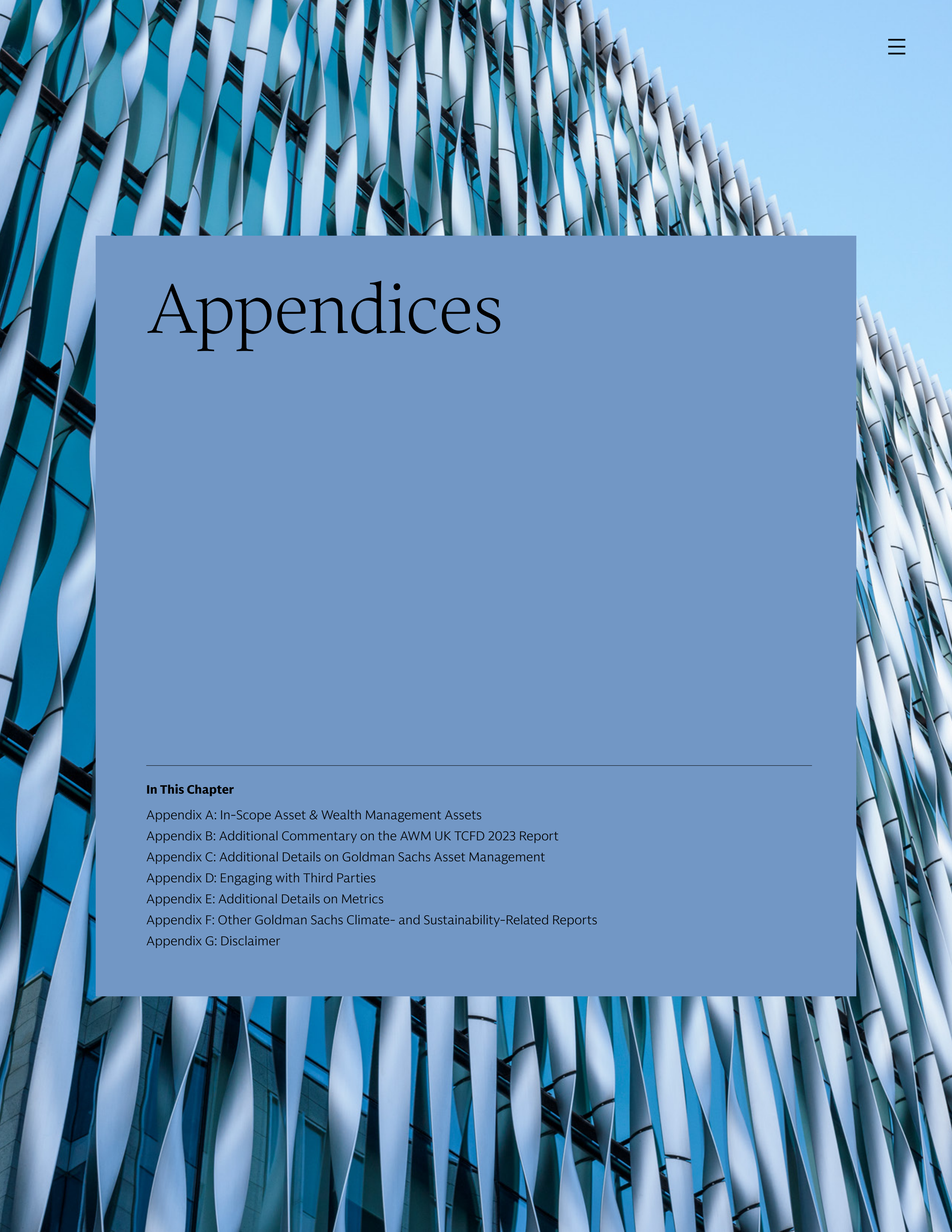
- **Data Collection Infrastructure:** GS Alternatives continues to work on automating portions of the ESG data collection process, including how information is collected and reported across investments. In 2023, improvements included onboarding of an ESG data collection tool and initiation of a workstream to provide direct data feeds between the GHG accounting provider and the collection tool.
- **Data Availability and Quality:** GS Alternatives is engaging with portfolio companies as well as the Real Estate supply chain and tenant base to encourage tracking and reporting of data to help increase access to primary data and support decarbonisation initiatives. GS Alternatives' efforts include:
  - Enhancements to centralised data governance and controls to improve quality of reported data.
  - Training webinars for select portfolio companies, investment professionals, and Real Estate stakeholders on data collection and measurement best practices. In 2023, this included the launch of GHG accounting and inventory management webinars as well as teach-ins for select teams on data quality related issues.
  - Ongoing partnership with a GHG accounting provider to help select portfolio companies measure GHG emissions and report on their GHG emissions in a cost-effective manner. In 2023, this included negotiating for enhancements to Scope 3 reporting methodologies, in-platform data governance controls, and inventory management services to portfolio companies.

Targets

While each of Public Markets Investing, GS Alternatives, and Private Wealth Management have not set business line-level, AWM-specific GHG emissions reductions targets, select business units are undergoing build-out of decarbonisation engagement and planning tools and services to support capabilities for scenario-aligned GHG emissions reductions to meet client-specific demand. Our approach to the investments we manage is intended to be data-driven; it will evolve in response to our clients' investment objectives and based on our individual business lines and investment activities.

As part of Goldman Sachs, AWM is included within the purview of firmwide operational GHG emissions initiatives and goals. In 2015, Goldman Sachs achieved carbon neutrality across firmwide operations and business travel. Since then, Goldman Sachs has expanded this goal with the aim of achieving net zero by 2030 in the firmwide supply chain and operations, inclusive of AWM operations. For further details on the firm's operational net-zero goals and key initiatives across operations and supply chain, refer to the ***Goldman Sachs 2023 Sustainability Report.***

In addition, Goldman Sachs has set business-related, ranged physical emissions intensity-based targets for 2030 for the firm's financing activities across three sectors: Energy, Power, and Auto Manufacturing. Later this year, Goldman Sachs plans to provide another update on its sectoral targets and continue supporting clients in critical sectors as they deliver on their climate transition strategies. AWM oversees a portion of the firm's on-balance sheet alternative assets in these sectors, which are included in the firm's 2030 physical emissions intensity-based targets. For more details on these firmwide targets, refer to the ***Goldman Sachs 2023 TCFD Report***.



Appendices

In This Chapter

APPENDIX A

In-Scope Asset & Wealth Management Assets

The FCA's requirements are set out in the ESG Sourcebook of the FCA Handbook, which mandates TCFD-aligned disclosures for asset and wealth management entities domiciled in the UK. The AWM UK TCFD 2023 Report has been developed in line with the ESG Sourcebook.

The Goldman Sachs legal entities that meet the threshold for disclosure are GSI and GSAMI.

GSI is a subsidiary of Goldman Sachs and delivers a broad range of financial services to clients located worldwide. GSI also operates a number of branches and representative offices across EMEA, providing financial services to clients in those regions. The company generates revenue from the following business activities: Investment Banking; Fixed Income, Currency, and Commodities (FICC); Equities; and Private Wealth Management.

GSAMI is a subsidiary of Goldman Sachs and an asset management company principally operating in the EMEA region. In 2023, GSAMI's asset management activities focused on public and alternatives investments.

The ESG Sourcebook only requires an in-scope firm to prepare a TCFD entity report for the assets managed or administered by the firm in relation to its TCFD in-scope business (e.g., portfolio management). Accordingly, a firm will not need to include all business activity in the TCFD entity report, only those that carry out TCFD in-scope business. On that basis, we have concluded that only business conducted within: Public Markets Investing (under the purview of GSAMI); GS Alternatives (in GSAMI), and Private Wealth Management (in GSI) business lines are in the scope of the requirement to make UK TCFD reports at the legal entity level.[140]

For Public Markets Investing, the scope of assets is taken to include:

- Separately managed accounts managed by GSAMI (including sub-advised mandates where external fund managers delegate to GSAMI)
- Separately managed accounts where GSAMI delegates portfolio management to affiliates (e.g., Goldman Sachs Asset Management, L.P., GSAMLP) or to external managers
- Separately managed accounts where GS affiliates have delegated portfolio management to GSAMI
- Public Markets Investing funds delegating portfolio management to GSAMI (including funds managed by GSAMI and sub delegated to external managers and other GS affiliated entities); this includes all Goldman Sachs Asset Management Fund Services Limited (GSAMFSL) funds and certain funds under the management of Goldman Sachs Asset Management BV
- Products on the Private Wealth Management platform delegating portfolio management to GSAMI

For GS Alternatives, the scope of assets is taken to include:

- GS Alternatives where portfolio management is conducted by GSAMI either directly or on a delegated basis with respect to GS Alternatives funds, or by an affiliate of GSAMI (e.g., Goldman Sachs & Co, GSCO, GSAMLP) to which it has delegated portfolio management

For Private Wealth Management, the scope of assets is taken to include:

- All holdings within discretionary accounts contracted to GSI

[140] Following an internal reorganisation that took place on 1 April 2023, the UK GS Alternatives business now sits within GSAMI.

APPENDIX B

Additional Commentary on the AWM UK TCFD 2023 Report

This entity-level TCFD report is separate from any on-demand TCFD product reports developed by AWM in accordance with the ESG Sourcebook. When appropriate, this report leverages and references information from these TCFD product reports.[141] However, this report focuses on climate activities at the GSI and GSAMI entity level, rather than at the product level.

This report is also separate from ***The Goldman Sachs 2023 TCFD Report***, which was published on 15 December 2023 and covers the firm's two primary businesses: Global Banking & Markets and Asset & Wealth Management.[142] This AWM UK TCFD 2023 Report focuses on AWM's activities in the UK legal entities, but refers back to Goldman Sachs' climate activities and other firmwide climate and sustainability reports, where relevant.

Additionally, this report focuses solely on AWM's investment activities in scope for the GSI and GSAMI legal entities. For details related to GSI's operations, including carbon, energy, and business travel consumption and reporting, refer to the ***GSI 2023 Annual Report***.[143] For details on Goldman Sachs' firmwide climate-related operational goals, see the ***Goldman Sachs 2023 Sustainability Report***.

Further, this report focuses on climate-related considerations per the TCFD Recommendations. However, within AWM, we consider climate-related risks and opportunities, typically alongside other related sustainability risks and opportunities, where financially material. As such, this report includes areas where our business lines and units consider climate and sustainability factors alongside each other.

Note: As part of the investment process, Public Markets Investing may integrate ESG factors alongside traditional factors.[144]

[141] Note: Product-Level reporting may also draw from and reference entity-level reporting where applicable.
[142] Note: Goldman Sachs 2023 TCFD was produced voluntarily and is not currently addressing any regulatory requirement.
[143] GSAMI also produces an annual report with details on its operations. However, Goldman Sachs International only publishes an annual report if the entity has listed debt or significant public interest. GSAMI does not meet this criterion, and therefore the report is not publicly available.
[144] The identification of a risk related to an ESG factor will not necessarily exclude a particular investment that, in the view of Public Markets Investing, is otherwise suitable and attractively priced for investment, and Public Markets Investing may invest in an issuer without integrating ESG factors or considerations into the investment process. Moreover, ESG information, whether from an external and/or internal source, is, by nature and in many instances, based on a qualitative and subjective assessment. An element of subjectivity and discretion is, therefore, inherent to the interpretation and use of ESG data. The relevance and weightings of specific ESG factors to, or within the investment process vary across asset classes, sectors, and strategies and no one factor, or consideration is determinative. Public Markets Investing in its sole discretion and without notice may periodically update or change the process for conducting its ESG assessments and implementation of its ESG views in portfolios, including the format and content of such analysis, and the tools and/or data used to perform such analysis. Accordingly, the type of assessments described here may not be performed for every portfolio holding. The process for conducting ESG assessments and implementation of ESG views in portfolios, including the format and content of such analysis and the tools and/or data used to perform such analysis, may also vary among portfolio management teams.

APPENDIX C

Additional Details on Goldman Sachs Asset Management

Memberships and Collaborative Engagement within Goldman Sachs Asset Management[145]

Goldman Sachs Asset Management participates in numerous forums and media events each year to gain perspective on the evolving corporate governance and sustainability landscape across regions. Goldman Sachs Asset Management seeks to build industry influence and promote best practices in stewardship through its memberships and affiliations with industry groups and investor coalitions.

Examples of Goldman Sachs Asset Management memberships and affiliations include the following:

- Goldman Sachs Asset Management is a member of the IIGCC and is closely engaged with IIGCC on the Paris Alignment Investment Initiative, which aims to inform the industry standard on monitoring and acting on asset-owner ambitions related to net zero-aligned investing. As a member of this leading climate investor group, Goldman Sachs Asset Management participates in informing developing standards and advancing engagement strategies.
- Goldman Sachs Asset Management has been a member of the Sustainability Accounting Standards Board Investor Advisory Group since 2018 and continues to support their work as part of the IFRS International Sustainability Standards Board (ISSB), including holding two seats on the ISSB Investor Advisory Group.
- Goldman Sachs Asset Management has been a member of the Council of Institutional Investors (CII) since 2017, with a seat on the Corporate Governance Advisory Council for the CII.

Climate- and Sustainability-Related Training within Public Markets Investing

Through the Sustainability and Impact webinar series, Public Markets Investing aims to educate clients on important climate and sustainability topics. Examples of the topics covered in 2023 include decarbonisation, energy security and affordability, actionable investment levers to capture climate transition opportunities, nature-based solutions and how to leverage nature to achieve net-zero goals, and sustainability in real estate.

Public Markets Investing also holds a regular meeting series, The Forum. During this meeting, climate and ESG topics are frequently discussed. In 2023, examples of sessions dedicated to climate-related themes include: the evolving regulatory environment, the complexity of the energy transition and the increased scrutiny on ESG, and detail on investment opportunities in which Public Markets Investing can expect capital formation for sustainable solutions.

The inputs that Public Markets Investing derives from The Forum allow portfolio managers and research analysts to stay updated on the latest developments in the climate space, and meaningfully enrich investment processes across each asset class. Public Markets Investing endeavours to drive engagement and knowledge around the firm's climate strategy, goals, and product offerings. In this regard, there will be a continual impetus to invest in both engaging and educating all employees across business lines, regions, and seniority levels in 2024.

[145] This includes both Public Markets Investing and GS Alternatives.

APPENDIX D

Engaging with Third Parties

The AWM climate strategy approach detailed in the **"Asset & Wealth Management: Our Climate Strategy"** section has influenced, and continues to influence, the process and decision-making for engaging third parties and the services and products we offer and employ from those third parties (including third-party data vendors). In practice, considerations and decisions around engaging third parties (including where we delegate to such entities) are made, where relevant, in view of:

(1) The extent to which the engagement (or delegation) may directly or indirectly enhance the development and ongoing delivery of a platform that allows clients to optimise their unique climate preferences, and/or enable us to more effectively manage climate-related risks and opportunities

(2) Conversely, the extent to which the engagement (or delegation) may directly or indirectly impede our ability to deliver on our strategic aims under (1)

When assessing third-party tools and data vendors, critical consideration is given to our vendor relationships, vendor capabilities, and applicability to our investment strategies. This includes an assessment of their climate- and sustainability-related capabilities, where applicable to our investment products and strategies. We are committed to developing our approach to further quantify our exposure to climate-related risks and to assess the potential financial impacts of climate-related risks; as well as evaluating enhancements to our approach, including staying abreast of industry-wide capabilities and tools.

When assessing third-party asset managers—whose products and strategies we may leverage through our open architecture platform—we rely on XIG, which performs comprehensive investment and operational due diligence processes on third-party managers across public markets and alternatives.

APPENDIX E

Additional Details on Metrics

Additional Details on Metrics for Public Markets Investing and Private Wealth Management

Scope of Metrics Calculated

As noted in the **"Metrics and Targets"** section, Public Markets Investing and Private Wealth Management reference the PCAF Standard[146] for calculation of financed GHG emissions for investments managed within these business lines. PCAF sets out metrics to be calculated and disclosed at an asset class (or sectoral) level, where asset class is defined as one of the seven listed below.

- Listed Equity & Corporate Bonds
- Business Loans & Unlisted Equity
- Project Finance
- Commercial Real Estate
- Mortgages
- Motor Vehicle Loans
- Sovereign Debt

PCAF acknowledges that there are recognised limitations in data availability and quality for many asset classes, and, therefore, calculation methodologies continue to improve and evolve. As such, calculations have been performed for asset classes where calculation methodologies are provided by PCAF and where data availability and quality limitations do not prevent calculation. For this report, this includes Listed Equity (including Real Estate Investment Trusts), Corporate Bonds, and Sovereign Debt for Public Markets Investing and Private Wealth Management. Given data limitations and/or the nascency of calculation methodologies, other asset classes have been excluded (i.e., Business Loans & Unlisted Equity, Project Finance, Commercial Real Estate, Mortgages, and Motor Vehicle Loans).

The PCAF Standard does not yet provide guidance for Alternative Investment Funds holding Unlisted Equity and/or Commercial Real Estate. As such, and in line with the approach in the AWM UK TCFD 2022 Report, Alternative Investment Funds will be excluded from metrics calculation for Public Markets Investing and Private Wealth Management. GS Alternatives will continue to perform metrics calculation at the level of the individual Unlisted Equity and Real Estate holdings within their funds.

Where data limitations exist for a holding that is in scope for disclosure, the holding is excluded from the calculation of the relevant metric and the weights of the holdings remaining in the portfolio are normalised accordingly.

Additionally, given the limited level of fund-level metric disclosure by third-party fund managers for this UK TCFD report, third-party managed funds have been excluded from metric calculation.

Additional Details on Metrics for GS Alternatives

Data Verification

GS Alternatives uses all reasonable commercial means to obtain accurate data to transparently report on investments' GHG emissions. Apex Companies LLC, (Apex) was engaged to conduct an independent verification of the GHG emissions reported by GS Alternatives (specifically, within Private Equity, Infrastructure, Growth Equity, SIG, and Private Credit investments subject to UK FCA TCFD requirements) for the period 1 January 2023 to 31 December 2023. GS Alternatives was provided a Limited Assurance verification opinion by Apex, details are available ***here***. Where proxied GHG emissions data has been used, GS Alternatives has relied on third parties to gather this data and have not edited or amended this data in any way. For GHG emissions estimates, company and financial data were gathered from centralised data storage systems, where company profiles are completed by investment teams. This data is then consolidated and prepared by the Fund and Information Management Group (FIMG). ESG and operational metrics may supplement GHG emissions estimates in some cases, based on GS Alternatives' ESG data collection process or direct collection from deal teams.

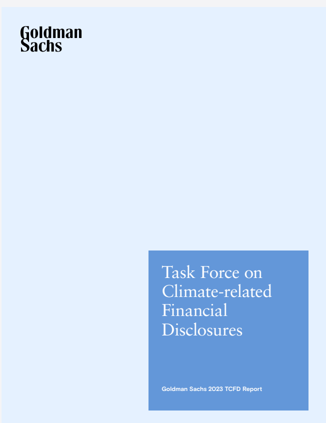
In limited cases where financial data may not be readily available in centralised data storage systems or may not have been updated in time, GS Alternatives engages with FIMG to complete financial data used for GHG emissions estimates. To fill gaps related to supplementary ESG and operational metrics for estimation, this may include reaching out to a limited number of investment teams, as well as leveraging FIMG.

[146] Financed GHG Emissions: The Global GHG Accounting & Reporting Standard, https://carbonaccountingfinancials.com/en/standard.

APPENDIX F

Other Goldman Sachs Climate- and Sustainability-Related Reports

Below we highlight select other Goldman Sachs climate-related reports.



Goldman Sachs 2023 TCFD Report

The Goldman Sachs 2023 TCFD Report provides an update on Goldman Sachs' approach to climate transition, including the firm's strengthening of the climate finance expertise and expanded climate solutions, enhancement of climate data and tooling capabilities, integration of climate risk into the firm's risk management framework, and progress on the firm's 2030 sectoral targets.

Goldman Sachs 2023 Sustainability Report—Driving Long-Term Value: Our Client-Centric Sustainability Strategy

The Goldman Sachs 2023 Sustainability Report describes the firm's client-focused sustainable finance strategy of working with clients, managing the firm, and addressing market gaps. In addition, the report provides an update on progress towards both the firm's sustainable finance as well as operational and supply chain goals.

Goldman Sachs Asset Management Stewardship Report 2023

The Goldman Sachs Asset Management Stewardship Report 2023 focuses on engagement and stewardship efforts from the Global Stewardship Team within the Public Markets Investing business. The report details the Global Stewardship Team's proxy voting efforts, engagement with company management, and participation in industry conferences and forums.

APPENDIX G

Disclaimer

THIS MATERIAL DOES NOT CONSTITUTE AN OFFER OR SOLICITATION IN ANY JURISDICTION WHERE OR TO ANY PERSON TO WHOM IT WOULD BE UNAUTHORISED OR UNLAWFUL TO DO SO.

This report is provided for informational purposes only and should not be construed as investment advice or a direct or indirect offer or solicitation to buy or sell securities. This report is not intended to be used as a general guide to investing, or as a source of any specific investment recommendations; it makes no implied or express recommendations concerning the manner in which any person's investments should or would be handled, as appropriate investment strategies depend upon factors such as the relevant person's investment objectives and financial circumstances.

Views and opinions expressed are for informational purposes only and do not constitute a recommendation by Goldman Sachs International (GSI), Goldman Sachs Asset Management International (GSAMI) and its affiliates to buy, sell, or hold any security, including (without limitation) any securities or investment products offered or manufactured by GSI or GSAMI or its affiliates. This report should not be relied on in whole or part in making an investment decision, evaluating an investment, or for any other purpose. Views and opinions are current as of the date of this report and may be subject to change, they should not be construed as investment advice.

Prospective investors should inform themselves and take appropriate advice as to any applicable legal requirements and taxation and exchange control regulations in the countries of their citizenship, residence or domicile that might be relevant to the subscription, purchase, holding, exchange, redemption, or disposal of any GSI or GSAMI product.

GSI, GSAMI, and its affiliates do not provide legal, tax, or regulatory advice to prospective investors in any product; each prospective investor is urged to discuss any prospective investment in a product with its legal, tax, and regulatory advisers in order to make an independent determination of the suitability and consequences of such an investment.

This report includes certain information on GSI, GSAMI, and its affiliates' approaches to sustainability, climate risks, and opportunities at an organisational or business line level, which may not be reflected within specific products or strategies offered or managed by these businesses. Nothing contained in this report shall be relied on as a promise or representation regarding the historic, current, or future position or performance of any GSI, GSAMI, or its affiliates product, or any other investment referenced herein. In particular, no representation or warranty is made with respect to the reasonableness of any estimates, forecasts, prospects, or returns, which should be regarded as illustrative only, or that any profits will be realised.

ESG strategies may take risks or eliminate exposures found in other strategies or broad market benchmarks that may cause performance to diverge from the performance of these other strategies or market benchmarks. ESG strategies will be subject to the risks associated with their underlying investments' asset classes. Further, the demand within certain markets or sectors that an ESG strategy targets may not develop as forecasted or may develop more slowly than anticipated.

This report contains certain information, including data, which has been provided by third parties. While such information has been obtained from third parties that GSI, GSAMI, and its affiliates consider to be reliable, GSI, GSAMI, and its affiliates do not warrant or guarantee the accuracy or completeness of such information. GSI and GSAMI (or any other Goldman Sachs entity) shall have no liability for any errors or omissions in the information contained in this report, whether such information has been obtained from third parties or not. Where the proprietary, diagnostic, or data collection tools are mentioned, the quantitative outputs may be affected by the existing data gaps.

Any data provided in select case studies has been obtained from sources, including those publicly available, believed to be reliable, but no representation or warranty is made by GSI and GSAMI (or any other Goldman Sachs entity) as to the quality, completeness, accuracy, fitness for a particular purpose, or non-infringement of such information. GSI and GSAMI (or any other Goldman Sachs entity) has not assured, verified, or validated this third-party information and is not liable for the adequacy, accuracy, or completeness of such information. Data relied upon may be produced based on methodologies that are not transparent to GSI and GSAMI (or any other Goldman Sachs entity), and the data used, and underlying methodologies are subject to change without notice.

Website links provided are for your convenience only and are not an endorsement or recommendation by GSI, GSAMI, or its affiliates of any of these websites or the products or services offered. GSI, GSAMI, and its affiliates are not responsible for the accuracy and validity of the content of websites that are not maintained by GSI and GSAMI themselves.

GSI, GSAMI, and its affiliates leverage the resources of Goldman Sachs & Co. LLC subject to legal, internal, and regulatory restrictions.