



NORTHERN TRUST  
ASSET MANAGEMENT

# TCFD Report 2024



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# A message to our stakeholders



This year's Task Force on Climate-related Financial Disclosures (TCFD) report describes Northern Trust Asset Management's (NTAM) approach to assessing and managing climate-related risks and opportunities. We believe investors should be compensated for the risks they take — in all market environments and in any investment strategy. At the heart of our investment approach is a strong commitment to transparency and decision useful disclosures that are essential to understanding risks and delivering long-term investment value and outperformance opportunities. We are advocates for TCFD and International Financial Reporting Standards (IFRS) S1 and S2 climate-related disclosure guidance, and this report reflects our ongoing commitment to meaningful disclosure and aligns with the expectations we hold for the companies in which we invest on behalf of our clients.

In 2024, we made meaningful strides in identifying and managing climate-related risks and opportunities. Key highlights from the past year include:

- **Strengthening Stewardship:** We appointed a new Global Head of Stewardship, tasked with expanding our direct engagements and deepening our team's climate expertise on a global basis.

- **Embedding Climate Change Research in Market Outlooks:** Through our Capital Market Assumptions (CMA) process, we continued to collaborate across investment teams to identify the structural trends likely to shape markets and the economy over the next decade. *Navigating the Energy Transition* emerged as one of our three core investment themes of our investment teams globally.

- **Enhancing UCITS Money Market Fund Sustainability:** We matured a bottom-up sustainability evaluation process across our money market strategies in our Irish-domiciled Undertakings for Collective Investment in Transferable Securities (UCITS) funds to address risks in short-duration debt issuers.

- **Advancing Data Capabilities:** Ongoing collaboration between investment and technology teams enabled further expansion of our sustainability-focused datahub, supporting better analysis, integration, and decision-making that impacted our engagement and investments globally.

We recognize that our stakeholders — including clients, regulators, and portfolio companies — bring a range of perspectives on climate change. While views may differ, our focus remains on identifying material risks and opportunities that may affect long-term value, including both physical and transition climate risks. Climate-related disclosures aim to provide transparency into how we integrate these considerations into our investment process, in support of delivering strong, risk-adjusted returns and meeting our fiduciary obligations. We will continue to invest in data, tools and research capabilities needed to help clients navigate a changing landscape and achieve their investment objectives.

A handwritten signature in green ink that reads "Daniel Gamba". The signature is fluid and cursive.

**Daniel Gamba**  
President  
Northern Trust Asset Management

# Introduction

Northern Trust Asset Management (NTAM) is a global investment manager entrusted by investors around the globe to help them navigate changing market environments, so they can confidently realize their long-term objectives.

We are committed to designing innovative and efficient strategies that seek to compensate investors for risk and deliver positive outcomes in all market environments, including the risks and opportunities associated with climate change. We believe investors should be compensated for the risks they take in any investment strategy. At the heart of this philosophy is how we think about, view, and analyze risk. This deep understanding and respect for employing risk purposefully serves as the foundation for every investment solution and perspective we provide to our clients.

Climate change poses a potential systematic risk that, if not managed properly, may have material impacts on our economy and society. We believe we have a responsibility to act in the best interest of our clients by serving as an active steward and to protect and grow capital over the long term.

# 2024 Milestones

Building on commitments from our 2022 and 2023 TCFD Reports, we achieved the following:

Appointed a dedicated  
**Global Head of Stewardship**

Appointed a dedicated Global Head of Stewardship to lead the team, and continue to encourage investee companies to increase transparency in matters investors find material to long-term sustainability and investment performance. The team develops and implements investment-focused plans that support our independent stewardship and sustainable investment capabilities.

.....  
**Continued collaboration**

with the CMA Working Group

Continued collaboration with the Capital Market Assumptions (CMA) Working Group to develop long-term views via a 10-year outlook. *Navigating the Energy Transition* is one of three key themes we believe investors and economies must navigate over the next decade. Diversifying energy sources, improving technology, and securing raw material supplies, all while also balancing transition- and physical risks will present opportunities and challenges.

.....  
**Bottom-up**

sustainability evaluation process instituted

Instituted a bottom-up sustainability evaluation process across our money market strategies to highlight and address material sustainability risks in low-duration debt issuers.

## EXHIBIT 1: Summary of Disclosures Aligned With TCFD Recommendations

Including guidance for all sectors and asset managers

Governance	Strategy	Risk Management	Metrics and Targets
<p>Describe the board's oversight of climate-related risks and opportunities.</p> <hr/> <p>Describe management's role in assessing and managing climate-related risks and opportunities.</p> <hr/> <p><a href="#">REVIEW NTAM'S RESPONSES</a> →</p>	<p>Describe the climate-related risks and opportunities the organization identified over the short-, medium-, and long-term.</p> <hr/> <p>Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.</p> <hr/> <p>Describe how climate-related risks and opportunities are factored into relevant products or investment strategies.*</p> <hr/> <p>Describe how each product or investment strategy might be affected by the transition to a low-carbon economy.*</p> <hr/> <p>Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.</p> <hr/> <p><a href="#">REVIEW NTAM'S RESPONSES</a> →</p>	<p>Describe the organization's processes for identifying and assessing climate-related risks.</p> <hr/> <p>Describe how you identify and assess material climate-related risks for each product or investment strategy. This might include a description of the resources and tools used in the process.*</p> <hr/> <p>Describe engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks in order to improve data availability and asset managers' ability to assess climate-related risks.*</p> <hr/> <p>Describe the organization's processes for managing climate-related risks.</p> <hr/> <p>Describe how you manage material climate-related risks for each product or investment strategy.*</p> <hr/> <p>Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.</p> <hr/> <p><a href="#">REVIEW NTAM'S RESPONSES</a> →</p>	<p>Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.</p> <hr/> <p>Describe metrics used to assess climate-related risks and opportunities in each product or investment strategy.*</p> <hr/> <p>Asset managers should describe the extent to which their AUM and products and investment strategies, where relevant, are aligned with a well-below 2°C scenario.*</p> <hr/> <p>Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.</p> <hr/> <p>Disclose GHG emissions for their AUM.*</p> <hr/> <p>Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.</p> <hr/> <p><a href="#">REVIEW NTAM'S RESPONSES</a> →</p>

\*Supplemental Guidance for Asset Managers.

# About Northern Trust Asset Management

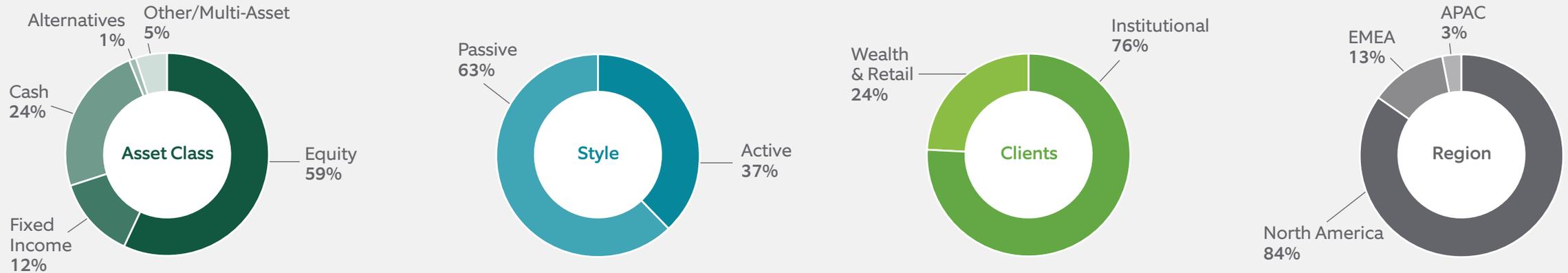
NTAM is the asset management division of Northern Trust Corporation (NTC), a leading provider of wealth management, asset servicing, investment management, and banking solutions.

NTAM is entrusted by investors around the globe to help them navigate changing market environments so they can confidently realize their long-term objectives. We are among the world's largest asset managers, with US\$1.3 trillion in AUM, including US\$189 billion in sustainable investment strategies as of December 31, 2024.<sup>1</sup> A more detailed breakdown of our AUM is shown in Exhibit 2.

As regulations, data, and company-level actions continue to progress, we remain diligent in our evolving role with companies, industry associations, policymakers, and other stakeholders to help

analyze climate change impacts. This report demonstrates NTAM's commitment to transparently manage climate-related risks and opportunities across the legal entities listed in [Appendix 1](#). Also, an [entity-level addendum](#) for Northern Trust Global Investments Limited (NTGIL) is available at the end of this report, which is to be read in conjunction with this report. This addendum is prepared to highlight relevant disclosures in line with Chapter 2 of the UK's Financial Conduct Authority's (FCA) ESG sourcebook and cross references multiple sections of this report where relevant.

**EXHIBIT 2:**  
NTAM Assets Under Management<sup>2</sup>



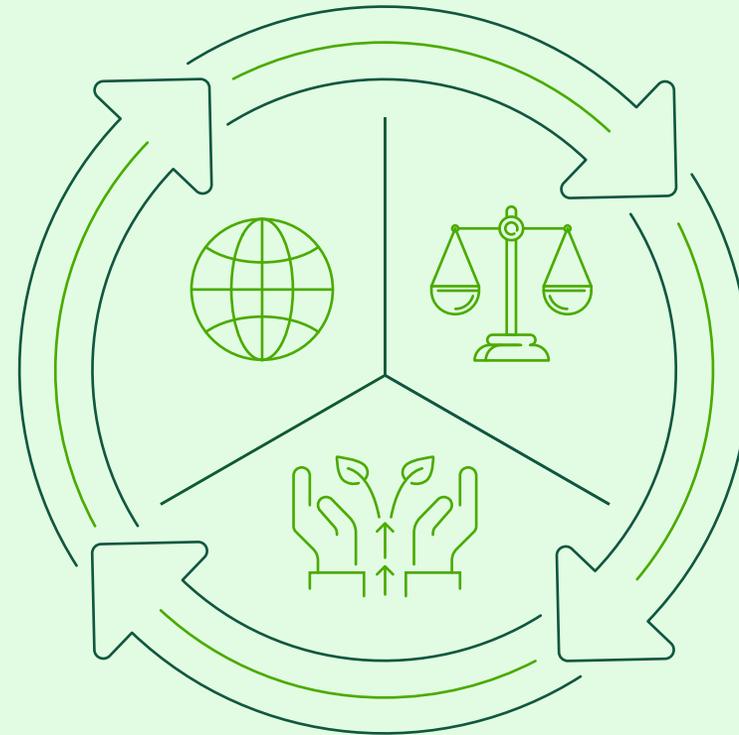
<sup>1</sup> At NTAM, we define sustainable investing as encompassing all of NTAM's investment strategies and accounts that utilize values-based and norms-based screens, best-in-class and ESG integration, or thematic investing that may focus on a specific ESG issue such as climate risk. NTAM's sustainable investing includes portfolios designed by NTAM as well as those portfolios managed to client-defined methodologies or screens. As the data, analytical models and aforementioned portfolio construction tools available in the marketplace have evolved over time, so too has NTAM. NTAM's sustainable investing encompasses strategies and client assets managed in accordance with client-specified responsible investing terms (historically referred to as socially responsible), as well as portfolios that leverage contemporary approaches and data sets, including ESG analytics and ESG thematic investing.

<sup>2</sup> Breakdown of products classified as active is as follows: Cash/Liquidity = 65%; Multi-Asset Class = 13%; Fixed Income = 13%; Equity = 7%; Alternatives = 2%. For the Northern Trust Asset Management entities included in assets under management total, please see disclosure at end of this document. As a result of rounding, not all percentages may sum to 100%, like it does here.

# 03

## Governance

NTAM's governance framework identifies and manages the impact of climate change while strengthening accountability to our stakeholders.



# Oversight

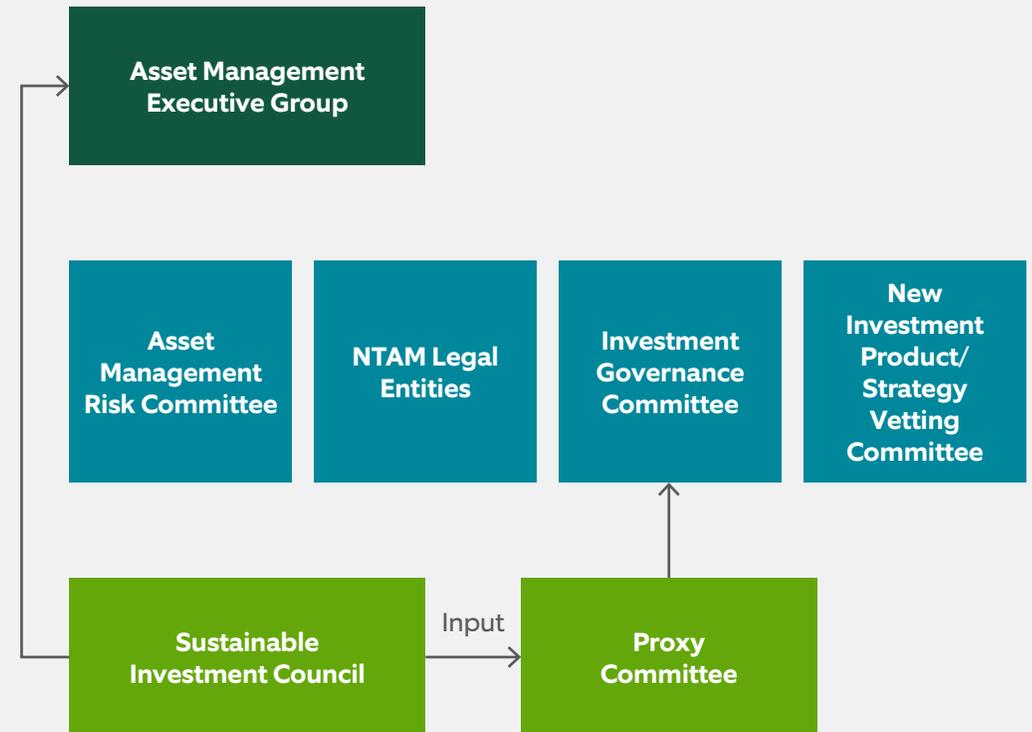
Across NTAM, each legal entity board provides oversight of senior management who are responsible for setting and executing the business strategy, including climate objectives where appropriate.

NTAM's Sustainable Investing Council (SIC), chaired by the Global Head of Investment Platform Services, provides multidisciplinary oversight across sustainable investing practices, including climate change.

The NTAM Asset Management Risk Committee (AMRC) is the senior risk committee providing oversight and governance for risks, including climate change within NTAM and its legal entities.

Please refer to Exhibits 3 and 4 for our sustainability oversight structure and responsibilities of the committees.

**EXHIBIT 3:**  
NTAM's Sustainability Oversight Structure



**EXHIBIT 4:**  
**Our Governance Bodies**

Name	Responsibilities	Meeting Frequency
NTAM Legal Entity Boards	Oversight of each legal entity's business and execution	Quarterly/Ad hoc as needed
Asset Management Risk Committee (AMRC)	The primary purpose of the AMRC is to oversee the management of risks, including climate change risks, within NTAM globally, and for each legal entity. The AMRC is chaired by NTAM's Chief Risk Officer (CRO).	Monthly
New Investment Product/Strategy Vetting (NIPSV) Committee	NIPSV Committee reviews and approves new investment capabilities, strategies, or products for potential development, launch, and distribution by NTAM, including strategies with climate considerations.	Ad hoc as needed
Investment Governance Committee (IGC)	IGC promotes effective governance related to investment strategy decisions, portfolio performance, and related matters. This committee is responsible for escalation of significant investment governance and performance matters to the AMRC.	Quarterly
Sustainable Investing Council (SIC)	<p>SIC is responsible for governing strategies to address sustainable investment issues and implementing sustainable investing initiatives within NTAM. The mission of the Council is to provide multidisciplinary oversight of NTAM's sustainable investing practices and industry commitments in our drive to identify and analyze investment opportunities and risks resulting from financially relevant sustainable investing criteria.</p> <p>The Council surfaces informed industry perspectives on investment, and commercial and regulatory market developments that can shape sustainable investing integration, product development, client engagement and stewardship priorities. The Global Head of Investment Platform Services chairs the Council. Membership includes representatives from all relevant business units and functions enterprise-wide (including the Head of Corporate Sustainability, Inclusion, and Social Impact) deemed appropriate by the chairperson or general membership of the Council. Members are expected to have knowledge of sustainable investing issues pertaining to their function.</p>	Bi-monthly
Proxy Committee	The Proxy Committee evaluates the effectiveness and robustness of our stewardship policies, initiatives, engagements with companies and proxy voting. It also ensures the effectiveness of the vendors we use to augment our stewardship program and investigates conflicts of interest that may arise from our stewardship activities. The Proxy Committee is chaired by the Global Head of Stewardship and comprises senior representatives from across business functions, including investment research, portfolio management, client relationship management and sustainable investing specialists. Additionally, risk professionals from EMEA and the U.S. support the committee, providing critical insights into regional issues and regulations governing stewardship and sustainable investing.	Quarterly

# Management Oversight

NTAM’s governance structure provides oversight and accountability of climate-related risks. Within NTAM, each functional group is responsible for overseeing its own sustainability and climate-related objectives.

## Asset Management Executive Group (AM EG)

AM EG is comprised of senior-level executives within NTAM and is responsible for setting priorities, communicating, coordinating, and implementing strategic objectives. This group also oversees business activities, monitors performance against strategic, financial, and risk management parameters, and manages significant issues that may impact the business. The executive sponsor of the sustainable investing practice is a member of AM EG and sets the strategic priorities and implementation of NTAM’s sustainable investing and climate-related objectives.

## Global Sustainable Investing (SI Team) and Stewardship Team

The SI and Stewardship Teams are comprised of dedicated specialists serving as subject matter experts across NTAM, ensuring our firm understands and continuously improves best practices in sustainable investing integration and stewardship. In order to deliver specialist knowledge, the stewardship and sustainability teams are organized around three core areas: client engagement, research and portfolio integration, and stewardship. Further information on these specializations is outlined here:

## 1

### CLIENT ENGAGEMENT

- Partner with our client and sales teams to understand how to support clients in meeting their sustainable investment objectives and to provide solutions that best align with their financial objectives and values.
- Partner with our stewardship and sustainability research analysts to develop and evolve innovative sustainable investing solutions, based on input from clients.
- Provide educational programs for NTAM employees and clients.

## 2

### SI RESEARCH AND INTEGRATION:

- Partner with our investment teams to design and implement the integration of material sustainability-related factors into portfolios across asset classes, investment strategies and time horizons.
- Develop research insights and proprietary data tools, such as the Northern Trust ESG Vector Score™.
- Keep abreast of developments related to sustainability data tools and technology, to improve the investment process and gain research insights.

## 3

### STEWARDSHIP

- Engage with companies on financially material governance, strategy and sustainability factors, to support improved company and market returns.
- Ensure that our proxy voting decisions align with our policies and client requirements.
- Lead our participation in industry-wide associations to continue to evolve best practices.

## Sustainability Champions Across Other Functions

As one of the largest global asset managers, we have an extended network of NTAM employees with expertise in client servicing, distribution, product, portfolio management, compliance, risk, and research, who also serve as sustainable investing champions within their respective teams. This cohort works in collaboration with the SI and Stewardship Teams to

explore emerging sustainability themes, industry trends, and regulatory developments which may impact our firm, clients, and investment strategies. Sustainability champions can leverage the resources of our SI Team and participate in various committees and regional sustainability working groups, with oversight and accountability provided by the SIC.

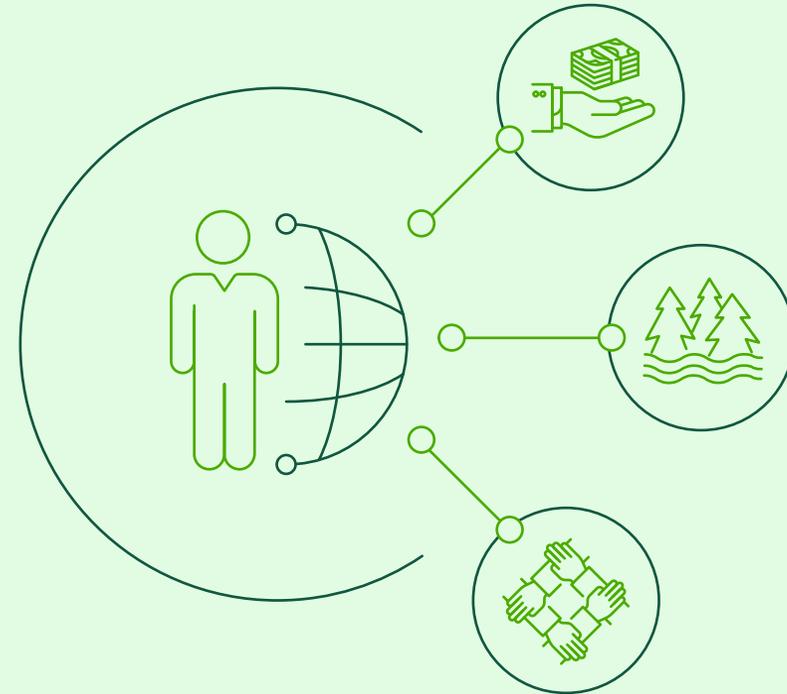
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**Within NTAM, each functional group is responsible for overseeing its own sustainability and climate-related objectives supported by the dedicated specialists in SI and Stewardship teams.**

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# 04 Strategy

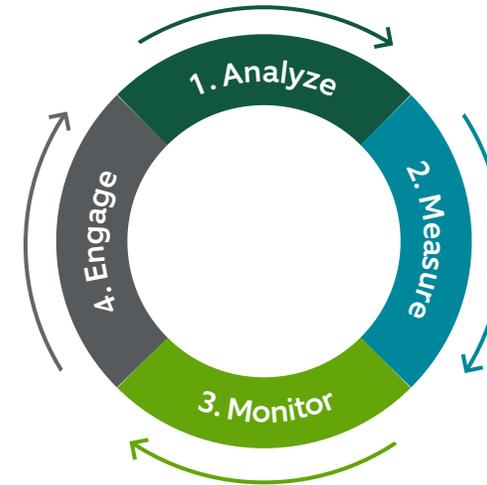
NTAM's perspective on climate change is embedded in our sustainable investing philosophy, which is consistent with our view that investors should be compensated for the risks they take. We believe understanding and evaluating companies' performance using sustainability criteria enhances our forward-looking view of risks and opportunities.



# NTAM's Sustainable Investing Approach

We employ a rigorous analytical investment approach, leveraging quantitative and fundamental research and our expertise to uncover financially relevant information that can impact a company's performance.

To implement this approach, our sustainability and stewardship specialists work in tandem with investment management teams to identify investment and engagement opportunities. Our investment solutions purposefully employ a robust four-step investment approach:



## 1. Analyze

We analyze business-related sustainability issues — financially material and industry-specific factors — that can shape short- and long-term results. Key to our process are a proprietary framework of measurable sustainability targets and decades of practical experience building sustainable portfolios.

## 2. Measure

We believe the companies that manage sustainability risks well are better positioned to deliver long-term returns. We use a variety of tools, including, external best-in-class sustainability data sets, the Northern Trust ESG Vector Score™, our established methodologies for exclusionary screening, and long-term experience to select performance indicators and material sustainability factors to analyze publicly traded companies.

## 3. Monitor

We continually assess the sustainability performance of the securities within our sustainable investment portfolios. With clients' objectives in mind, we employ industry-specific frameworks and proprietary screening criteria, including the Northern Trust ESG Vector Score™, to assess and govern our sustainable investing platform and securities held in portfolios. This comprehensive view allows us to differentiate between sustainability leaders and laggards, and flag companies that may require additional research or targeted engagement.

## 4. Engage

Stewardship is an integral part of our investment process across both actively managed and index strategies. Our stewardship philosophy is rooted in our firmly held belief that engaging investee companies on material matters is our fiduciary duty. We identify long-term risks that pose potential challenges to shareholder value and engage on issues of substance — those that can affect businesses on many levels.

Our teams continually assess and consider climate change’s associated risks and opportunities in the process of developing sustainable investing strategies and goals. Our sustainable investing philosophy guides us as we seek to align with our clients’ investment and climate objectives, while addressing the growing need by certain clients for integration of climate considerations in portfolios. This is achieved through the implementation of our climate-focused strategic pillars explained here:

	<p><b><u>Sustainable Investing Integration</u></b> We focus on sustainable value creation and effective risk mitigation.</p>	
	<p><b><u>Innovation across our climate-focused investment solutions</u></b> NTAM does not take a one-size-fits-all approach to climate investment solutions. Our approach varies between asset classes to reflect the integration philosophies of each team, client preferences and objectives, and the specific nuances of each investment strategy.</p>	
	<p><b><u>Stewardship focus on:</u></b></p> <ul style="list-style-type: none"> <li>a. Engagement with investee companies</li> <li>b. Proxy voting in line with long-term value creation</li> </ul>	
	<p><b><u>Industry advocacy</u></b> We participate in various industry events to better understand climate-related risks and opportunities and evolving regulatory environment. This informs the integration of climate considerations in the portfolios we manage.</p>	
	<p><b><u>Investing in resources, tools, and technology</u></b> We continue to strengthen our team by adding new roles and enhancing our ESG data hub capabilities.</p>	

# NTAM's Sustainable Investing Integration Approach

We believe material sustainability risk indicators may affect a company's future financial viability and clients' long-term risk-adjusted investment returns. NTAM purposefully combines robust capital markets research, expert portfolio construction and comprehensive risk management to craft efficient solutions to deliver targeted investment outcomes.

Our roles and responsibilities as a fiduciary guide our principle-based culture and collaborative approach, resulting in a distinctive client experience. Our business strategy seeks to deliver investment solutions that solve the most complex needs of institutional and individual investors, with a focus on solutions that we believe align with our competitive advantage, provide the most value to investors and show potential for growth. Some of these solutions include sustainable investing, quantitative, multi-asset, cash and alternative strategies.

We believe that, by serving as an active owner on behalf of our clients, we can help portfolio companies produce sustainable value as long as a company's long-term financial returns are connected to their strategic sustainability related performance.

In 2021, we launched the Northern Trust ESG Vector Score™, which assesses a company in the context of financially relevant sustainability-related criteria including climate change that could impact company performance. By leveraging two industry-leading frameworks, the Northern



Trust ESG Vector Score™ provides investors a more transparent methodology that can assess companies with a consistent metric for both portfolio construction and stewardship.

In 2023, we integrated periodic, sustainability-focused reviews into the money market fund portfolio construction process. Representatives from portfolio management, sustainable investing, and capital structure analysts conduct the monthly reviews. The sessions are designed to highlight overall portfolio positioning, deliberate and discuss the merits of material sustainability risks and opportunities on held securities alongside the repayment risks companies may face.

Our approach represents a refined perspective on material sustainability risks and leverages our quantitative and fundamental research expertise. We believe our distinct ability to home in on these critically important and financially material sustainability risks, which includes climate change, will help further align sustainable investments and company engagements. And, as sustainable investing continues to mature and evolve, the Northern Trust ESG Vector Score's™ open architecture means it can adapt to support multiple data sources and requirements over time. We see it as a foundational metric that can be used for years to come.

## Integrating Climate Change Into Capital Market Assumptions

Every year, Northern Trust's Capital Market Assumptions (CMA) Working Group gathers to develop long-term financial market forecasts. The team adheres to a forward-looking, historically aware approach. This involves understanding historical relationships between asset classes and the drivers of those asset class returns, but also debating how these relationships will evolve in the future. Our forward-looking views are encapsulated in our annual list of CMA themes, which — combined with our quantitative analysis — guide our expectations for 10-year asset class returns. *Navigating the Energy Transition* is one of the three key themes. The CMA return forecasts are combined with other portfolio construction tools (standard deviation,

correlation, etc.) to annually review and/or update the recommended strategic asset allocations for Northern Trust managed portfolios and multi-asset class products.

*Navigating the Energy Transition* requires a robust set of options, innovations and finance mechanisms as global energy demand continues to increase. Many countries are seeking to satisfy surging demand for energy, secure more energy independence and meet commitments to slow climate change. To do so, many are diversifying their energy sources, improving energy technology, and securing raw material supplies, while also balancing transition- and physical risks. For more details, see the [CMA website](#).



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### NAVIGATING THE ENERGY TRANSITION

Requires a robust set of options, innovations and finance mechanisms as global energy demand continues to increase.

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## Identifying Impacts of Climate-related Risks and Opportunities

Climate-related risks have the potential to impact future revenues and expenses of NTAM's investee companies, which ultimately can affect client returns.

The materiality and impact of climate-related risks factors in NTAM's investment strategies depend on many variables, including: investment style; regulatory impact; client guidelines and objectives; region; asset class; and holding period of the investments. When analyzing the climate-related risks and opportunities to client accounts and products, these factors are considered in the portfolio design process.

NTAM is committed to understanding how climate factors may contribute to risk in client portfolios as well as across our broader range of investments. The risks of climate change can be divided into two categories:

- Climate-related **transition risks** may arise as the world moves from a reliance on carbon-based energy toward lower-carbon alternatives. These risks include the potential for additional regulation and reporting requirements, legal exposure, reduction in the value of investments, and costs associated with developing low-carbon technology. Depending on the nature and extent of these changes, the global climate transition may catalyze meaningful shifts across the economy and impact the companies in which we invest. Our current view is that identifying and managing transition risks and opportunities are particularly important in the short- (0 to 5 years) and medium-term (5 to 10 years) and continues to be our area of focus.

- Climate-related **physical risks** arise from the direct impacts of a changing climate. Physical risks are both acute and chronic. Acute physical impacts include extreme weather or climate events, like flooding. Chronic impacts include longer-term shifts, such as increased temperatures and rising sea levels. Such risks can lead to extreme weather events impacting operations and leading to impairment of infrastructure and facilities or the disruption of supply chains. We foresee physical risks becoming increasingly frequent over longer time horizons (10 to 30 years), although extreme weather events could have near-term impacts.

Exhibits 5 and 6 summarize the specific climate-related risks and opportunities potentially arising in each time horizon (short-, medium-, and long-term) and the anticipated financial impact to NTAM.

**EXHIBIT 5:****Climate-related Opportunities**

<b>Opportunities</b>	<b>Description</b>	<b>Anticipated Financial Impact*</b>	<b>Time Horizon</b>
<b>Products and Services</b>	Increasing demand from clients for climate focused investment solutions may help NTAM generate new business through product offerings.	Increased Revenue	Short- to medium-term (0–10 years)
<b>Markets</b>	Increasing decarbonization efforts in the market may increase the demand for climate-focused investment solutions. NTAM's sustainability strategies, with varying levels of decarbonization, may resonate with client needs as they move towards net zero solutions.	Increased Revenue	Short- to long-term (0–30 years)

**EXHIBIT 6:****Climate-related Risks**

<b>Risks</b>	<b>Description</b>	<b>Anticipated Financial Impact*</b>	<b>Time Horizon</b>
<b>Policy and Legal</b>	Climate-related disclosure regulations may continue to evolve, potentially resulting in higher compliance costs to manage climate-focused investment strategies.	Increased expenses	Short-term (0–5 years)
	New regulations could impact client investment strategies or allocation decisions in a manner that may not be favorable to NTAM.	Reduced revenues	Short- to medium-term (0–10 years)
	New policies could result in stranded assets for some of our investee companies, which might result in unfavorable short-term impacts.	Reduced revenues	Short-term (0–5 years)
<b>Market</b>	Climate-related risks could cause asset value fluctuations, which may result in a decline in NTAM AUM.	Reduced revenues	Medium- to long-term (5–30 years)
<b>Reputation</b>	Increasing scrutiny around climate-related activities and a potential lack of sufficient action from NTAM could create reputational risks impacting our AUM.	Reduced revenues	Short- to medium-term (0–10 years)
<b>Physical</b>	NTAM offices could be impacted by adverse climate impacts. However, the financial impacts are limited as NTAM leases most of its facilities. Climate adaptation would also affect the expenses due to impact of physical risks.	Increased expenses	Medium- to long-term (5–30 years)

\*Anticipated financial impact cannot be guaranteed as impacts are driven by multiple factors not within our control

# Scenario Analysis and Portfolio Resilience

Once again this year, NTAM conducted a climate scenario analysis, assessing the resilience of NTAM’s portfolio against a range of Network for Greening the Financial System (NGFS) climate scenarios.<sup>3</sup> The analysis applied to equity, corporate bond and sovereign bond holdings, as of December 31, 2024. This section details the scenarios assessed, methodology used, and results.

To capture the impact of the complex interaction of the economy, energy system and physical climate risk on NTAM’s portfolio, Planetrics,<sup>4</sup> a third-party data provider, supported the climate scenario analysis and modelling. The analysis focused on investments for which comprehensive financial and environmental data were available.

Overall, this analysis focused on US\$987 billion of NTAM’s equity, corporate bond and sovereign bond AUM, which is about 78% of the overall NTAM AUM (hereafter referred to as, “total aggregated portfolio”).<sup>5</sup> At the asset class level, nearly all global listed equities, over two-thirds of corporate bonds, and over three-quarters of sovereign bonds were included in the exercise, as shown in Exhibit 7.

<sup>3</sup> NGFS is a consortium of central banks and financial supervisors aiming to enhance climate risk management in the financial sector and support mobilization of capital for the green transition.

<sup>4</sup> This report was created by Northern Trust Asset Management drawing on selected data provided by Planetrics, a McKinsey & Company solution (which does not include investment advice). This report represents Northern Trust Asset Management’s own selection of applicable scenarios selection and/or its own portfolio data. Northern Trust Asset Management is solely responsible for, and this report represents, such scenario selection, all assumptions underlying such selection, and all resulting findings, and conclusions and decisions. McKinsey & Company is not an investment adviser and has not provided any investment advice.

<sup>5</sup> This excludes cash, repurchase agreement (repo) transactions, securitized credit, agency credit, municipal credit, asset backed credit and derivatives in the corporate and sovereign bond portfolios as of December 31, 2024.

## EXHIBIT 7:

### Climate Scenario Analysis 2024 Asset Coverage

Asset Class	AUM (US\$B)	Scenario Analysis Coverage (US\$B)	Scenario Analysis Coverage (%)
Equity	793.2	787.1	99
Corporate Bonds	58.3	40.1	69
<i>Corporates (Equity + Bonds)</i>	<i>851.5</i>	<i>827.2</i>	<i>97</i>
Sovereign Bonds	136.0	108.2	80
<b>Overall</b>	<b>987.5</b>	<b>935.4</b>	<b>95</b>

Source: Planetrics, NTAM holdings as of December 31, 2024.

Where results are presented at an asset class level, the portfolio is compared against the following publicly available indices holdings as of December 31, 2024:

- For aggregated equities, MSCI All Country World Index
- For aggregated corporate bonds, Bloomberg Global Aggregate Corporate Total Return Index
- For aggregated sovereign bonds, Bloomberg Global Aggregate Treasuries Total Return Index
- For total aggregated portfolio, a weighted combination of above indices (hereafter referred to as, “Total Aggregated Index”).

## Climate Scenarios

In alignment with last year’s report, the NTAM climate scenario analysis exercise selected three scenarios developed by NGFS — Current Policies (referred to as “Hot House World” or “business as usual” throughout this document and serves as the baseline scenario), Delayed Transition, and Net Zero 2050.<sup>6</sup> Each scenario draws from the NGFS Phase 5 scenarios updated in November 2024.

These scenarios are based on outputs from the REMIND-MAgPIE Integrated Assessment Model (IAM),<sup>7</sup> which is widely adopted by regulators, the broader financial sector, and is also included in the Intergovernmental Panel on Climate Change’s Sixth Assessment Report (IPCC AR6).<sup>8</sup> The selected scenarios span a range of narratives and varying levels of transition and physical risk, summarized in Exhibit 8.

NGFS scenario variables provide the pace and the pathway of physical and transition risks and opportunities for the selected scenario narrative, also seen in Exhibit 8. Physical risks are driven by emissions levels and their associated impacts on global mean temperature. The Hot House World scenario, where current policies are maintained, results in the highest level of physical risk as temperatures rise above 2°C by 2050.

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### NGFS SCENARIO UPDATES

It is important to note there are three key updates in the newly released NGFS Phase 5 scenarios versus the Phase 4 scenarios used in last year’s analysis. The main changes in the updated NGFS Phase 5 include:

1. Higher carbon prices in transition scenarios such as Net Zero 2050 as slow progress in implementing climate policies to date necessitates more ambitious climate policy in the future.<sup>9</sup>
  2. Higher temperature outcomes due to the slow uptake of climate policy thus far.
  3. Slower uptake of electric vehicles (EVs) in the baseline scenario, particularly in the U.S, resulting in greater demand destruction and creation under transition scenarios as the difference in EV uptake relative to the baseline increases.
- 

<sup>6</sup> There are seven NGFS scenarios, falling into four quadrants: Hot House World, which includes the Current Policies scenario; Disorderly, which includes Delayed Transition; Orderly, which includes Net Zero 2050; and Too Little Too Late.

<sup>7</sup> REMIND (Regional Model of Investment and Development) is a numerical model that represents the future evolution of the world economies with a special focus on the development of the energy sector and the implications for our world climate. MAgPIE (Model of Agricultural Production and its Impacts on the Environment) is a global land use allocation model. Both models are run out of the Postdam Institute for Climate Impact Research.

<sup>8</sup> The IPCC is the United Nations’ body for assessing the science related to climate change.

<sup>9</sup> A carbon price of around \$300/tCO<sub>2</sub> is now required by 2035 transition to meet Net Zero 2050, this is around \$50/tCO<sub>2</sub> more than in Phase IV. Source: NGFS Technical Documentation, 2024.

**EXHIBIT 8:****Selected NGFS Scenarios at a Glance**

All scenarios are based on outputs from the REMIND-MAGPIE model.

Scenario	Description	Median 2100 Warming (Unless Otherwise Stated)	Net Zero (CO <sub>2</sub> ) Year	Technology Change	CO <sub>2</sub> Reduction Assumption	Regional Policy Variation
<b>Hot House World</b>	Existing climate policies remain in place, but there is no strengthening of ambition level. Thus, there is no transition risk. Heightened physical risks are assumed through high climate sensitivity, specifically 90th percentile temperature increase (4.0°C by 2100), high levels of ice sheet melt, and higher responsiveness of tropical and windstorm frequency and intensity to changing temperatures.	4.0°C (90th percentile)	N/A	Slow change	Low use	Low variation
<b>Delayed Transition</b>	Imposes the 2°C target in 2100 and allows for temporary overshoot. Annual emissions do not decrease until 2030. Strong policies are then needed to limit warming to below 2°C. This scenario includes regional carbon price variation. Regional net-zero targets for countries with clear commitments (China, EU, Japan, and U.S.) are applied from 2030 onwards, but for other countries ambition equivalent to the overall temperature target of below 2°C in 2100 is assumed leading to strong regional differentiation.	1.7°C	N/A	Slow until 2030; fast thereafter	Medium use	High variation
<b>Net Zero 2050</b>	Limits global warming to below 1.5°C (the median temperature returns to 1.4°C in 2100, after a limited temporary overshoot) through stringent climate policies and innovation, reaching global net zero CO <sub>2</sub> emissions around 2050. Some jurisdictions such as the U.S., EU and Japan reach net zero for all GHGs by 2050.	1.4°C	2050	Fast change	Medium/high use	Medium variation

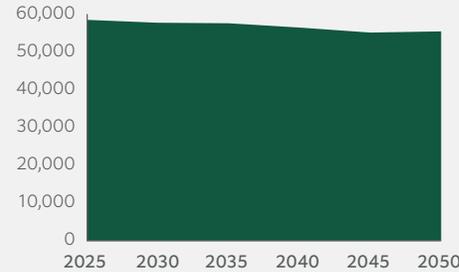
Source: NGFS Technical Documentation, 2024.

Transition risks are driven by increasing carbon prices and changes in the energy system. Rising carbon prices increase costs for emissions intensive industries, while changes in demand for oil, gas and coal negatively impact revenues in the energy sector and demand for fossil fuel intensive products, such as internal combustion vehicles (ICEs). However, the low-carbon transition also results in opportunities as the transition away from fossil fuels increases demand for low-carbon generation technologies and low-carbon products, such as EVs and biofuels. The Net Zero 2050 scenario, where policies are enacted immediately to reach net zero emissions around mid-century, results in the most transition risk and transition opportunity as temperatures are limited to below 1.5°C. Exhibit 9 shows the scenario variables of projected GHG emissions and carbon price for NGFS scenarios. More details on projected temperature anomaly and energy mix are available in [Appendix 2](#).

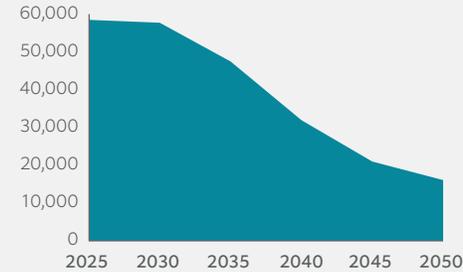
**EXHIBIT 9:**  
**Key Variables for Selected NGFS Scenarios**

**a) Projected GHG emissions (Mt CO<sub>2</sub>e/year)<sup>10</sup>**

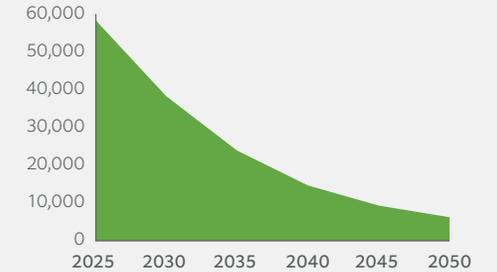
**Hot House World**



**Delayed Transition**

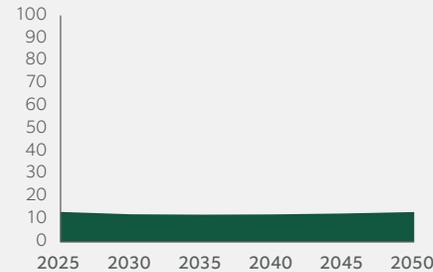


**Net Zero 2050**

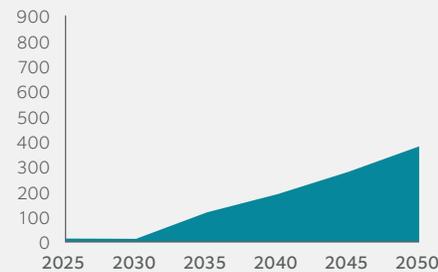


**b) Projected carbon price (based on 2020 US\$/tCO<sub>2</sub> baseline)<sup>11</sup>**

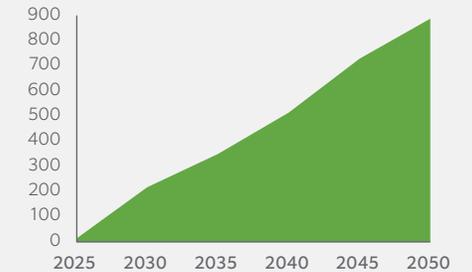
**Hot House World\***



**Delayed Transition**



**Net Zero 2050**



Source: NGFS Technical Documentation, 2024. \* Note change in scale when comparing charts.

<sup>10</sup> CO<sub>2</sub>e is used throughout this document and includes GHGs, such as methane, nitrous oxide and fluorinated gases in calculations. Therefore, CO<sub>2</sub>e is a more accurate measure of an asset’s true carbon footprint.

<sup>11</sup> NGFS “implicit” carbon prices encompass carbon taxes, market-based carbon prices, and the cost of complying with other climate change regulations. The NGFS provides regional carbon prices. For illustration, the chart displays global carbon prices, representing a weighted average of regional carbon prices.

## Modeling Approach

Our data provider’s modelling quantifies the impact of a range of physical and transition risks on security values under a range of possible future climate scenarios. For equities and corporate bonds, a four-step framework is deployed, also seen in Exhibit 10.

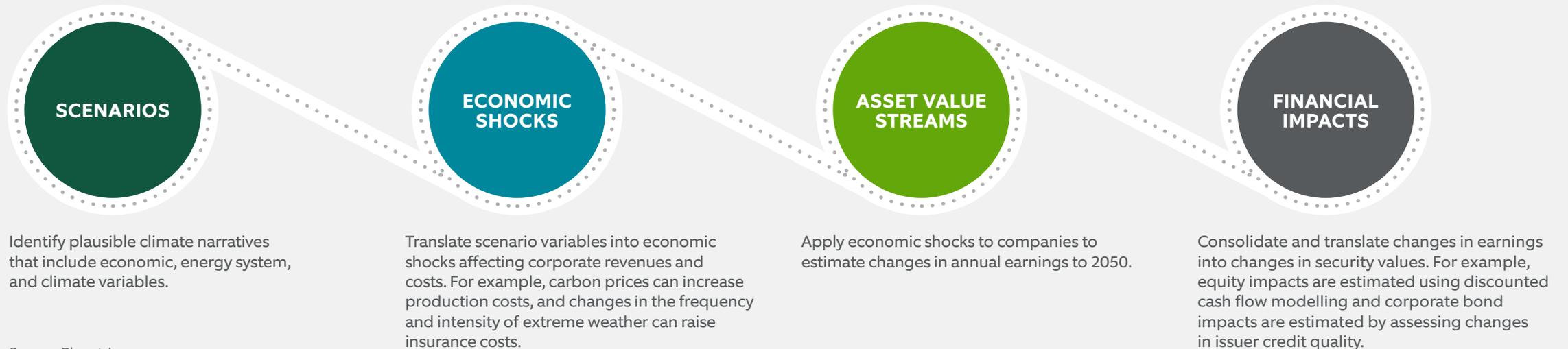
The model accounts for company-specific characteristics — such as the markets in which the company operates, revenue segmentation and emissions intensity — and security-specific characteristics, including duration and issuer credit rating for bonds. It also simulates company responses to shocks, including the adoption of economically optimal abatement opportunities, and captures

the effects of competition dynamics, such as changes in market share and cost pass-through to consumers.

For sovereign-bonds, value impacts are estimated by drawing on macroeconomic modelling of changes in debt-to-gross domestic product (GDP) and resulting default risk premia adjustments for each NGFS scenario.

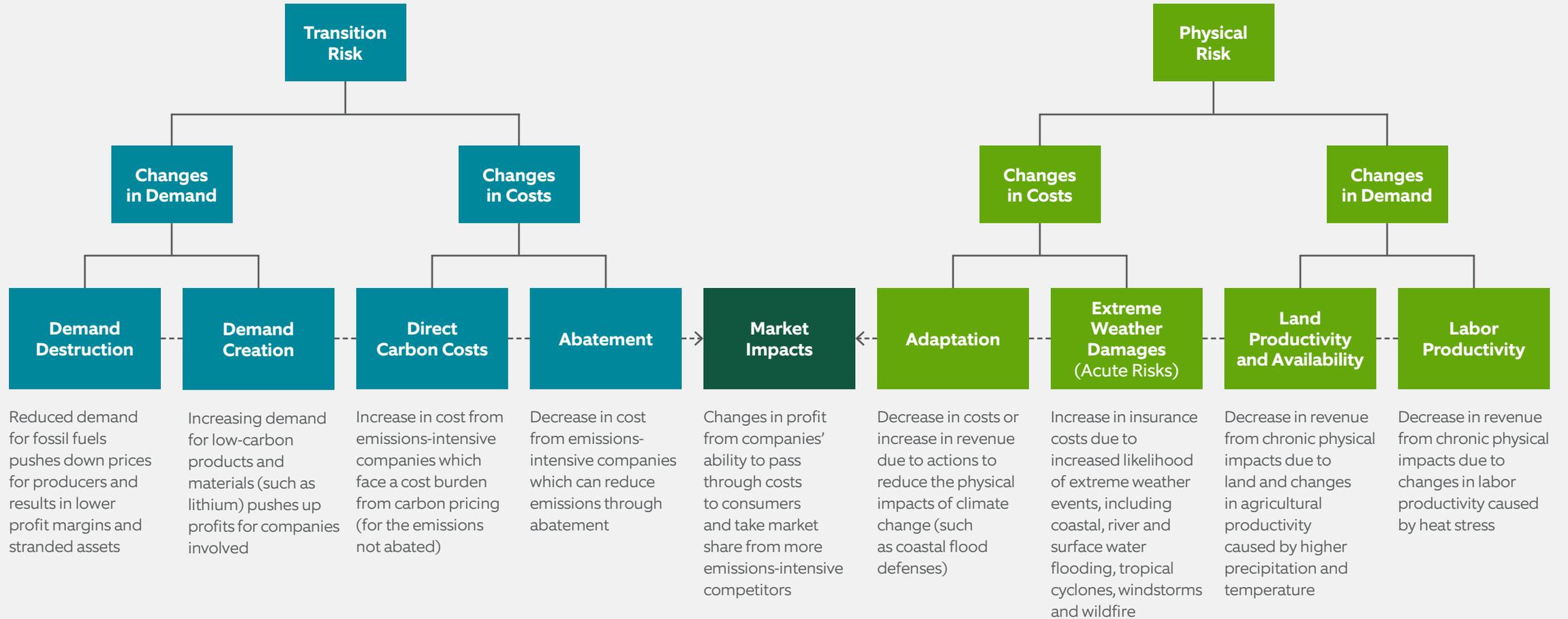
The output from the model includes changes in the current value of financial assets from each climate scenario, disaggregated by source of transition and physical risk as shown in Exhibit 11. This supports the identification of climate risk and opportunity drivers at portfolio, sector, region and security level.

### EXHIBIT 10: Four-step Modeling Framework



Source: Planetrics.

**EXHIBIT 11:**  
**Climate Risk’s Impact Channels**



Source: Planetrics.

## Scenario Analysis Results and Insights

The NTAM total portfolio remains better positioned relative to the benchmark to climate-driven value impacts under each of the three climate scenarios relative to the broader market indices, as measured by net present value (NPV) impacts. It is important to note that updates to NGFS Phase 5 drove changes to physical and transition risks impacts on the total portfolio. Physical risk increased due to slightly higher temperature outcomes across all scenarios, and particularly for the Hot House World scenario. Transition risks decreased under the Delayed Transition and Net Zero 2050 scenarios mainly due to changing scenario variables as opposed to any changes in underlying securities. Here are five key findings from the exercise:

### 1

Within each asset class of the NTAM total aggregated portfolio, NPV impact remains about the same or better than broad market indices, across each of the climate scenarios. NTAM portfolio resilience increased versus last year under the Net Zero 2050 and Delayed Transition scenarios.

### 2

As was the case in 2023, the most material NPV impact occurs in Net Zero 2050, the scenario with the most stringent climate policies.

### 5

Company emission reduction targets continue to matter, especially in carbon intensive sectors as NGFS Phase 5 accelerates declining revenue and demand for fossil fuels.

### 3

The equity portfolio remains durable under the Net Zero 2050 scenario. Relative to the 2023 analysis, the equity holdings see a reduced (better) impact in the NPV projections, which are driven by updates in the NGFS scenario as well as portfolio composition.

### 4

Downside risk continues to persist for corporate debt under the Delayed Transition and Net Zero 2050 scenarios. The negative NPV impacts increased in these scenarios under NGFS Phase 5 due to the passage of time and limited action relative to the NGFS Phase 4 models.

## Impacts to NPV

The most material NPV impacts continue to occur in Net Zero 2050, the scenario with the most stringent climate policies, followed by the Delayed Transition scenario and Hot House World, seen in Exhibit 12. The difference in NPV impacts across scenarios is driven by the varying time horizons over which transition and physical risks materialize.

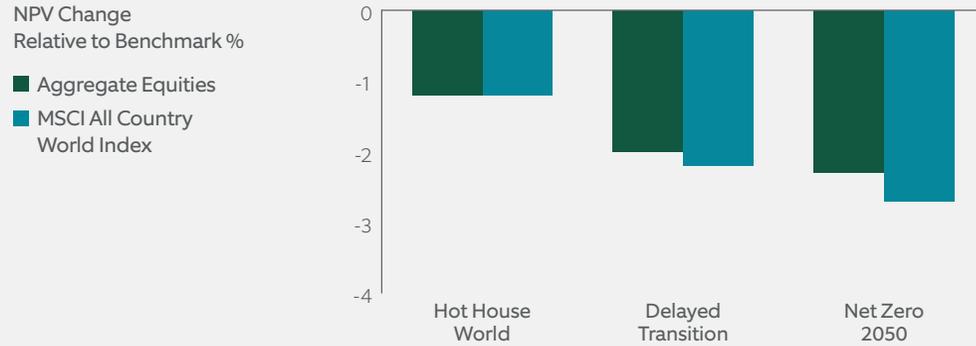
Transition risks materialize first under Net Zero 2050, as climate policies are immediately introduced to limit warming to below 1.5°C by 2100. In the Delayed Transition scenario, transition risks do not materialize until the introduction of stringent climate policies in 2030, resulting in a more disorderly transition to limit temperatures to below 2°C. Physical risks materialize over longer time horizons in the Hot House World scenario and continue to increase beyond the modelling horizon of 2080.<sup>12</sup>

Equities face the most material climate impacts, followed by sovereign and corporate bonds under a Delayed Transition scenario, also seen in Exhibit 12. Equities are more exposed to climate risks and opportunities than corporate bonds because bondholders receive fixed payments and have a higher claim on assets. Each asset class within the NTAM total aggregated portfolio performs about the same or better than the broad market indices, across all the climate scenarios. Further, NTAM's total aggregated portfolio is more resilient to climate risk relative to benchmark portfolios under the Net Zero 2050 scenario, again seen in Exhibit 12.

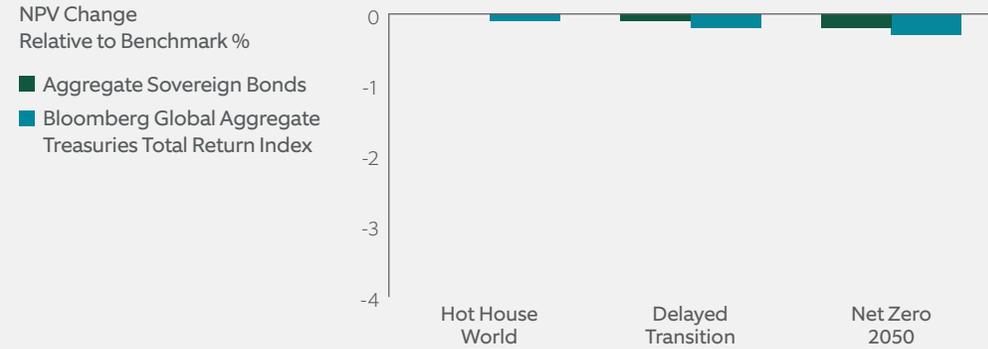
<sup>12</sup>In the model, risks are discounted to their present-day values, making near-term transition risks more prominent than longer-term physical risks. The impacts of transition risk are modelled to 2050 and physical risks to 2080.

**EXHIBIT 12:**  
**Asset Class Level NPV Impacts vs. Broader Market Index Impacts**

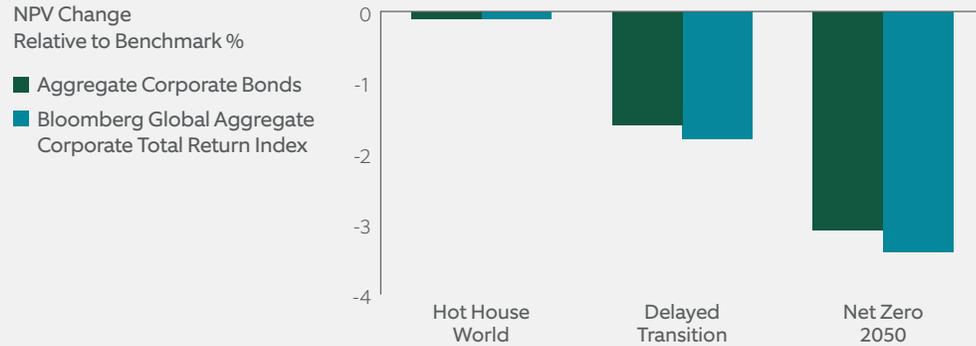
**Aggregate Equities vs. MSCI All Country World Index**



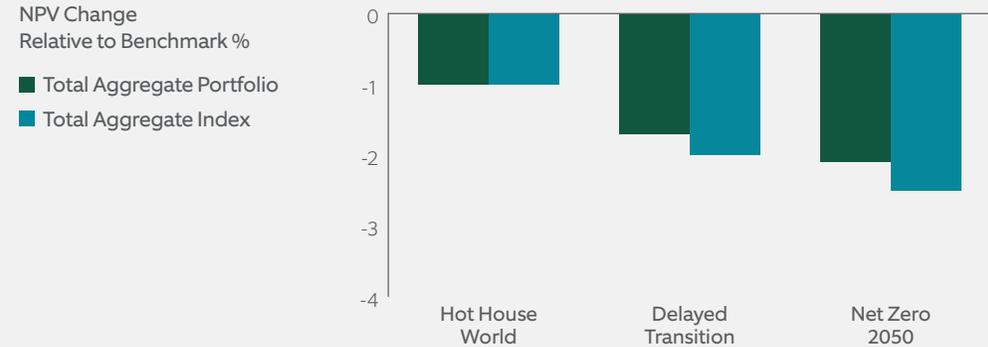
**Aggregate Sovereign Bonds vs. Bloomberg Global Aggregate Treasuries Total Return Index**



**Aggregate Corporate Bonds vs. Bloomberg Global Aggregate Corporate Total Return Index**



**Total Aggregate Portfolio vs. Total Aggregate Index**



The most material NPV impacts continue to occur in Net Zero 2050.

Source: Planetrics, NTAM holdings as of December 31, 2024.

### Equity Impacts Under Net Zero 2050 Scenario

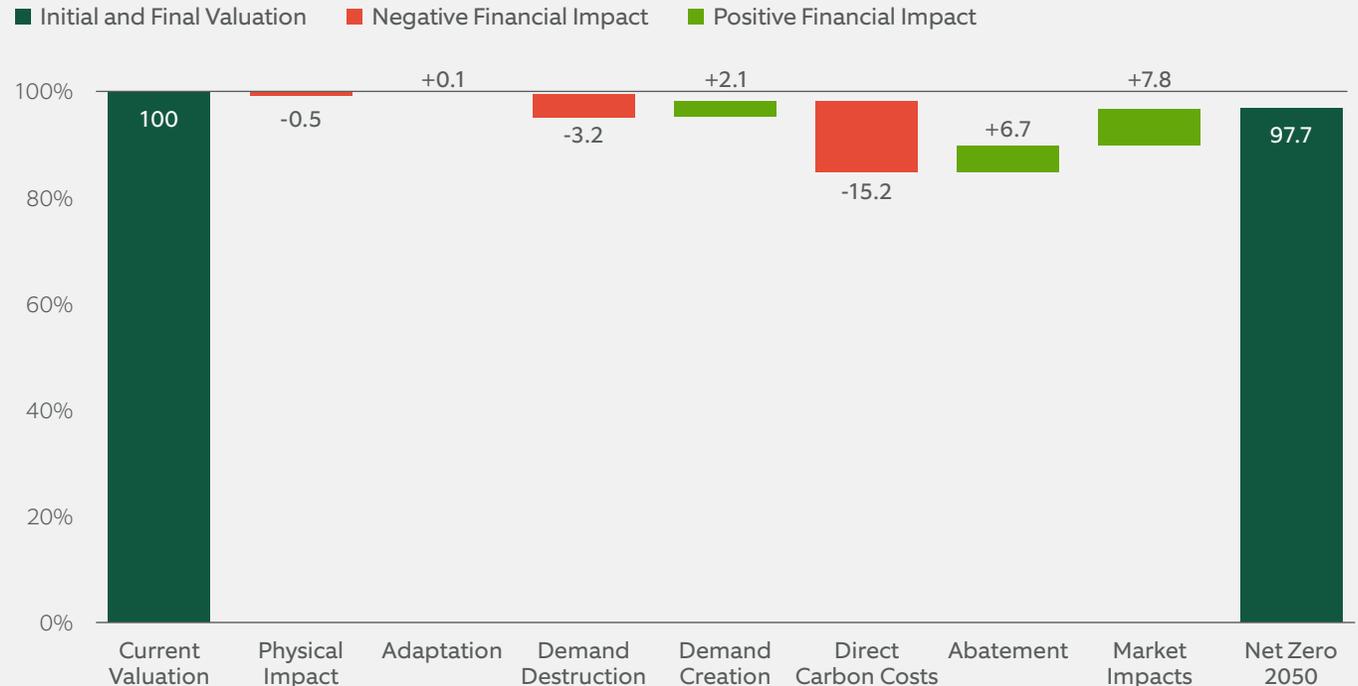
The equity portfolio remains resilient to climate risk in the Net Zero 2050 scenario, with NPV impacts reduced versus last year (-2.3% in 2024 vs. -3.4% in 2023). This improvement is largely driven by higher levels of demand creation, but is partially offset by higher carbon impacts,<sup>13</sup> as shown in Exhibit 13. Demand creation is largely driven by the updates to NGFS Phase 5, specifically around the treatment of EV uptake in the Net Zero 2050 and Delayed Transition scenarios relative to the baseline. Additionally, the equity portfolio reduced exposure to climate-sensitive sectors, such as energy (3.6% in 2024 vs. 4.3% in 2023) and non-energy materials (3.9% in 2024 vs. 5.0% in 2023), while increasing exposure to less climate sensitive sectors, such as technology (32.8% in 2024 vs. 28.1% in 2023) and finance (18.5% in 2024 vs. 17.8% in 2023). Conversely, some of this reduction was offset by increased carbon impacts. It is important to note that modelling estimates of companies will react to rising carbon prices by adopting economically optimal levels of abatement, weighing the carbon price against abatement costs for each ton of emissions. In addition, modelling finds that companies are able to pass some costs on to consumers. The combination of emissions abatement and cost pass-through reduces the impact of direct carbon costs.

In the Net Zero 2050 scenario, physical risk has a relatively smaller impact on equity value, which is also partially offset by adaptation measures, reflecting the benefit of policy limiting warming to below 1.5°C.

#### EXHIBIT 13:

### Equity Portfolio Value Impacts, Disaggregated by Risk Channel

(Based on Net Zero 2050)



Equity impacts reduced versus last year, largely driven by higher demand creation, but partially offset by higher carbon impacts.

Source: Planetrics, NTAM holdings as of December 31, 2024.

<sup>13</sup> Carbon impact refers to the net effect of Direct carbon costs, Abatement, and Market impacts.

### Transition-exposed Sectors

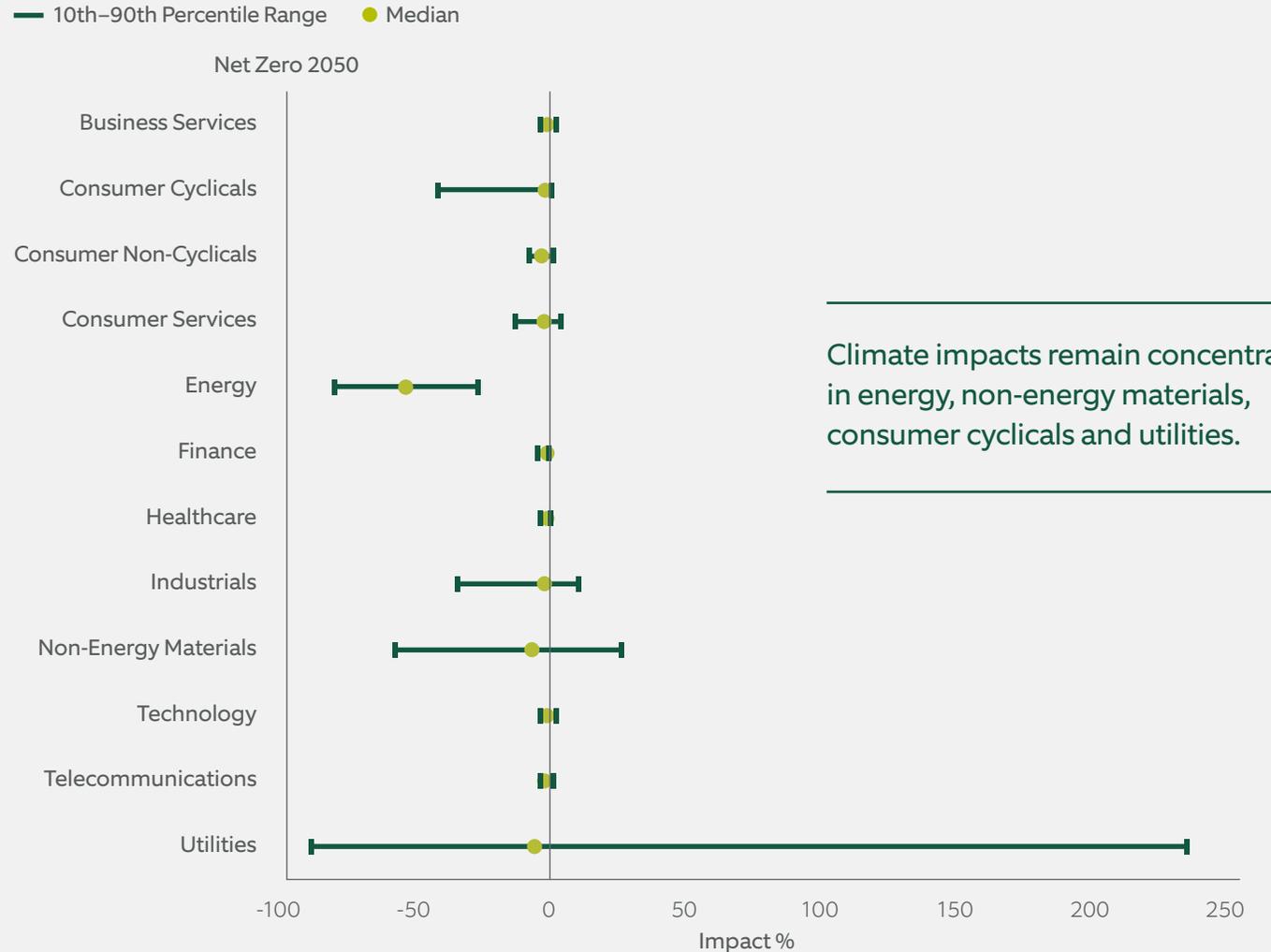
Climate risks and opportunities are concentrated across and within sectors. Under Net Zero 2050, climate impacts are largest in transition-exposed sectors, including energy and non-energy materials. In this scenario, impacts are driven by declining revenues from reduced fossil fuel demand. Rising carbon prices result in material cost increases for non-energy materials companies with highly emissions-intensive manufacturing processes, such as chemical and cement production.

In 2024, climate impacts remain concentrated in energy, non-energy materials, consumer cyclicals and utilities, as seen in Exhibit 14. The biggest NPV movers versus last year were consumer cyclicals, industrials, and utilities. Consumer cyclicals increased significantly (+15.1%) due to greater upside due to demand creation, which was also offset by higher downside risk due to greater demand destruction and higher carbon costs. For example, EV manufacturers benefit from greater demand creation in Net Zero 2050 (relative to baseline) while ICE manufacturers face larger demand destruction impacts. Industrials decreased (-3.0%) largely due to higher carbon prices. Utilities didn't experience a massive change in weighted average (+3.9%), but did experience a large jump in 90th percentile NPV (from +193% in 2023 to +230% in 2024). This is driven by the higher carbon prices in the NGFS Phase 5 Net Zero 2050 scenario. As carbon prices increase, the likelihood of passing costs through to consumers increases as well,

**EXHIBIT 14:**

### Distribution of Equity Impacts by Sector

(Median and 10th–90th Percentile Range, Under Net Zero 2050)



Climate impacts remain concentrated in energy, non-energy materials, consumer cyclicals and utilities.

Source: Planetrics, NTAM holdings as of December 31, 2024.

resulting in larger windfall profits for low-carbon utilities due to lower generation costs. Conversely, for a traditional utility more dependent on fossil fuel generation costs, carbon prices will likely rise faster than electricity prices and the utility will be unable to effectively pass those rising costs onto customers in a higher carbon price environment.

### Company Targets Matter

To understand how companies are positioned for the low-carbon transition, NTAM also analyzed the impact of companies achieving their publicly announced climate targets, which often results in a material reduction in climate risk. For example, an automotive original equipment manufacturer (OEM) may target a specific share of EV sales and emissions targets. This approach supports assessing company-level results both with and without revenue-share targets. Exhibit 15 shows value impacts by risk channel for a selected OEM under Net Zero 2050, with and without targets applied in the analysis. Without targets, this auto OEM risks NPV impacts of 40% (compared to 8% in 2023), driven by demand destruction for ICE vehicles. However, if the company meets its targets, demand creation for EVs outweighs demand destruction for ICEs, leading to a 12% NPV increase (compared to 5% in 2023) in the scenario. Meeting climate targets matters in the NGFS Phase 5 scenarios, including for auto makers, in order to mitigate the impacts of higher carbon prices and higher levels of demand destruction.

**EXHIBIT 15:**

### Value Impact for Auto OEM With and Without EV Sales by 2030 Targets Applied

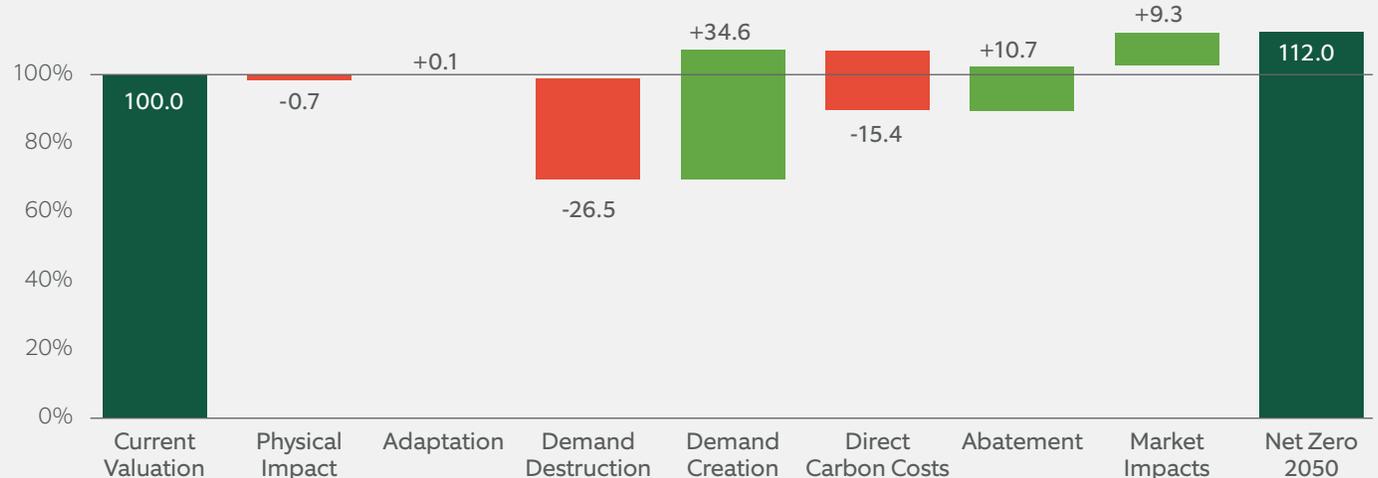
(Based On Net Zero 2050)

■ Initial and Final Valuation ■ Negative Financial Impact ■ Positive Financial Impact

#### Impact on Value Without Targets



#### Impact on Value With Targets



Source: Planetrics, NTAM holdings as of December 31, 2024.

## Limitations

Climate scenario analysis and climate analytics continue to evolve and improve. For NTAM’s scenario analysis exercise, there are several important limitations, including:

- **Climate scenarios are sensitive to variables:** Each climate scenario will have unique sets of temperature, emissions and socioeconomic assumptions and results will be sensitive to these variables. Scenario assumptions have different implications for how emissions are spread across geographies and sectors, and the extent to which carbon trading is relevant across those geographies and sectors.
- **Uncertainty in physical risk modelling:** There are considerable uncertainties related to first and second order impacts of physical climate change. The analysis does not explicitly account for second-order non-linearities in the climate system, such as tipping points.<sup>14</sup> Nor does the analysis capture potential second-order social impacts from climate change, such as conflict and migration. As a result, the analysis likely underestimates physical impacts in high warming scenarios.

- **Average damages vs. tail risks:** The analysis captures the change in average expected damage from acute hazards. However, this average may be materially lower than the damages resulting from tail risks that could materialize during extreme weather events.
- **Data quality and company disclosure:** The quality of data and the extent of company disclosures vary materially. When company-reported data is unavailable, proxies such as sector averages are used to fill in the gaps.
- **Cleantech “unknown unknowns”:** The analysis captures potential growth in demand for mature cleantech products that are already in commercial production or proven at scale. However, it does not account for emerging technologies that have not yet been widely deployed as these cannot be easily attributed to companies based on current financials.

- **Societal impacts are not included in models:** There are important humanitarian and societal effects of climate change which are not yet considered in this type of analysis. Most prominent among these are the effects on migration and conflict due to extreme weather events, sea-level rise, crop failures, reduced yields, extreme heat and many more. These wider climate risks could indirectly impact investors.

In future exercises, we will continue to evaluate and, as appropriate, adopt enhanced data and methodologies to mitigate such limitations.

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**As climate scenario analysis evolves and improves in the future, NTAM is committed to adopting enhanced data and methodologies to overcome current limitations.**

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<sup>14</sup>The IPCC defines “tipping points” as critical thresholds in a system that, when exceeded, can lead to a significant change in the state of the system, often with an understanding that the change is irreversible.

# Climate-focused Investment Solutions

NTAM offers a broad range of investment solutions across the sustainable investing spectrum, as explained in Exhibit 16.

With NTAM’s decades of experience working with clients across the globe to integrate sustainable elements into the portfolio construction, we understand not only the desire to consider climate change in investment strategies, but also the need to implement an actionable strategy.

NTAM does not take a one-size-fits-all approach to climate investment solutions. Our approach varies between asset classes to reflect the integration philosophies of each team, client preferences and objectives, and the specific nuances of each investment strategy. Most of our climate strategies use a combination of approaches including, but not limited to:

- Screens to minimize climate-related risks, including stranded assets
- Reduction in carbon emissions and potential carbon emissions relative to the investable universe
- Climate-related stewardship to encourage companies to develop and disclose climate goals by using engagement and voting as a tool
- Efficiently managing forward-looking risks and opportunities by favoring companies well-positioned for the low carbon transition

**EXHIBIT 16:**  
The Spectrum of Our Sustainable Investing Capabilities

EXCLUSIONS	ESG INTEGRATION	BEST-IN-CLASS	THEMATIC
Strategy excluding from a fund or portfolio certain sectors, companies or practices based on specific ESG criteria and/or minimum standards of business practice based on international norms such as United Nations Global Compact Principles	Strategy incorporating ESG considerations across business activities and investment valuation	Strategy investing in a defined percentage of companies/issuers that lead in their peer groups in implementing ESG	Strategy investing in targeted ESG themes and often seeks an environmental or social outcome, such as clean technologies

In order to cater to different client objectives, our products include a wide range of climate-based strategies, such as NT World PAB Plus Equity Select Index, NT Real Estate Climate Index, NT Global Bond Select Index and NT Global Green Bond Index.

# NTAM Stewardship

## NTAM Approach to Engagement

As global investors, we have the responsibility and opportunity to encourage companies to implement strong corporate governance and sustainability practices, as key drivers of long-term business success and shareholder returns. We do this through the fostering of supportive, on-going relationships with investee companies. To prioritize engagements, we identify key risk factors that may impact performance. We focus on key priorities through:

- **Key themes:** Our process for engaging with companies on long-term sustainability, social and governance risks starts with prioritizing key themes which we see as significant risks. In addition, engaging and tracking companies' activities against

specific United Nations Sustainable Development Goals (SDGs) provides us with valuable insights into investment risks, opportunities and long-term sustainability.

- **Internal alignment:** We prioritize issues aligned with our internal investment practices, beliefs and goals.
- **Client priorities:** Some of our most effective stewardship outcomes begin with our clients. We listen to what our clients judge as important and align our efforts with their priorities and organizational values.
- **Region:** Some topics and issues are more pressing within specific geographies. That means priorities may differ by region.

- **Probability of success:** We concentrate our efforts on the goals where we are most likely to be successful, using realistic and timebound objectives.

We have identified more than 30 themes, including “Reduce climate risk”, that may impact a company’s long-term value. We focus our efforts on the key themes/issues where we believe we have the highest probability of achieving the desired outcomes.

The next page features a case study on how NTAM engaged with Equinor ASA to seek enhanced disclosure on the climate transition strategy:<sup>18</sup>

### 2024 Engagement Highlights

NTAM conducted more than 140 climate-related engagements with 125 companies (increased 58% compared to 2023), focusing on TCFD-based disclosures, strategic alignment to 1.5°C or below and other climate related topics.

EOS at Federated Hermes (EOS)<sup>15</sup> engaged on 3,857 themes<sup>16</sup> with 845 companies on NTAM’s behalf. Out of 3,857 themes in 2024, more than 1,500 were environmental focused.

In 2024, NTAM participated as a collaborating investor on engagements with 6 companies through our Climate Action 100+ membership.<sup>17</sup> NTAM participated as engagement lead on CEZ (Czech Republic), National Grid (UK), Walmart (US), The Home Depot (US), South32 (Australia) and KEPCO (Korea).

<sup>15</sup> We appointed EOS to act as agent of our UCITS pooled funds in EMEA.

<sup>16</sup> As part of our engagement approach, NTAM identified more than 30 themes focusing on environmental, social and governance issues. Reduce climate risk is one of the key themes in our engagement approach.

<sup>17</sup> In January 2025, NTAM made the decision to withdraw from Climate Action 100+. This decision reflects our confidence that we can independently and effectively manage material risks and engage with portfolio companies to safeguard and grow our clients’ capital.

<sup>18</sup> The case study presented are intended to illustrate stewardship efforts undertaken by NTAM. Stewardship includes engaging with portfolio companies, policy makers, service providers and other stakeholders — sometimes collaboratively — in an effort to encourage positive change and maximize overall long-term value. They do not necessarily represent the views of all clients, nor do they indicate future performance. Individual results may vary, and not all engagement efforts are successful in driving positive change in portfolio companies.

## NTAM CASE STUDY

# Equinor

## Seeking Enhanced Disclosure On The Climate Transition Strategy

### THE CHALLENGE

Equinor, headquartered in Norway, is one of the world's largest oil and gas companies. At Equinor's 2024 annual general meeting, U.K. and European institutional investors co-filed a shareholder resolution requesting the company align its climate strategy and capital expenditure plan according to the Paris Agreement goals.

### WHAT WE DID

In the second quarter of 2024, on behalf of our equity and fixed income position, NTAM engaged Equinor ahead of its annual general meeting to discuss its climate transition plan and the shareholder resolution. With regards to the climate transition plan, we were seeking to determine how the company considered the transition risks that may arise from bringing oil and gas projects online that may operate beyond 2050, given the Norwegian state's (its controlling shareholder) ambitious climate goals. We requested greater disclosure about Equinor's plans post 2035, in particular, how it intends to protect value in a decarbonizing world and ensure that long-cycle oil and gas projects are compatible with its stated climate commitments.

### THE OUTCOME

Equinor stated that it valued our input ahead of a 2025 update to its transition strategy. Noting the forthcoming "Say on Climate" vote at the 2025 annual general meeting, we voted in favor of the resolution as it would enhance Equinor's disclosure about its long-term capital allocation decisions. The vote did not pass, however, receiving 6.5% support, representing 19.5% of independent shareholders. We will continue to engage with Equinor in light of recent changes to its transition strategy.

## Proxy Voting Approach on Climate Change

Voting rights have economic value and provide the opportunity for shareholders, as company owners, to provide their views to management on a range of topics. The exercise of voting rights is a fundamental part of our stewardship activities. As a leading investment manager representing permanent capital in more than 10,000 companies globally, voting at shareholder meetings helps advance stewardship goals on behalf of our clients.

In 2024, we:

- **Supported 30% of environmental shareholders resolutions** where we were able to vote. Our support for shareholder proposals declined compared to previous years due to several factors. First, although many companies significantly improved their sustainability disclosures in recent years, we observed a continuation of proposals filed with companies requesting further disclosure despite improvements. In some cases, proposals requested similar data to that already available, but not exactly meeting the proponent's requirements. Second, there is an increase in the prescriptive nature of such proposals, which is leading to an overall reduction in aggregate shareholder support. As a long-term investment manager, we prioritize proposals with a clear, demonstrable material financial impact, ensuring that our support is directed towards initiatives that provide tangible benefits and

disclosure requests that we find useful. We believe that each shareholder resolution requires unique analysis, and we carefully examine these on a case-by-case basis to make informed decisions that align with our clients' best interests.

- **There were multiple management and shareholder resolutions** with climate agendas in 2024, including: Adopt or Report on GHG Emissions and Emissions Targets, Report on Climate Change and others. Details of how we voted on key issues in 2024 including climate change can be found in our 2024 [Stewardship Report](#).

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We formalized new [proxy voting policies, procedures, and guidelines](#) to support a thoughtful approach to proxy voting. For more information on the impacts of our engagements and proxy voting, please refer to our [2024 Stewardship Report](#).

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**EXHIBIT 17:**  
**A Year of Stewardship <sup>19</sup>**

**147,000+**

Number of votable items proposed by management and shareholders



**15,750**

Shareholder meetings voted



**1,095**

Total number of companies engaged

**28%**

Shareholder meetings in which we voted against management on at least one resolution



**+56%**

Increase in number of companies directly engaged by NTAM vs 2023<sup>20</sup>



**NTAM Direct Engagements by Theme**



Based on 276 direct engagements by NTAM across 250 companies.

<sup>19</sup> Source: NTAM and EOS at Federated Hermes (EOS). We appointed EOS to act as agent of our UCITS pooled funds in EMEA and APAC. An engagement is defined as a meeting or call with an investee company. Individual engagements may have covered one or more themes, and multiple engagements may occur with the same company. NTAM engaged with 250 companies in 2024; EOS engaged 845 companies. NTAM-led engagements capture those performed individually or in collaboration with other investors. Voting statistics represent the votes cast by NTAM in line with our custom set of guidelines – the Northern Trust proxy voting policies and procedures. Statistics do not include votes cast by clients through Proxy Voting Choice or in select sustainability funds which subscribe to alternative voting policies.

<sup>20</sup> NTAM directly engaged 250 companies in 2024 and 160 companies in 2023.

# Industry Advocacy

NTAM engages with various industry organizations to better understand and support sustainability initiatives. These include a range of industry initiatives aimed at reducing systemic risks linked to long-term sustainability, including climate change.

One example is our membership in the IFRS Sustainability Alliance (member of the Investors Advisor Group and Standards Advisory Group), which promotes consistent, comparable and decision-useful corporate disclosure of material sustainable business practices. Also, in early 2025, members of our SI team were selected to the Principles for Responsible Investment (PRI) Listed Equity Advisory Committee (LEAC) responsible to provide advice, share knowledge and collaborate on responsible investment

initiatives. Such efforts underscore our commitment to engage in policy and regulatory initiatives to promote high standards. We believe it is important to partner with industry organizations to enhance our understanding of market developments and support information sharing, as well as the development of industry standards on climate-related matters.

<sup>21</sup> The complete list of our participation in industry organizations can be found in Appendix 3 of our [2024 Stewardship Report](#).

<sup>22</sup> In January 2025, NTAM made the decision to withdraw from Climate Action 100+. This decision reflects our confidence that we can independently and effectively manage material risks and engage with portfolio companies to safeguard and grow our clients' capital.

<sup>23</sup> In January 2025, NTAM made the decision to withdraw from NZAMI. This decision reflects our confidence that we can independently and effectively manage material risks and engage with portfolio companies to safeguard and grow our clients' capital.

**Below is a list of various climate initiatives in which we participate:<sup>21</sup>**

Member of Ceres Investor Network on Climate Risk and Sustainability

Signatory of Climate Action 100+<sup>22</sup>

Signatory of Farm Animal Investment Risk & Return Initiative (FAIRR)

Signatory of Net Zero Asset Manager Initiative (NZAMI)<sup>23</sup>

Member of IFRS Sustainability Alliance (member of the Investors Advisor Group and Standards Advisory Group) and Task Force on Climate-Related Financial Disclosures (Supporter)

Member of Institutional Investors Group on Climate Change (IIGCC)

Member of Institutional Investors Group on Climate Change (IIGCC) Net Zero Engagement Initiative

# Investing in Resources, Tools, and Technologies

In 2024, NTAM continued to invest in various resources to support sustainable investing, including growing the SI and Stewardship Teams and investing in our SI data, analytical resources, and infrastructure to enhance the accessibility of sustainability-related information.

In addition to the appointment of a new dedicated global head of stewardship, we further enhanced our SI and Stewardship Teams by appointing three stewardship analysts, one SI client engagement specialist and one SI research and integration analyst across global locations in 2024 and early 2025. We plan to continue to grow our team and sustainable investing capabilities in 2025, adding additional internal resourcing and topic expertise across global locations, with further analyst hires.

In an effort to expand learning and expertise across the organization, the SI and Stewardship Teams led numerous training sessions for NTAM investment professionals, executive leadership, clients and employees in 2024.

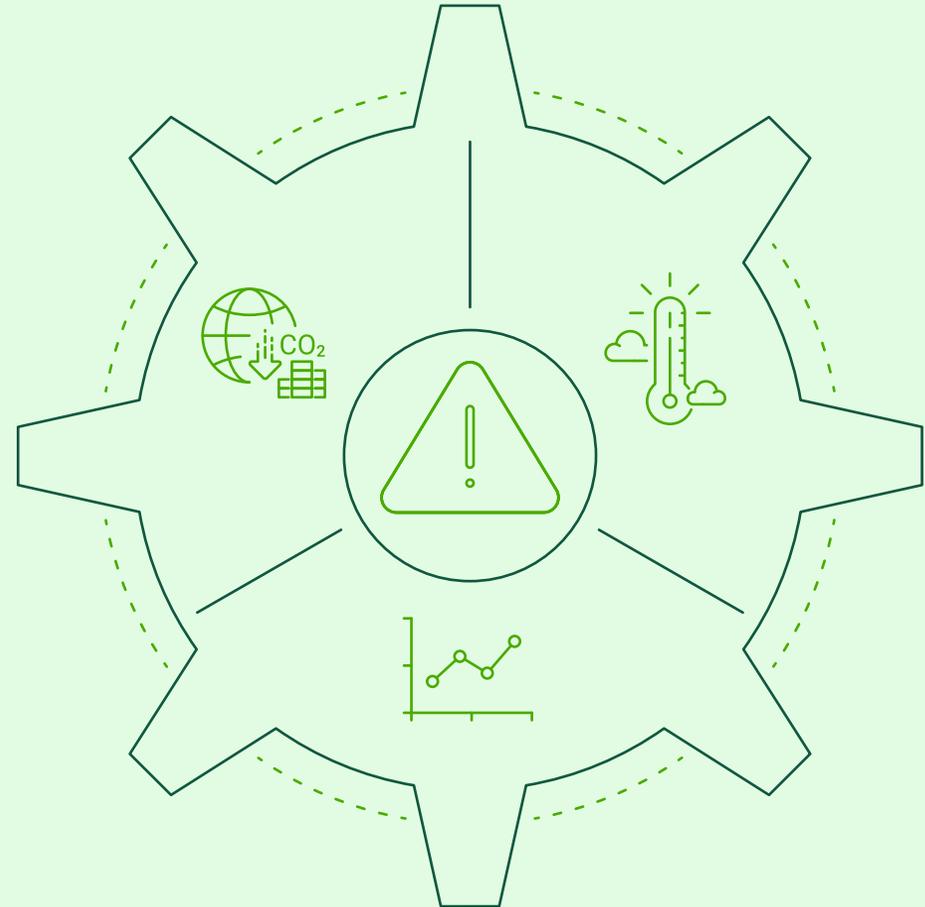
We continued to enhance our ESG datahub in 2024, which centralizes sustainability metrics across our investible universe, to further the SI integration, research and stewardship efforts across the organization.

We integrated direct data feeds into our daily ESG hub ingestion/dissemination process, so that third-party vendor data is received and updated in the timeliest manner available. This helped improve the scale and scope of data available for use by investment teams.

# 05

## Risk Management

Potential systemic risks, such as climate change, threaten to destabilize increasingly interconnected financial markets.



# Identifying and Assessing Risks

NTAM employs an integrated risk management framework to enable a risk-informed profile and to support its business decisions and the execution of its strategy. The framework provides a methodology to identify, manage, report, and govern both internal and external risks to NTAM, and promotes a culture of risk awareness and good conduct across the organization.

The risk management framework consists of three inter-related elements designed to support consistent risk identification, management, and reporting:

## **1** A comprehensive risk inventory

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## **2** A static taxonomy of risk categories

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## **3** A dynamic taxonomy of risk themes

The risk inventory is a detailed register of the risks inherently faced by NTC and its subsidiaries. The risk categories and risk themes are classification systems used for classifying and managing the risk inventory and enabling different risk profile views.

All identified risks inherent in NTAM's business activities are cataloged into the following risk categories: credit, operational, fiduciary, compliance, liquidity, market, and strategic risk. All material risks are also dynamically cataloged into various risk themes, which are defined groupings that share common characteristics, focus on business outcomes, and span across risk categories.

## Climate-specific Risk

Climate risk continues to be an evolving strategic risk for NTAM. Climate risk refers to the risk of loss arising from climate change and is comprised of physical risk, liability risk, and transition risk:

- **Physical risk** refers to risks emanating from the increased severity of extreme weather events (e.g., cyclones, droughts, floods, and fires). It can also refer to longer-term shifts in precipitation and temperature and increased variability in weather patterns (e.g., sea level rise).
- **Liability risk** stems from the potential for litigation in response to institutions' and boards' approach to the impacts of climate change.
- **Transition risk** reflects the risks associated with transitioning to a lower-carbon economy that may entail extensive policy, legal, technological, and market changes. Depending on the nature, speed, and focus of these changes, transition risks may pose varying levels of financial and reputational risk.

NTAM also leverages NTC's climate risk management efforts, overseen by NTC's Chief Climate and Sustainability Risk Officer who reports directly to the NTC CRO. NTC's Risk Management function has created a dedicated climate and sustainability risk unit to monitor, oversee, and take account of the increasing impacts climate change has, or may have in the future, on financial risk, non-financial risk, and regulatory compliance across the globe. The climate and sustainability risk unit works to evolve the risk management framework to ensure NTC, including NTAM, meets the expectations of all stakeholders as well as all climate-related commitments made by NTC to external agencies.

Apart from the integrated risk management framework, our Stewardship Team proactively reviews the climate change risk exposure across our investee companies. We engage with companies where we have material holdings and climate risk exposure with the goal of addressing the key risks. Please refer to the [Strategy section](#) for more details on our climate stewardship approach.

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Climate risk continues to be an evolving strategic risk for NTAM. We continue to monitor, oversee and take account of the increasing impacts climate change has, or may have in the future, on financial risk, non-financial risk, and regulatory compliance across the globe.

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# Managing Climate-related Risks

At NTAM, global and regional business risk committees are responsible for reviewing the management of portfolio-level climate risks and implementing the risk management framework through a “three lines of defense” operating model.

Within this operating model, our investment teams are the first line of defense, responsible for evaluating the material environmental and climate-related risks across the investments’ strategy. Access to climate-related data sets are essential for our investment teams to manage climate-related risks and opportunities in the investment process. To identify and assess material sustainability and climate-related risks, we leverage our investment expertise in fundamental, quantitative, and passive spaces, along with internal and external sustainability-related data providers.

Teams across NTAM have the flexibility and tools to incorporate climate data from multiple sources (see Exhibit 18 for details) for investment research, portfolio management, risk, and compliance functions. When managing products on behalf of certain clients who require climate-related guidelines in their portfolios, investment teams can leverage data to integrate climate risk management further into their investment processes in order to meet our clients’ specific needs.

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**To identify and assess material sustainability and climate-related risks, we leverage our investment expertise in fundamental, quantitative, and passive spaces, along with internal and external sustainability-related data providers.**

---

NTAM's risk management function, the second line of defense, sets the direction for risk management activities and provides aggregate risk oversight and reporting in support of risk governance. The risk management function is also responsible for the design, delivery, and ongoing enhancement of climate-related investment risk monitoring in client portfolios. During 2024, NTAM enhanced investment risk oversight of relevant pooled fund products and separately managed accounts with client driven guidelines, including monitoring of portfolio level sustainability targets and exclusions. Activity undertaken includes monitoring of sustainability scoring of products versus parent benchmarks, and where applicable, assessing carbon intensity reduction against portfolio objectives.

Audit Services, the third line of defense, provides independent assurance as to the effectiveness of the Corporate Risk Management Framework of NTC.

### Regulatory Risks

NTC operates a Regulatory Change Framework (RCF), which provides a consistent approach to how we monitor, manage, and deliver regulatory change across the firm, including NTAM. Centralized monitoring informs NTAM of jurisdictional developments across topic areas, which provides early-stage identification of impacts across entities, businesses, and regions as regulations develop. Appropriate governance structures are in place to oversee regulatory change throughout the organization.

During 2024, two sustainable investing related regulatory change events impacted NTAM's operations in EMEA. These were the European Securities and Markets Authority (ESMA) *Guidelines on Fund Names using ESG or sustainability-related terms*,<sup>24</sup> and the Financial Conduct Authority (FCA) Policy Statement in relation to *Sustainability Disclosure Requirements (SDR) and investment labels*.<sup>25</sup>

<sup>24</sup> See [ESMA's website](#) for more info.

<sup>25</sup> See [FCA's website](#) for more info.

### EXHIBIT 18:

## Our ESG Data Providers, Tools and Technology

#### ESG Data providers

- Equileap
- GRESB
- ICE Data Services
- ISS ESG
- MSCI ESG Research
- Planetrics
- SDI AOP
- Sell-side research
- S&P TruCost Environmental
- Sustainalytics
- TruValue Labs
- World Bank Worldwide Governance Indicators

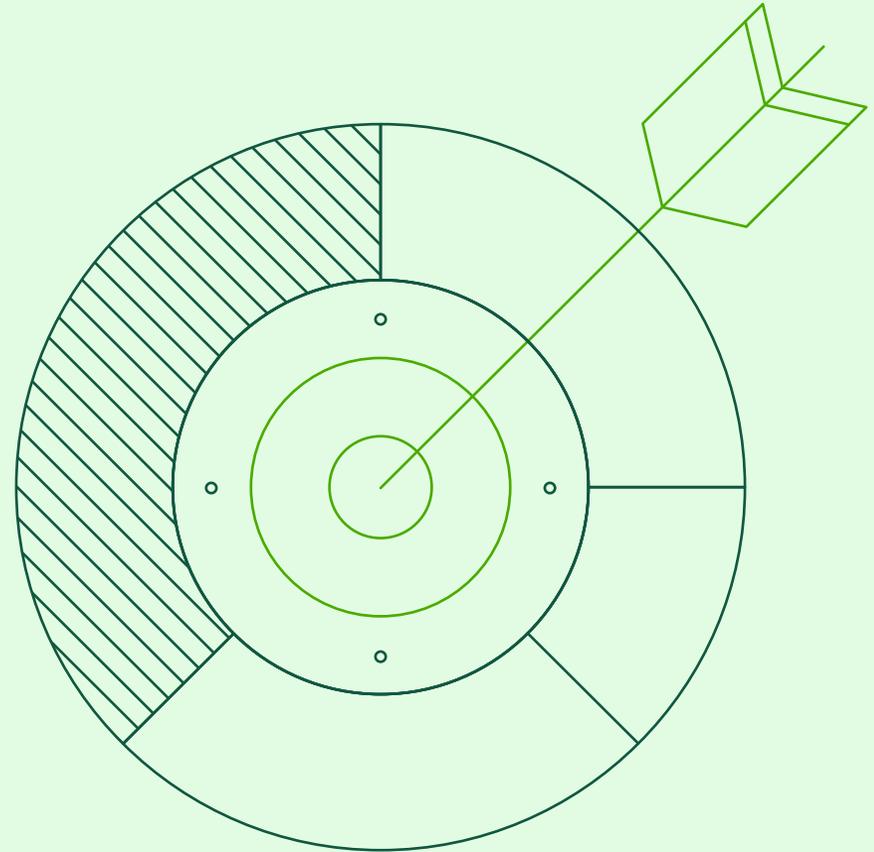
#### Tools and Technology Enablers

- Aladdin
- Bloomberg
- FactSet
- Microsoft Azure
- Snowflake

# 06

## Metrics and Targets

Metrics and targets are critical in facilitating NTAM's management of climate and environmental risks.



# Climate Metrics

NTAM uses a range of metrics to assess the environmental footprint of our global equities and fixed income strategies, enabling investment strategies to align with our clients' objectives.

These metrics include the following and definitions of these metrics are available in [Appendix 4](#):

- **Total carbon emissions (also known as financed emissions) calculated in line with Partnership for Carbon Accounting Financials (PCAF) recommendations** <sup>26</sup>
- **Weighted Average Carbon Intensity (WACI)**
- **Carbon footprint**
- **Fossil fuel reserves**
- **Potential future emissions**

NTAM values transparency with clients to raise awareness of portfolio-level exposure to climate-related risks. This is achieved through disclosing climate metrics in our standard sustainability reports and fund fact sheets.

NTAM's aggregated corporate issuers and sovereign bonds exposure is about US\$988

billion or roughly 78% of our overall AUM. Other asset classes such as cash, repurchase agreement (repo) transactions, securitized credit, agency credit, municipal credit, asset backed credit, and derivatives are currently out of scope due to a lack of reliable frameworks and data challenges.

To calculate the carbon metrics, we used our climate analytics data provider, Planetrics, to analyze two aggregated NTAM portfolios as explained below:

**1** NTAM's aggregated corporate holdings portfolio, consisting of equities and corporate bonds, constitutes about US\$852 billion, or roughly 67% of NTAM's overall AUM, as of December 31, 2024. Carbon metrics for NTAM's aggregated corporate

holdings portfolio are disclosed in Exhibit 19. These metrics are calculated in alignment with PCAF recommendations based on the securities data available from the third-party data provider. The portfolio has roughly 98% coverage, which is about US\$834 billion of portfolio AUM.

## EXHIBIT 19: NTAM Carbon Metrics for Corporates<sup>27</sup>

Metric <sup>^</sup>	Unit	Emissions Scope*	2022	2023	2024
Weighted Average Carbon Intensity (WACI)	tCO <sub>2</sub> e per US\$ million revenue	Scope 1	116	84	81
		Scope 2	24	21	20
		Scope 3	996	1,112	1,007
Total Carbon Emissions (Financed Emissions)	tCO <sub>2</sub> e	Scope 1	32,492,074	24,165,352	23,417,281
		Scope 2	6,695,219	5,319,943	5,342,026
		Scope 3	325,236,539	334,002,235	334,630,025
Carbon Footprint	tCO <sub>2</sub> e/ US\$ million AUM	Scope 1	51	33	28
		Scope 2	11	7	6
		Scope 3	510	458	401
Exposure to Carbon-Related Assets	US\$ million invested		86,938	85,990	67,904
	% of AUM		13	11	8

Sources: Planetrics and NTAM holdings as of December 31, 2022, 2023 and 2024.

\*Notes: See [Appendix 3](#) for definitions of Scope 1, 2, and 3. <sup>^</sup>See [Appendix 4](#) for carbon metrics definitions. All weights in metric tons.

<sup>26</sup> The PCAF is an industry led initiative enabling financial institutions to measure and disclose GHG emissions of loans and investments.

<sup>27</sup> The calculations and metrics disclosed are in alignment with PCAF recommendations. Exposure to carbon-related assets is calculated based on portfolio company revenue generation in industries identified in TCFD guidelines as carbon intensive. This includes Energy and Utilities.

2 NTAM's aggregated sovereign holdings portfolio, consisting of sovereign bonds only, constitutes about US\$136 billion, or roughly 11% of NTAM's overall AUM, as of December 31, 2024. Carbon metrics for NTAM's aggregated sovereign holdings portfolio are disclosed in Exhibit 20.

These metrics are calculated in alignment with PCAF recommendations based on the securities data available from the third-party data provider. The portfolio has 100% coverage, which is US\$136 billion of portfolio AUM.

For sovereign WACI and financed emissions, we report two types of Scope 1 values: including and excluding Land Use, Land Use Change, and Forestry (LULUCF) emissions in Exhibit 20. In accordance with the United Nations Framework Convention on Climate Change (UNFCCC) guidelines, adopted by PCAF, emissions should encompass key sectors and categories, including: energy, industrial processes and product use, agriculture, forestry, other land use, and waste. However, there is significant uncertainty in LULUCF emissions. In addition, countries vary in how they account for LULUCF emissions in their mitigation targets, and our clients may adopt different perspectives on the potentially offsetting role of LULUCF emissions. Therefore, we report Scope 1 emissions including and excluding LULUCF.<sup>29</sup>

### EXHIBIT 20: 2023 NTAM Carbon Metrics for Sovereigns<sup>28</sup>

Metric <sup>^</sup>	Unit	Emissions Scope*	2023	2024
Weighted Average Carbon Intensity (WACI)	tCO <sub>2</sub> e per US\$ million PPP-adjusted GDP	Scope 1 (excl. LULUCF)	244	247
		Scope 1 (incl. LULUCF)	217	218
		Scope 2	0.30	0.28
		Scope 3	65	64
Total Carbon Emissions (Financed Emissions)	tCO <sub>2</sub> e	Scope 1 (excl. LULUCF)	25,682,936	33,573,933
		Scope 1 (incl. LULUCF)	22,763,468	29,674,800
		Scope 2	31,482	38,612
		Scope 3	6,805,121	8,725,233
Carbon Footprint	tCO <sub>2</sub> e/ US\$ million AUM	Scope 1 (excl. LULUCF)	235	247
		Scope 1 (incl. LULUCF)	208	218
		Scope 2	0.29	0.28
		Scope 3	62	64

Sources: Planetrics and NTAM holdings as of December 31, 2023 and 2024.

\*Notes: See [Appendix 3](#) for definitions of Scope 1, 2, and 3. <sup>^</sup>See [Appendix 4](#) for carbon metrics definitions. All weights in metric tons.

<sup>28</sup> In 2024, our data provider, Planetrics, enhanced their sovereign carbon emissions calculation methodology to better align with the recent PCAF recommendations. This resulted in changes to the Scope 1, 2 and 3 emissions. For consistency, we recalculated the NTAM's 2023 carbon metrics for the sovereign portion of the AUM. PCAF recommends that only emissions occurring as a consequence of the domestic use of grid-supplied electricity, which is imported from another territory should be considered within Scope 2 emissions. This resulted in a sharp decline in estimated Scope 2 emissions compared to the previous methodology, which included any emissions associated with electricity production within a country.

<sup>29</sup> More details on PCAF recommendations can be found [here](#).

## Addressing Data Gaps and Challenges

While carbon emissions data, specifically Scope 1 and 2, are widely reported and have well-defined methodologies; other metrics such as Scope 3 emissions, temperature alignment, and climate NPV are still nascent, highly estimated, lack transparency, and require additional time to evolve. We believe the tools for climate-related measurement will improve in the future as increased focus on global standards of disclosure evolves. However, we are taking the following actions to address current data gaps:

**1** We leverage multiple data providers, including MSCI, ISS, Planetrics and S&P Global Trucost for climate-related information. When companies do not report emissions, we utilize estimated emissions supplied by data providers. The data is stored in our centralized ESG datahub, which goes through several data quality checks to validate the readiness of the data before it is integrated into our stewardship, portfolio management, and investment risk management processes.

**2** When companies are not covered by third party data providers and exposed to material risks, we engage with investee companies to seek enhanced disclosure of emissions data and what actions they plan to take in the short- and medium-term.

**3** We utilize proxies, wherever appropriate, to fill data gaps. For example, if the actions noted above do not result in meaningful outcomes, we could use the average emissions of the industry, or sub-industry or peers to fill these gaps.

The approach outlined above helps us overcome data gaps and provide more comprehensive coverage across our business. We understand that using proxies or estimations sometimes can result in values with varying data quality. However, we consider these approaches in a balanced and transparent way by providing measured inputs to differentiate companies across sectors.

## Targets

NTAM is evolving our net-zero aligned targets in light of advancements we are undertaking in investment stewardship together with evolving client and regulatory expectations. We will re-baseline the internal commitments to December 31, 2024, and include components related to our portfolio construction approach alongside our stewardship activities. The analysis is expected to conclude in the second half of 2025.

# 07

## Legal Entity Addendum



# Northern Trust Global Investments Limited (NTGIL)

This entity-level addendum is designed to be read in conjunction with the Northern Trust Asset Management (NTAM) TCFD Report.

NTAM operates a global asset management business with global processes and approaches. NTGIL is the UK regulated entity of this business and elected to utilize the global TCFD Strategy and Risk Management Frameworks outlined in the main content of this report. NTGIL also benefits from the global Governance and Metrics and Targets, and prepared this addendum to highlight the separate legal entity Governance and Metrics providing relevant disclosures in line with Chapter 2 of the UK's Financial Conduct Authority's (FCA) ESG sourcebook.

As of December 31, 2024, NTGIL had US\$189 billion in assets under management (AUM).

# Governance

## Board Oversight

The NTGIL Board of Directors is responsible for governing and overseeing NTGIL’s strategy and providing oversight of its operations and risks, including climate-related risks and sustainability themes. The Board is comprised of both Executive and Non-Executive Directors each of whom perform a Senior Management Function (SMF) under the FCA’s Senior Management and Certification Regime (SMCR). The Directors are subject to training and competence requirements to ensure requisite knowledge and skills remain in line with both the business and client

needs. A key component of the Board’s remit is managing regulatory risk through staying abreast of future regulatory expectations, informed by horizon scanning, and oversight of the implementation of regulatory change. Horizon scanning facilitates and informs strategic discussions on financial and other potential material impacts, allowing NTGIL to keep pace with market developments and maintain a high standard of compliance. The Board meets on a quarterly basis and receives an update from the Global Head of Sustainable Investing.

In addition to the NTGIL Board, local oversight is provided as follows:

Board/Committee	Roles and Responsibilities	Meeting Frequency
<b>NTGIL Risk and Audit Committee</b>	The Risk and Audit Committee is responsible for the oversight of risk management (including climate risk management) on behalf of the NTGIL Board.	Quarterly
<b>NTAM EMEA Business Risk Committee</b>	Provides oversight and governance for risks within the EMEA region of the Asset Management Business Unit and legal entities and includes the responsibility for reviewing sustainability risks related to climate change at an organizational and a product level.	Quarterly

This local entity oversight is supported by the wider NTAM governance framework. NTGIL Executive Directors along with other senior managers participate in global governance committees and councils as described in the [Governance section](#) of the Report.

## Management Oversight

NTGIL benefits from the management oversight mechanisms described in the NTAM Report. In particular, the Sustainable Investing Council (SIC), Proxy Committee and regional SI working groups. These are designed to capture the needs of all asset management entities within NTAM.

NTGIL also benefits from the NTAM EMEA Product Governance Forum (PGF), which considers SI integration and implementation

of sustainability regulations in relevant products and services managed by NTGIL. The PGF considers the provision of portfolio management services to new and/or existing clients. This includes how to incorporate clients’ increasing data and reporting needs, particularly in relation to material sustainability risks including climate-related metrics and targets.

Management Forum	Roles and Responsibilities	Meeting Frequency
EMEA Product Governance Forum	Provides oversight for all NTAM Products that are either manufactured or distributed in EMEA. The PGF oversees Product Approval and monitors Product Governance and meets monthly.	Monthly

# Strategy

NTAM's perspective on climate change is presented in our [Sustainable Investing Philosophy](#). This perspective is consistent with our view that investors should be compensated for the risks they take. We believe understanding and evaluating companies' performance using sustainability criteria enhances our forward-looking view of risks and opportunities.

NTGIL adopts the same approach to manage climate-related risks and opportunities from an asset management perspective as set out in more detail in the [Strategy section](#) of the NTAM Report.

## Statement on Delegated Functions

NTGIL is responsible for the management of US\$189 billion AUM, as of December 31, 2024, some of which are sub-delegated to other NTAM entities. Delegate investment managers share the same investment processes, participation in the SIC, and are subject to the same Corporate Risk Management framework as NTGIL. No assets are sub-delegated to third parties outside of NTAM.

# Risk Management

The risk management framework is adopted across NTAM with no material deviations specific to NTGIL. Information on the identification, assessment, and management of risks, including climate-related ones can be found in the [Risk Management section](#) of the NTAM report.

Investment risk oversight is performed on pooled funds and segregated mandates with client driven guidelines managed by NTGIL, including monitoring of portfolio level sustainability criteria and exclusions. Activities undertaken include monitoring of sustainability scoring versus parent benchmarks, and where applicable, assessment of carbon intensity and fossil fuel reduction against portfolio objectives.

The EMEA Business Risk Committee receives climate metrics reporting from Risk Management related to NTGIL assets under management. The purpose is to provide an entity level view of climate risks related to the investments under management, including: emissions exposure, sector and issuer level attribution, scenario alignment, and physical risk exposure by geography and hazard type.

# Metrics

NTGIL uses a range of climate metrics to develop an informed view of environmental footprint to ensure that the investment strategies align with the clients' objectives.

NTGIL utilizes total carbon emissions (also known as financed emissions) in line with PCAF recommendations; Weighted Average Carbon Intensity (WACI); carbon footprint; fossil fuel reserves; and, future potential emissions metrics from MSCI, ISS, Planetrics and S&P Global Trucost in the investment and risk analysis across the global equities and fixed income capabilities. For more information on carbon metrics definition, see [Appendix 4](#).

NTGIL's aggregated corporate issuers and sovereign bonds exposure is about US\$153 billion or roughly 81% of overall NTGIL AUM. Other asset classes such as cash, repurchase agreement (repo) transactions, securitized credit, agency credit, municipal credit, asset backed credit, and derivatives are currently out of scope due to a lack of reliable frameworks and data challenges.

To calculate the carbon metrics, we used our climate analytics data provider to analyze two aggregated portfolios as explained below:

**1** NTGIL's aggregated corporate holdings portfolio (consists of equities and corporate bonds), which constitutes about US\$149 billion or roughly 79% of NTGIL's overall AUM, as of December 31, 2024. Carbon metrics for the NTGIL's aggregated corporate holdings portfolio are disclosed in Exhibit 21. These metrics are calculated in alignment with PCAF recommendations based on the securities data available from the third-party data provider. The portfolio has roughly 95% coverage, which is about US\$142 billion of portfolio AUM.

## EXHIBIT 21: NTGIL Carbon Metrics For Corporates<sup>30</sup>

Metric <sup>^</sup>	Unit	Emissions Scope*	2022	2023	2024
Weighted Average Carbon Intensity (WACI)	tCO <sub>2</sub> e per US\$ million revenue	Scope 1	103	75	65
		Scope 2	28	24	21
		Scope 3	918	1,029	985
Total Carbon Emissions (Financed Emissions)	tCO <sub>2</sub> e	Scope 1	4,905,369	4,155,887	3,477,126
		Scope 2	1,134,144	1,111,926	981,394
		Scope 3	47,184,478	59,096,702	55,721,318
Carbon Footprint	tCO <sub>2</sub> e/US\$ million AUM	Scope 1	50	34	24
		Scope 2	12	9	7
		Scope 3	480	485	391
Exposure to carbon-related assets	US\$ million invested		11,866	10,340	8,811
	% of AUM		12	8	6

Sources: Planetrics and NTGIL holdings as of December 31, 2022, 2023 and 2024. \*Notes: See [Appendix 3](#) for definitions of Scope 1, 2, and 3. <sup>^</sup>See [Appendix 4](#) for carbon metrics definitions. All weights in metric tons.

<sup>30</sup> The calculations and metrics disclosed are in alignment with PCAF recommendations. Exposure to carbon-related assets is calculated based on portfolio company revenue generation in industries identified in TCFD guidelines as carbon intensive. This includes Energy and Utilities.

2 NTGIL's aggregated sovereign holdings portfolio (includes sovereign bonds only), which constitutes about US\$4 billion or roughly 2% of NTGIL's overall AUM, as of December 31, 2024. Carbon metrics for the NTGIL's aggregated sovereign holdings portfolio are disclosed in Exhibit 22. These metrics are calculated in alignment with PCAF recommendations based on the securities data available from the third-party data provider. The portfolio has 100% coverage, which is US\$4 billion of portfolio AUM.

### EXHIBIT 22: NTGIL Carbon Metrics For Sovereigns<sup>31</sup>

Metric <sup>^</sup>	Unit	Emissions Scope*	2023	2024
Weighted Average Carbon Intensity (WACI)	tCO <sub>2</sub> e per US\$ million revenue (or PPP-adjusted GDP)	Scope 1 (excl. LULUCF)	167	195
		Scope 1 (incl. LULUCF)	164	190
		Scope 2	1	1
		Scope 3	94	102
Total Carbon Emissions (Financed Emissions)	tCO <sub>2</sub> e	Scope 1 (excl. LULUCF)	879,463	723,649
		Scope 1 (incl. LULUCF)	865,157	706,901
		Scope 2	4,979	3,836
		Scope 3	497,200	378,164
Carbon Footprint	tCO <sub>2</sub> e/US\$ million AUM	Scope 1 (excl. LULUCF)	167	195
		Scope 1 (incl. LULUCF)	164	190
		Scope 2	1	1
		Scope 3	94	102

Sources: Planetrics and NTGIL holdings as of December 31, 2023 and 2024 \*Notes: See [Appendix 3](#) for definitions of Scope 1, 2, and 3. <sup>^</sup>See [Appendix 4](#) for carbon metrics definitions. All weights in metric tons.

<sup>31</sup> In 2024, our data provider, Planetrics, enhanced their sovereign carbon emissions calculation methodology to better align with the recent PCAF recommendations. This resulted in changes to the Scope 1, 2 and 3 emissions. For consistency, we recalculated the NTGIL's 2023 carbon metrics for the sovereign portion of the AUM. PCAF recommends that only emissions occurring as a consequence of the domestic use of grid-supplied electricity, which is imported from another territory should be considered within Scope 2 emissions. This resulted in a sharp decline in estimated Scope 2 emissions compared to the previous methodology, which included any emissions associated with electricity production within a country.

<sup>32</sup> More details on PCAF recommendations can be found [here](#).

For sovereign WACI and financed emissions, we report two types of Scope 1 values: including and excluding LULUCF emissions in Exhibit 22. In accordance with UNFCCC guidelines, adopted by PCAF, emissions should encompass key sectors and categories, including energy, industrial processes and product use, agriculture, forestry, other land use, and waste. However, there is significant uncertainty in LULUCF emissions. In addition, countries vary in how they account for LULUCF emissions in their mitigation targets, and NTGIL clients may adopt different perspectives on the potentially offsetting role of LULUCF emissions. Therefore, we report Scope 1 emissions including and excluding LULUCF.<sup>32</sup>

## Targets

Refer to the [Targets section](#) of the Main report.

# Compliance Statement

**This NTGIL addendum should be read in conjunction with the full Northern Trust Asset Management TCFD Report.**

The disclosures for NTGIL, including those in the NTAM TCFD Report, comply with the requirements in line with Chapter 2 of the FCA's ESG sourcebook.

**Richard Bartholomew**

Director, Northern Trust Global Investments Limited

# 08

## Appendices

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### APPENDIX 1

NTAM Business Legal Entities in  
Scope for TCFD Report ▶

### APPENDIX 2

Key Variables for Selected  
NGFS Scenarios ▶

### APPENDIX 3

Defining Scope 1, 2 and 3 Emissions ▶

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### APPENDIX 4

Carbon Metrics Definition ▶

### APPENDIX 5

Summary of Disclosures Aligned  
With TCFD Recommendations ▶

## APPENDIX 1

# NTAM Business Legal Entities in Scope for TCFD Report

Below are the details of the legal entities which are in scope of this TCFD report for the NTAM business:

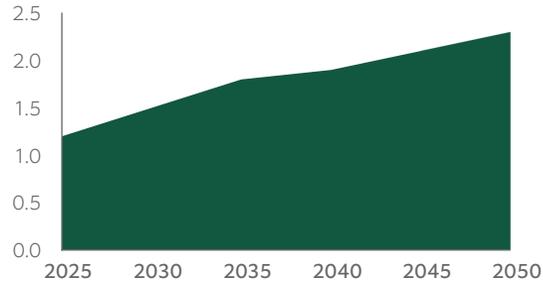
Entity Code	Legal Entity Name
NTI	Northern Trust Investments, Inc
NTFMIL	Northern Trust Fund Managers Ireland Limited
NTGIL	Northern Trust Global Investments Limited
NTAMA	Northern Trust Asset Management Australia Pvt Ltd
TNTCHK	Northern Trust Company of Hong Kong Limited
NTGIJ	Northern Trust Global Investment Japan, K.K.

APPENDIX 2

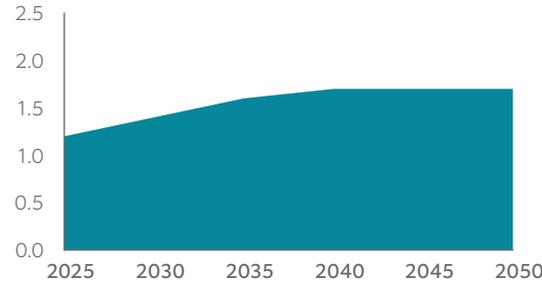
# Key Variables for Selected NGFS Scenarios

a) Projected temperature anomaly (Global mean temperature relative to pre-industrial levels, °C)<sup>33</sup>

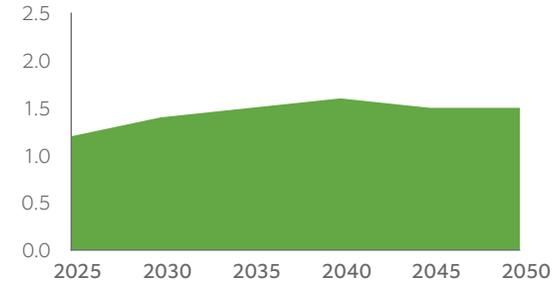
Hot House World



Delayed Transition



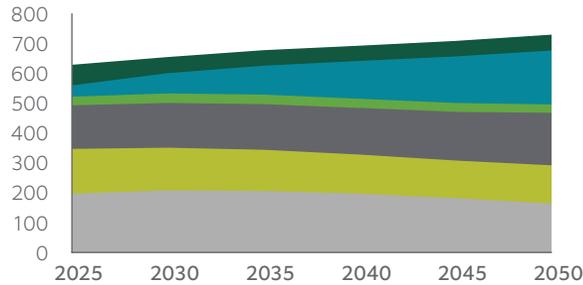
Net Zero 2050



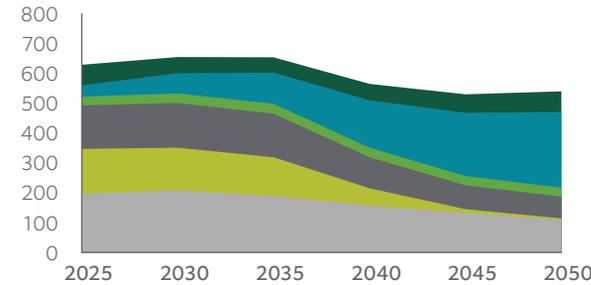
b) Projected Energy Mix (EJ<sup>34</sup>/year)

■ Biomass ■ Non-Biomass Renewables ■ Nuclear ■ Gas ■ Coal ■ Oil

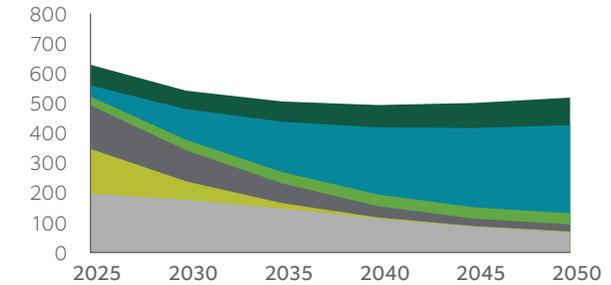
Hot House World



Delayed Transition



Net Zero 2050



Source: NGFS Technical Documentation. As of November 2024.

<sup>33</sup>The chart displays median warming impacts, with the exception of Hot House World, which shows 90th percentile temperature rise. NGFS scenarios (median warming) are aligned in 2020 at 1.2°C.

<sup>34</sup>An exajoule (EJ) is equal to 10<sup>18</sup> (one quintillion) joules.

## APPENDIX 3

# Defining Scope 1, 2, and 3 Emissions

Scope Type	Asset Class	Description
Scope 1	Corporates	Direct GHG emissions from sources owned or controlled by the company, such as company-owned vehicles and facilities.
	Sovereigns	Domestic GHG emissions from sources located within the country territory.
Scope 2	Corporates	GHG emissions from energy generation purchased or otherwise brought into the company's organizational boundary.
	Sovereigns	GHG emissions occurring as a consequence of the domestic use of grid-supplied electricity, heat, steam and/or cooling which is imported from another territory.
Scope 3	Corporates	Includes all indirect GHG emissions (not included in Scope 2) that are not produced by the company itself and are not the result of activities from assets owned or controlled by the company, but by those that it is indirectly responsible for upstream and downstream in the value chain.
	Sovereigns	Emissions attributable to non-energy imports as a result of activities taking place within the country's territory.

## APPENDIX 4

# Carbon Metrics Definition

Metrics	Unit*	Metric Description	Use Case
WACI for Corporates	tCO <sub>2</sub> e per US\$ million revenue	Calculates each portfolio company's emissions (tons of CO <sub>2</sub> equiv.) per unit of revenue (US\$ million), then aggregates each company's emissions using % weight of the holding within portfolio.	Allows best comparison between portfolios, and portfolio decomposition and attribution analysis.
WACI for Sovereign Bonds	tCO <sub>2</sub> e per US\$ million PPP-adjusted GDP	Calculates each issuer country's emissions (tons of CO <sub>2</sub> equiv.) per unit of Purchase Power Parity (PPP) adjusted GDP (US\$ million). Then aggregates figures using % weights of holdings within investment portfolio.	
Total Carbon Emissions (Also Called "Financed Emissions") for Corporates	tCO <sub>2</sub> e	Apportions total GHG emissions of a portfolio based on the ownership of issuer by enterprise value including cash (EVIC).	Measures impact of investments through absolute measure and to set emissions baseline
Total Carbon Emissions (Also Called "Financed Emissions") for Sovereign Bonds	tCO <sub>2</sub> e	Allocates total GHG emissions of issuer country based on lender exposure to the total value of borrower (the sovereign), with latter proxied by PPP-GDP.	
Carbon Footprint	tCO <sub>2</sub> e/US\$ million AUM	Calculated by dividing total carbon emissions by market value of portfolio.	Compares portfolios and/or to benchmark. Enables understanding link between money invested and associated emissions.
Exposure to Carbon-Related Assets	Expressed in US\$M or % of current portfolio value	Focuses portfolio's exposure to sectors and industries considered most GHG emissions-intensive.	Applied across asset classes. Does not rely on underlying companies' Scope 1 and Scope 2 emissions.

\*Note: All weights in metric tons.

## APPENDIX 5

# Summary of Disclosures Aligned With TCFD Recommendations

## Governance

### Describe the board's oversight of climate-related risks and opportunities

Legal entity boards provide oversight to senior management, who are responsible for setting and executing the business strategy, including sustainability and climate objectives. NTAM's Sustainable Investment Council (SIC) provides multi-disciplinary oversight of NTAM's sustainable investing practices with respect to climate change. Please refer to [Exhibits 3 & 4](#) for more details.

### Describe management's role in assessing and managing climate-related risks and opportunities

At NTAM, each legal entity and functional group across the firm are responsible for overseeing the sustainability and climate-related objectives as part of their oversight responsibilities. Consideration of sustainability and climate-related matters are led by specialist groups, as well as incorporated throughout existing responsibilities of broader functions, with oversight from management.

## Strategy

### Describe the climate-related risks and opportunities the organization identified over the short-, medium-, and long-term.

Our current view is that transition risks (i.e., Policy and Legal, Market, Reputation, Product and Services) and opportunities are particularly important in the short- (0 to 5 yrs) and medium-term (5 to 10 yrs), while physical risks (acute and chronic) are increasingly important over medium- to long-term (10–30 yrs).

### Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.

The impact of climate-related risks and opportunities in the short- and medium-term might be elevated by the transition to a low carbon economy, while, over the long-term, it might be the physical risks from extreme weather events. More details are available in [Exhibit 5 & 6](#).

### Describe how climate-related risks and opportunities are factored into relevant products or investment strategies.\*

### Describe how each product or investment strategy might be affected by the transition to a low-carbon economy.\*

NTAM does not take a one-size-fits-all approach to climate investing. Most of our climate strategies use a combination of approaches including, but not limited to: proprietary ESG screens to minimize climate-related risks (including stranded assets); reduction in carbon emissions intensity and potential carbon emissions; climate stewardship to

engage with companies to align with our climate goals and voting as a tool; and, efficiently managing the forward-looking risks and opportunities by favoring companies well-positioned for low carbon transition.

### Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

Once again this year, NTAM conducted a climate scenario analysis, assessing the resilience of NTAM's portfolio against a range of NGFS climate scenarios. The analysis applied to equity, corporate bond and sovereign bond holdings, as of December 31, 2024. The [Scenario Analysis section](#) details the scenarios assessed, methodology used, and results.

## Risk Management

### Describe the organization's processes for identifying and assessing climate-related risks.

Our risk management framework contains three inter-related elements, designed to support consistent risk identification, management, and reporting: a comprehensive risk inventory, a static taxonomy of risk categories, and a dynamic taxonomy of risk themes.

### Describe how you identify and assess material climate-related risks for each product or investment strategy. This might include a description of the resources and tools used in the process.\*

All identified risks inherent in NTAM's business activities are cataloged into the following risk categories: credit; market; liquidity; operational; fiduciary; compliance; and strategic risk. Climate-related risks are a driver across all risk categories.

### Describe engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks in order to improve data availability and asset manager's ability to assess climate-related risks.\*

The NTAM stewardship team proactively reviews the climate change risk exposure across our investee companies. We engage with companies where we have material holdings and climate risk exposure with the goal of addressing the key risks. Please refer to the [Strategy section](#) for more details on our climate stewardship approach.

### Describe the organization's processes for managing climate-related risks.

### Describe how you manage material climate-related risks for each product or investment strategy.\*

### Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.

In NTAM, global and regional business risk committees are responsible for reviewing the management of portfolio level climate risks and implement its risk management framework through a "three lines of defense" operating model. The first line of defense sits with our investment teams, who manage all the material sustainability and climate-related risks across the investment strategy. The Risk Management function is the second line of defense and sets the direction for risk management activities and provides aggregate risk oversight and reporting in support of risk governance. Audit Services, the third line of defense, provides independent assurance as to the effectiveness of the Corporate Risk Management Framework of Northern Trust Corporation (NTC).

## Metrics and Targets

### Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.

### Describe metrics used to assess climate-related risks and opportunities in each product or investment strategy.\*

### Asset managers should describe the extent to which their AUM and products and investment strategies, where relevant, are aligned with a well-below 2°C scenario.\*

NTAM utilizes a range of climate metrics to develop an informed view on climate-related risks and opportunities and to enable the investment strategies to align with clients' objectives. Currently, we use: total carbon emissions (also known as financed emissions) in line with PCAF recommendations; Weighted Average Carbon Intensity (WACI); carbon footprint; fossil fuel reserves; and future potential emissions metrics.

For alignment to a well-below 2°C scenario, please refer to the [Scenario Analysis section](#) of this report.

### Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.

### Disclose GHG emissions for their AUM.\*

Carbon exposure metrics for NTAM and Northern Trust Global Investments Limited (NTGIL) in-scope AUM as of December 31, 2022, 2023 and 2024 are disclosed in the [Metrics and Targets section](#).

### Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

With the growth of the NTAM Stewardship Team, outlined in the 2024 Milestones, and evolving client and regulatory expectations, NTAM is in the process of revising our internal net-zero aligned commitments. The ongoing analysis will re-baseline the internal commitments to December 31, 2024, and include components related to our portfolio construction approach alongside our stewardship activities. The analysis is expected to conclude in the second half of 2025.

\*Supplemental Guidance for Asset Managers.

## IMPORTANT INFORMATION

Northern Trust Asset Management (NTAM) is composed of Northern Trust Investments, Inc., Northern Trust Global Investments Limited, Northern Trust Fund Managers (Ireland) Limited, Northern Trust Global Investments Japan, K.K, NT Global Advisors, Inc., 50 South Capital Advisors, LLC, Northern Trust Asset Management Australia Pty Ltd, and investment personnel of The Northern Trust Company of Hong Kong Limited and The Northern Trust Company.

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Past performance is not a guarantee of future results. Performance returns and the principal value of an investment will fluctuate. Performance returns contained herein are subject to revision by NTAM. Comparative indices shown are provided as an indication of the performance of a particular segment of the capital markets and/or alternative strategies in general. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Net performance returns are reduced by investment management fees and other expenses relating to the management of the account. Gross performance returns contained herein include reinvestment of dividends and other earnings, transaction costs, and all fees and expenses other than investment management fees, unless indicated otherwise. For U.S. NTI prospects or clients, please refer to Part 2a of the Form ADV or consult an NTI representative for additional information on fees.

Forward-looking statements and assumptions are NTAM's current estimates or expectations of future events or future results based upon proprietary research and should not be construed as an estimate or promise of results that a portfolio may achieve. Actual results could differ materially from the results indicated by this information.

All data is as of December 31, 2024, unless otherwise stated.

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