



NORTHERN TRUST

ASSET MANAGEMENT

Northern Trust Asset Management TCFD Report 2022



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Executive Statement

Northern Trust Asset Management (NTAM) is a global investment manager entrusted with more than \$1.0 trillion of investor assets.¹ We help investors navigate changing market environments by providing them with robust capital markets research, trusted portfolio construction expertise, and comprehensive risk management solutions that address their most important concerns and goals, including the potential impact of climate change on their investment decisions.

We believe that a careful assessment of climate-related risks and opportunities is one component of an overall strategy for investors to stay informed and build sustainable value over the long term. We have been advocates for Task Force on Climate-related Financial Disclosures (TCFD) disclosure guidance and encourage companies to share key information that may be useful for investment decisions. Over the past few years, we have made substantial progress in identifying and managing climate-related risks and opportunities by:

- Increasing our stewardship efforts on climate change by encouraging companies to be more transparent about matters that are material to their long-term sustainability, such as considering publishing their climate transition plans, setting emissions reduction goals, and participating in more climate-focused collaborative engagements in both developed and emerging markets
- Signing a Net Zero commitment
- Integrating climate-related risks as one of the six themes in our Capital Markets Assumptions five-year outlook

Our commitments:

- Founding signatory to Climate Action 100+
- Signatory to Net Zero Asset Manager Initiative (NZAMI)²
- Signatory to One Planet Asset Manager Initiative³

¹Assets under management as of December 31, 2022

²NZAMI is an international group of asset managers committed to supporting the goal of Net Zero greenhouse gas emissions by 2050 or sooner.

³The One Planet Asset Managers (OPAM) initiative was launched in 2019 to support the members of the One Planet Sovereign Wealth Funds (OPSWF) in their implementation of the OPSWF Framework aim to integrate the implications of climate-related risks and opportunities within long term investment portfolios.

- Encouraging innovation in our investment options for clients with the launch of numerous strategies with integrated climate-related metrics, including an innovative Paris-aligned climate strategy offering clients a combination of responsible investment screens, Net Zero alignment, and nature-aware tilts to meet their climate goals

This inaugural report describes our approach to assessing and managing climate-related risks and opportunities, climate stewardship, and our Net Zero commitment. Our efforts to address climate-related risks and opportunities are aligned with the recommendations of the TCFD, and we are committed to implementing these recommendations in our reporting and disclosure practices. The report represents an important milestone in our journey towards providing more transparency and disclosure, and aligns to our stewardship expectations for the companies where we invest on behalf of our clients.

We are continuing to work closely with clients who view climate concerns as an important consideration in achieving their long-term investment objectives. We recognize that the climate change landscape is evolving quickly and understand that we have more to do in the future as we continue to make investments in our climate-related investment capabilities and enhance efforts to help clients consider the material implications of climate change within the portfolios. Additionally, we aim to enhance our analytical capabilities to integrate with more forward-looking climate factors and scenario analysis data across all of our investments and risk management processes — while simultaneously working with industry participants to advance reasonable and effective disclosure and preparedness in climate change efforts.

Sheri B Hawkins

Sheri B. Hawkins
Executive Vice President
Global Head of Product



Introduction

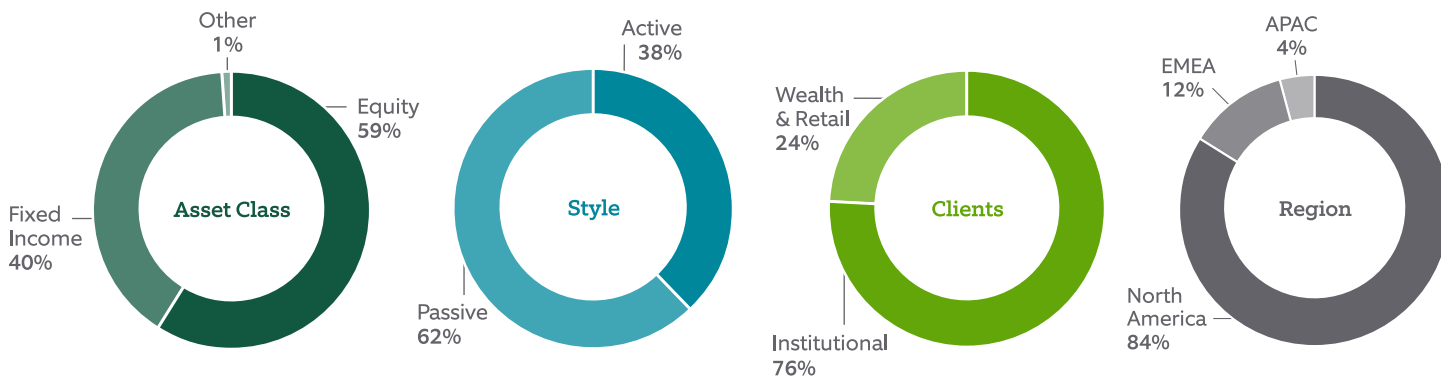
At NTAM, we align our business with the fundamental principle of sustainability: Meeting the needs of the present generation without compromising future generations' ability to meet their own needs.

NTAM is the asset management business of the Northern Trust Corporation (NTC), a leading provider of wealth management, asset servicing, asset 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 have grown to become among the world's largest asset managers, with \$1.0 trillion in assets under management (AUM)⁴, including \$137 billion in sustainable investment strategies⁵, and approximately 900 employees across 12 countries as of 2022-year end.

We are purposeful investors, which means 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 all market environments and 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.

Our research indicates that climate change poses a potential systematic risk that, if not managed properly, may have a material impact on our economy and society. We not only have an opportunity but a clear 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. Our integrated Global Sustainable Investment and Stewardship Team helps our clients align their investments with their values, where they choose to do so, and to manage their exposure to material environmental, social, and governance (ESG) issues.

EXHIBIT 1: NTAM ASSETS UNDER MANAGEMENT:



⁴Assets under management as of December 31, 2022.

⁵At 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-related risks. 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 datasets, including ESG analytics and ESG thematic investing.

Our efforts in incorporating climate-related risks and opportunities continue to grow and includes:

- **Engagement with companies and proxy voting:** We continue to enhance our ability to serve as effective stewards across all investments entrusted to NTAM. Recent expansion efforts include a dedicated team that covers specific regions, resulting in more direct engagements, particularly in emerging markets such as China, India, and South Korea. We also became collaborators in several new Climate Action 100+ (CA100+)⁶ engagements in India and South Korea. Serving as an active steward helps us produce value for our clients over the long term.
- **Sustainable investing strategies:** We enable investors to align their investment portfolios with their values and achieve their financial goals through a wide range of sustainable investing solutions. We have launched several investment solutions across asset classes integrated with climate objectives to meet our clients' evolving demand for innovative climate solutions.
- **Climate-related risk management:** We incorporate climate-related risk management into the investment process as part of our monitoring of key market trends.
- **Net Zero Commitment:** In 2022, NTAM became a signatory of Net Zero Asset Managers Initiative (NZAMI). This formative step demonstrates our commitment to reaching Net Zero portfolio emissions across in-scope assets by 2050. Refer to the [Metrics and Targets](#) section for more information on NTAM's NZAMI targets.

As regulations, data, and company-level actions continue to progress, we will 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 has been prepared to highlight relevant disclosures for the UK's Financial Conduct Authority's (FCA) PS 21/24 and is cross referenced to multiple sections of this report where relevant.

⁶Climate Action 100+ is an investor-led initiative to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change.

EXHIBIT 2: SUMMARY OF DISCLOSURES IN ALIGNMENT WITH TCFD RECOMMENDATIONS, INCLUDING GUIDANCE FOR ALL SECTORS AND FOR ASSET MANAGERS

Governance	Strategy	Risk Management	Metrics and Targets
a) Board's oversight of climate-related risks and opportunities	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	a) Describe the organization's processes for identifying and assessing climate-related risks. 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. ⁷	a) 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. ⁷ 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. ⁷
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 Investing Council (SIC) provides multi-disciplinary oversight of NTAM's sustainable investing practices with respect to climate change. Please refer to Exhibit 3 and 4 for more details.	Our current view is that transition risks and opportunities (Policy and Legal, Market, Reputation, Product and Services) are particularly important in the short and medium term (0-15 years), while physical risks (acute and chronic) are increasingly important over medium to long time horizons (15-30 years).	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. All identified risks inherent in NTAM 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	NTAM uses 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 below 2°C scenario, please refer to the Scenario Analysis section of this report.
b) Management's role in assessing and managing climate-related risks and opportunities.	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	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. ⁷	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks. Disclose GHG emissions for their assets under management ⁷ .
At NTAM, each legal entity and functional groups across the firm are responsible for overseeing the sustainability and climate-related objectives as part of their oversight.	The analysis of NTAM's AUM (consisting of equities and corporate bonds) sector-level emissions intensity shows that the laggard companies in Energy, Industrials, Materials and Utilities sectors may face higher costs to transition as climate-related regulations ramp up globally. Transition risks were higher in emerging market companies, highlighting the need for more collaborative engagements.	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.	Carbon exposure metrics for our AUM as of December 31, 2022 are disclosed under Exhibit 12.

⁷Supplemental Guidance for Asset Managers

EXHIBIT 2 CONTINUED: SUMMARY OF DISCLOSURES IN ALIGNMENT TO TCFD RECOMMENDATIONS GUIDANCE FOR ALL SECTORS AND FOR ASSET MANAGERS

Governance	Strategy	Risk Management	Metrics and Targets
	Describe how climate-related risks and opportunities are factored into relevant products or investment strategies. ⁸ Describe how each product or investment strategy might be affected by the transition to a low-carbon economy. ⁸	b) Describe the organization's processes for managing climate-related risks. Describe how you manage material climate-related risks for each product or investment strategy. ⁸ c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.
	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-related stewardship to encourage companies to develop and disclose climate goals by using engagement and voting as a tool and efficiently managing the forward-looking risks and opportunities by favoring companies well-positioned for low carbon transition.	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 ESG 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.	NTAM has signed on to Net Zero Asset Managers initiative in 2022 and has set interim targets in 2023 committing 10.8% of AUM, to be aligned with the goal of achieving Net Zero GHG emissions by 2050.
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.		
	NTAM is exploring solutions and developing a stronger understanding of the use of climate scenario analysis before formal integration into the investment and risk management process. Members of the sustainable investing, risk, and investment teams have considered various climate scenarios to better understand the evolution of the measurement and management of transition and physical risks and opportunities across sectors, regions, and time horizons. To date, the work has been focused on use within individual strategies and to provide additional disclosures to our clients. We look to expand upon these use cases in the future across the broader business. Please refer to the Scenario Analysis section of this report.		

⁸Supplemental Guidance for Asset Managers

GOVERNANCE

03

Board Oversight

Management Oversight



Governance

The governance we employ across NTAM creates a framework for identifying and managing the impact of climate change while strengthening accountability to our stakeholders.

Board Oversight

NTC’s Board and its committees engage in active oversight of sustainability and ESG matters of significance (including climate-related risks and opportunities) to the Corporation and its subsidiaries. To enhance the operational oversight of climate-related matters, in 2022, NTC named a Chief Sustainability Officer and a Director of Climate Risk, further demonstrating the ongoing commitment to managing risks and opportunities in this space.

The Sustainable Investing Council (SIC), chaired by the Global Head of Sustainable Investing and Stewardship, provides multidisciplinary oversight across sustainable investing practices, including climate change.

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.

The SIC provides multi-disciplinary oversight of NTAM’s sustainable investing practices, and the NTAM Asset Management Risk Committee (AMRC) which is the senior risk committee, provides oversight and governance for risks, including climate change within NTAM and its legal entities.

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

EXHIBIT 3: OVERVIEW OF NTAM’S GOVERNANCE STRUCTURE

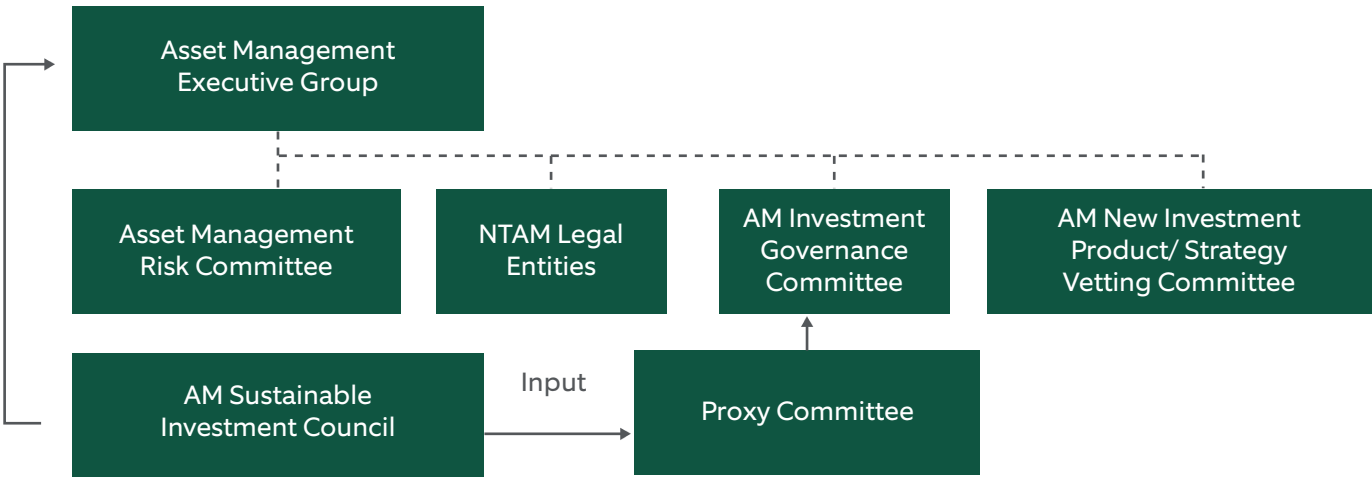


EXHIBIT 4: DESCRIPTION OF NTAM'S GOVERNANCE COMMITTEES

Committee Name	Responsibilities
NTAM Legal Entity Boards	Oversight of each legal entity's business and execution.
Asset Management Risk Committee (AMRC)	The primary purpose of the committee is to oversee the management of risks (including climate change risks) within NTAM globally and for each legal entity. The AMRC is chaired by the NTAM Chief Risk Officer (CRO) with membership that includes the President of NTAM, Asset Management Executive Group, Legal, Compliance, Internal Audit, and Finance support team as well as the NTC Chief Risk Officer (CRO) and Chief Compliance Officer. The AMRC meets on a monthly basis or as designated by the Chair.
New Investment Product/Strategy Vetting Committee (NIPSV)	NIPSV Committee reviews and approves new investment capabilities, strategies, or products for potential development, launch, and distribution by NTAM, including strategies with climate considerations.
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. This committee meets quarterly or as designated by the Chair.
Sustainable Investing Council (SIC)	SIC provides multi-disciplinary oversight of NTAM's sustainable investing practices including climate considerations within portfolio construction. The SIC purview includes oversight of the ESG integration process, review and approval of memberships such as the Net Zero Asset Managers Initiative (NZAMI). NTAM Global Head of Sustainable Investing & Stewardship serves as the chair; membership includes representation of senior leaders from relevant business units and functions such as corporate sustainability, product development and management, investments, portfolio management, risk, compliance, business development, proxy voting, and engagement who meet on a bi-monthly basis to review and approve various sustainable investing agendas. Climate change considerations are included in our broader sustainable investing agenda and covered separately, in detail, on an as-needed basis.
Proxy Committee	This committee is responsible for the content, interpretation, and application of the Northern Trust Proxy Voting Policies, Procedures and Guidelines, and the Northern Trust Asset Management Engagement Policy. These policies lay out how NTAM engages with companies on climate-related matters and votes on climate proposals across the companies we invest in.

Management Oversight

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

Below are the role summaries of the groups responsible for the oversight and execution of NTAM's 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 business strategic objectives. This group also oversees business activities and monitors performance against strategic, financial, and risk management parameters and oversees 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 Global Sustainable Investing and Stewardship Team is comprised of dedicated specialists who serve as a center of excellence across NTAM, ensuring we understand and continuously improve best practices in ESG integration and stewardship. The SI Team provides analysis and insights on emerging ESG themes and monitors critical issues, industry trends, and regulatory developments.

In order to deliver specialist knowledge, the team is divided into three areas with dedicated sustainability responsibilities:

1. **ESG research and integration** – This team is responsible for working with portfolio managers and research analysts to facilitate ESG integration across asset classes, including consideration of material climate-related risks and opportunities, development and maintenance of proprietary ESG ratings, definition of ESG methodologies across investment capabilities, and ongoing product innovation. Over the past two years, this team has worked with various investment groups to help integrate material ESG factors across asset classes and has developed multiple investment solutions, with appropriate climate goals designed to help clients achieve their climate objectives.
2. **Stewardship** – This team is responsible for defining and directing company and industry-level engagements based on priorities across our investee companies. This team provides expertise for engagement efforts, shapes the proxy voting and engagement policies, and exercises the proxy voting rights in a manner that is in the best interests of clients as we seek to protect and grow their capital over the long term.
3. **Client strategy** – This team is responsible for engaging with clients to help them design and meet ESG objectives within their investment strategies. The team partners with a broad range of functions and groups, both internally and externally, to advance our sustainability and climate thought leadership through education, industry advocacy, and commitment to ESG standards.

ESG champions across other functions

As a large global asset manager, we have an extended ESG champion network of more than 50 additional 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. These ESG champions keep us informed about how emerging ESG themes, industry trends, and regulatory developments may impact our firm, clients, and investment strategies. They can leverage the resources of our SI Team and participate in various committees and regional ESG working groups, with oversight and accountability provided by the SIC.

As the market evolves through development and evolution of ESG standards, regulations, and access to data, NTAM aims to continue enhancing our internal governance approach.

STRATEGY

04

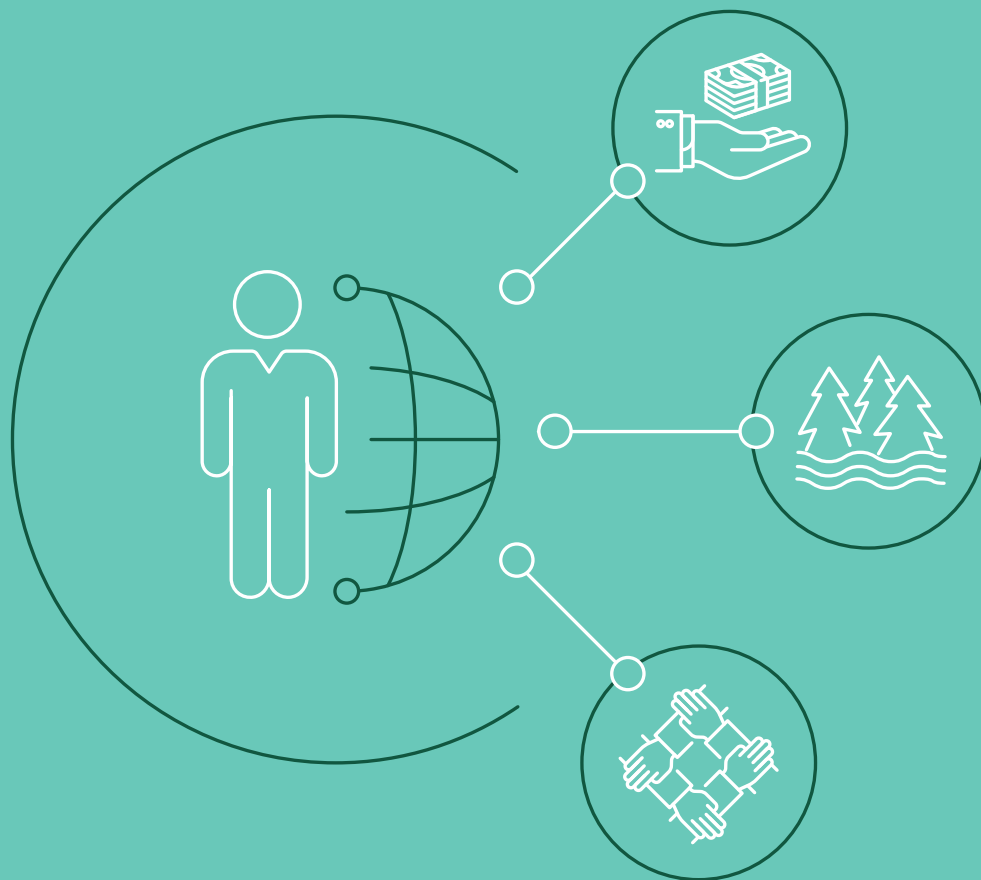
NTAM's Sustainable Investment Philosophy
ESG Integration Approach

Net Zero Asset Managers Initiative Commitment

Climate-focused Investment Solutions

Climate Stewardship

Industry Advocacy



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 ESG criteria enhances our forward-looking view of risks and opportunities.

NTAM's Sustainable Investing Approach

Our research indicates climate-related risks pose a potential systemic risk to financial markets that may affect the economy and risk-adjusted returns for investors in global markets.

Our investment solutions purposefully employ a robust four-step investment approach to consider these risks:

1. **Analyze** – We leverage leading industry-standard frameworks, such as Sustainability Accounting Standards Board (SASB) Standards and the TCFD recommendations, along with our proprietary frameworks to analyze climate-related risks and opportunities. These resources help us identify material climate change factors and their impact over different time horizons.
2. **Measure** – We utilize multiple tools, including external best-in-class ESG data sets, proprietary research and analytics, custom exclusionary screens, and measurements to evaluate how companies perform against various climate factors. Measuring historic and future climate-related risks and opportunities helps us make informed decisions.
3. **Monitor** – We regularly assess the securities in our sustainable investment portfolios where climate-related risks are relevant and material. Our monitoring process helps us proactively identify the climate-related risks to which we are exposed and take appropriate actions.
4. **Engage** – Stewardship is an integral part of our investment process, through which we identify long-term risks that have a potential to pose challenges to shareholder value, and then engage with those companies on specific issues.



Sustainable investing is a strategic priority of NTAM, with climate change and its associated risks and opportunities assessed and considered when developing our firm-wide 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 demand around integration of climate considerations in portfolios. This is achieved through the implementation of our climate-focused strategic pillars explained below:

- 1. **ESG integration across asset classes** focuses on climate change, including:
 - a. Identifying climate risks and their impact over different time horizons
 - b. Assessing transition risks and opportunities
 - c. Performing scenario analysis and portfolio resilience
- 2. **NTAM Net Zero Asset Managers Initiative (NZAMI) commitment**
- 3. **Innovation across our climate-focused investment solutions, including:**
 - a. Ongoing enhancements to the NTAM custom screens to align with industry developments around climate change
 - b. Creating innovative climate-focused investment strategies
- 4. **Stewardship** focuses on:
 - a. Engagement with investee companies
 - b. Proxy voting in line with long term value creation
- 5. **Industry advocacy and participation in industry associations**
NTAM understands regulatory risk is a key aspect of managing climate-related risks and opportunities. We participate in various industry associations to better understand and inform the integration of climate considerations in the portfolios we manage.
- 6. **Investing in resources, tools, and technologies**

Our ESG Integration Approach

We believe material ESG factors are pre-financial indicators that may affect a company’s future financial viability and clients’ long-term risk-adjusted investment returns. NTAM defines ESG integration as the systematic inclusion of material ESG factors as additional inputs into investment analysis and decision-making. ESG factors encompass a wide range of issues including climate change.



Identifying the impact 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 the returns of clients.

The materiality and impact of climate change factors in the NTAM 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 taken into account 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:

- **Transition Risk** – Climate-related transition risks may arise as the world moves from a reliance on carbon-based energy toward lower-carbon alternatives. These risks include potential 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 create meaningful shifts across the economy impacting the companies in which we invest.

Our current view is that identifying and managing transition risks and opportunities are particularly important in the short and medium term (0 to 15 years) and continues to be our area of focus.

- **Physical Risk** – Climate-related physical risks arise from the direct impacts of a changing climate. Physical risks are both acute and chronic. Acute physical impacts represent extreme weather or climate events like flooding. Chronic impacts represent longer-term shifts such as temperature increase or sea level rise. 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 more important over longer time horizons (> 15 years), although extreme weather events could have near-term impacts.

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

EXHIBIT 5: SUMMARY OF KEY CLIMATE-RELATED TRANSITION OPPORTUNITIES

Opportunities	Description	Anticipated Financial Impact ⁹	Time Horizon
Product and Services	Increasing demand from clients for climate solutions may help NTAM generate new business through its product offerings.	Increased Revenue	Short to Medium term (0-15 years)
Markets	As consumer demand for Net Zero solutions increases in the market, NTAM's Net Zero commitment may resonate well with client needs.	Increased Revenue	Short to Long term (0-30 years)

⁹The financial impact anticipation cannot be guaranteed as these are driven by multiple factors not in our control

EXHIBIT 6: SUMMARY OF KEY CLIMATE-RELATED TRANSITION RISKS

Risk	Description	Anticipated Financial Impact ¹⁰	Time Horizon
Policy and Legal	Increased 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 might not be favorable to NTAM.	Reduced revenues	Short to Medium term (0-15 years)
	New policies could also 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)
Market	Climate-related risks could cause asset value fluctuations, which may result in a decline in NTAM AUM.	Reduced revenues	Medium to Long term (5-20 years)
Reputation	Increasing scrutiny around climate-related activities and a potential lack of action from NTAM could create reputational risks impacting our AUM.	Reduced revenues	Short to Medium term (0-15 years)
Physical	NTAM offices could be impacted by adverse climate impacts however, the financial impact is limited as NTAM leases most of its facilities. Climate adaption would also affect the expenses due to impact of physical risks.	Increased expenses	Medium to Long term (15-30 years)

Assessing transition risks and opportunities

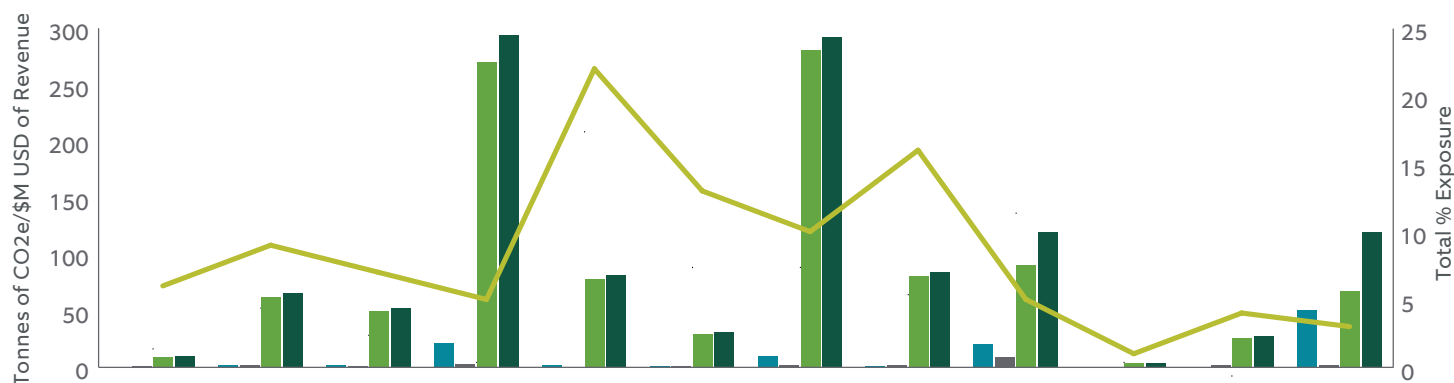
It is important for NTAM to continue to evolve its understanding of both the impact on the investments as well as company-level exposures to potential climate-related risks and opportunities. We recognize that the transition to a low-carbon economy could have significant implications on our business, stakeholders, and the companies in which we invest. This transition also presents an opportunity for companies to benefit through climate-related solutions as shifts in the market, regulations, and client preferences evolve. By leveraging our global research capabilities, NTAM is working towards a stronger understanding of the balance between potential risks and opportunities arising from the transition across our aggregate portfolio holdings.

¹⁰The financial impact anticipation cannot be guaranteed as these are driven by multiple factors not in our control

Below are some of the takeaways:

- To obtain a better understanding of our carbon emissions exposure across our AUM, we have created an aggregated portfolio consisting of listed global equities and corporate bonds, which represents about 65% of NTAM AUM (as of December 31, 2022)¹¹ and have calculated the sector level contribution of the portfolio carbon emissions through Weighted Average Carbon Intensity (WACI) metric.¹² The analysis of the aggregated portfolio's sector-level emission intensity shows that the Energy, Industrials, Materials, and Utilities sectors contribute about 70% of emissions intensity but collectively represents only 23% of the value of the aggregated portfolio. This analysis demonstrates that laggard companies in these sectors may face higher costs to transition as climate-related regulations ramp up globally. For definition of Scope 1, 2, and 3, please refer to [Appendix 2](#).

EXHIBIT 7: EMISSIONS INTENSITY BY SECTOR FOR NTAM AGGREGATED PORTFOLIO¹¹



	Communication Services	Consumer Discretionary	Consumer Staples	Energy	Financials	Healthcare	Industrials	I.T.	Materials	Others	Real Estate	Utilities
Scope 1	0.14	2.09	2.07	21.65	2.27	1.00	9.62	1.22	20.46	0.02	0.56	50.26
Scope 2	0.83	1.93	1.09	2.53	0.60	1.12	1.63	2.21	8.64	0.01	1.64	1.78
Scope 3	8.83	61.85	49.44	269.68	78.34	29.04	280.47	80.84	90.70	3.86	25.49	67.21
Total (1+2+3)	9.80	65.87	52.61	293.86	81.21	31.16	291.71	84.27	119.80	3.89	27.69	119.25
Portfolio Weight	6%	9%	7%	5%	22%	13%	10%	16%	5%	1%	4%	3%

Source: ISS ESG, NTAM holdings as of December 31, 2022

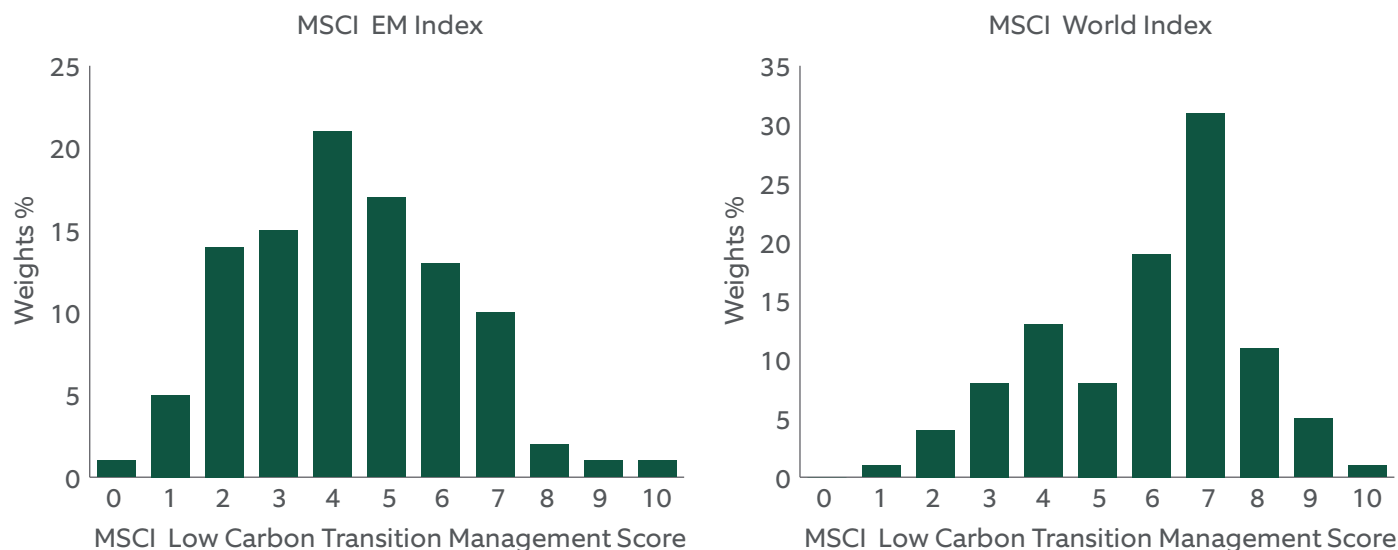
- As a global investor, NTAM has exposure to both developed and emerging market companies. In order to further enhance the understanding of our overall exposure to transition risks and opportunities, an analysis was undertaken to assess company level preparedness between the broad developed market (MSCI World Index) and emerging market (MSCI Emerging Markets Index) universes as of December 31, 2022. The purpose was to gain a more granular understanding of companies' exposures to transition risks in both developed and emerging markets. For this analysis we have used the MSCI Low Carbon Transition Management Score, which is on a scale of 0 to 10 where a higher score indicates that a company is better prepared to manage risks and opportunities related to the Low Carbon Transition.

The exercise showed that more than 70% of the MSCI Emerging market companies by market capitalization have a transition score of less than 6 compared to the 34% of the developed market companies. This implies that emerging market companies could face relatively higher transition risks and financial impacts than developed market counterparts in the short and medium term.

¹¹WACI metric was calculated across NTAM's aggregated equity and fixed income (corporates only) portion of the AUM excluding other asset classes such as sovereign credit, cash, agency credit, municipal credit, asset backed credit, and derivatives.

¹²WACI calculates each portfolio company's emissions (measured in tonnes of CO₂) per unit of revenue (measured in million USD), and then aggregates them using the percentage weight of the holding within the portfolio.

EXHIBIT 8: TRANSITION RISK EXPOSURE OF MSCI WORLD AND MSCI EMERGING UNIVERSE



Source: MSCI, NTAM holdings as of December 31, 2022

Through understanding the broad holdings across all NTAM strategies as well as the climate-related intricacies seen across the various markets in which NTAM invests, better decisions can be made in portfolio construction and more focused engagements with investee companies can be pursued. NTAM has different approaches to handle exposure to high carbon intensive sectors and transition risks and opportunities in the portfolio construction process based on the end goals for the client or fund vehicle. For example, in several strategies, NTAM employs measures of company preparedness for the transition to a low carbon economy and can create a positive tilt towards those companies that show greater progress in the resulting portfolios.

Scenario analysis and portfolio resilience

Climate-related events and their associated risks are subject to significant uncertainty in terms of timing, frequency, and severity. Forward-looking assessment approaches aid in evaluating potential portfolio impacts of climate-related risks, but these scenario analyses can be nuanced and there are limitations in data availability and consistency/comparability. Nonetheless, we believe these approaches will evolve in the near future and may add value towards the identification and assessment of risk exposures and potential impacts of physical and transition risks over different time horizons.

NTAM is exploring solutions and developing a stronger understanding of the use of climate scenario analysis before formal integration into the investment and risk management process. Members of the sustainable investing, risk, and investment teams have considered various climate scenarios to better understand the evolution of the measurement and management of transition and physical risks and opportunities across sectors, regions, and time horizons. To date, the work has been focused on use within individual strategies and to provide additional disclosures to our clients. We look to expand upon these use cases in the future across the broader business.

Currently, NTAM uses ISS ESG climate scenario analysis tool, which span short, medium, and long term time horizons and form an interpretation as to how the results may impact the business. The scenario utilized is the International Energy Agency Sustainable Development Scenario (SDS), which is a normative scenario in which the world meets the Paris Agreement goals with a 50% probability of limiting the temperature rise to less than 1.65°C¹³. The output of the ISS scenario analysis tool measures the alignment of the forecasted carbon emissions of the strategy and its key sectors with the SDS carbon budget¹⁴.

Forward-looking assessment approaches are crucial to better evaluate the unprecedented nature of climate change. Scenario analysis is an important tool for assessing the potential financial implications of climate change over different time horizons.

NTAM continues to build upon the usage of scenario analysis capabilities. Below are the findings thus far when applying the SDS scenario analysis on one of our existing investment strategies with climate objectives:

1. The strategy is within the assigned SDS carbon budget until 2050 and is 31% below the SDS budget in 2050. In contrast, the benchmark¹⁵ exceeds the SDS budget by 30% in 2030 and 295% in 2050. This implies that the strategy's projected carbon emissions until 2050 are within the carbon budget limit of the SDS scenario.
2. The strategy had a potential temperature increase of 1.5°C relative to the benchmark's potential temperature increase of 2.7°C. This implies that the strategy in its current state is in alignment with the SDS scenario until 2050 and decarbonizing along the 1.5°C pathway.
3. All the key sectors were within the strategy's allocated budget range except for conventional electricity which exceeds by 16% in 2050. This information guides us to focus on the companies in the conventional electricity sector contributing to the overshoot for a potential future engagement.

Summary and our focus areas for future.

The outcomes of the scenario analysis performed on the strategy are encouraging and showcase the resiliency of the investment approach to climate-related impacts; however, there is still more work to do to look more broadly across our strategies to better understand how climate change impacts vary in different scenario pathways, and how to convey those results to our clients. Over the near term, NTAM aims to:

- Help our clients understand the nature of climate impact embedded in our investment solutions.
- Adopt additional distinct scenario analysis with different probable outcomes (more than 2°C and possibly 3°C scenarios).
- Continue climate-related engagement efforts with portfolio companies through participation in Climate Action 100+ and the Net Zero Engagement Initiative¹⁶.
- Build upon the differentiated investment strategies and products, which support Net Zero and the transition to a low carbon economy.
- Advocate for best practices through engagements with regulators, policy makers, and industry participants.

¹³The Paris Agreement is a legally binding international treaty on climate change. Its overarching goal is to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

¹⁴A carbon budget is the cumulative amount of carbon dioxide (CO₂) emissions permitted over a period of time to keep within a certain temperature threshold.

¹⁵Content below: Broad market Index without any climate objectives

¹⁶The Net Zero Engagement Initiative aims to support investors aligning their portfolios with the goals of the Paris Agreement.

NTAM’s Net Zero Asset Managers Initiative Commitment

A Net Zero commitment is an important step and a core part of our climate strategy to enable us to remain aligned with the growing needs of our clients and partner with them on their transition journey. Additional details of the NTAM NZAMI commitment can be found in the [Metrics and Targets](#) section.

Climate-focused Investment Solutions

NTAM offers a broad range of investment solutions across the sustainable investing spectrum. Just under 14% of total AUM, or \$137 billion, have sustainable elements embedded within the portfolio construction process as of the end of 2022.

EXHIBIT 9: OUR SPECTRUM OF ESG CAPABILITIES

Exclusions	The exclusion from a fund or portfolio of certain sectors, companies or practices based on specific ESG criteria and/or minimum standards of business practice based on international norms like United Nations Global Compact principles
ESG Integration	Incorporating ESG considerations across business activities and investment valuation
Best-in-class	Strategy which invests in a defined percentage of companies / issuers that lead in their peer groups based on ESG criteria
Thematic	Strategy invested in targeted ESG themes and often seek an environmental or social outcome, such as clean technologies
Impact	Targeted investments aimed at generating measurable, beneficial social or environmental outcomes as well as generating financial return

Given 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 solidify this thinking into 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:

- Proprietary ESG 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 the forward-looking risks and opportunities by favoring companies well-positioned for the low carbon transition

In order to cater to different client objectives, our products include a wide range of climate-based strategies such as the Northern Trust World Natural Capital Paris-Aligned Index Strategy, Northern Trust Global Bond ESG Climate Strategy, and a range of climate ETFs in developed and emerging markets.

Below outlines our proprietary custom screens, climate stewardship approach, and a case study on the recently launched Northern Trust World Natural Capital Paris-Aligned Index Strategy.

NTAM Custom ESG screens

NTAM leverages an exclusionary screening process to help develop strategies that align with investors' goals and/or investment beliefs to serve as the base for the investible universe. The custom ESG screens contain various criteria across key thematic risks such as human rights, board diversity, climate change, etc. However, this section will focus only on climate-specific factors.

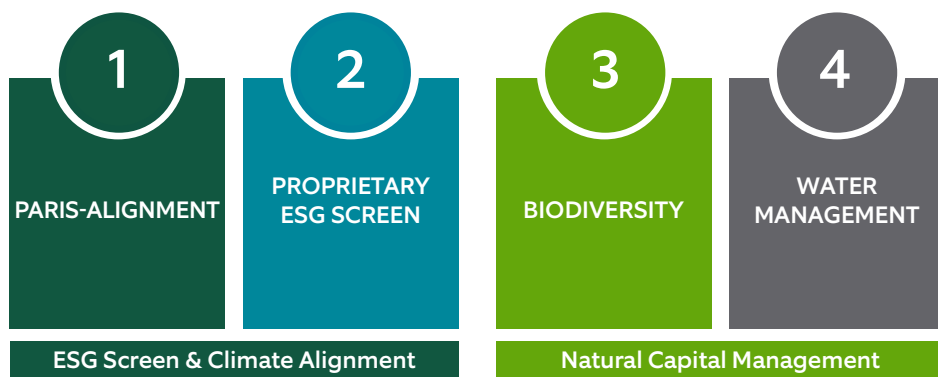
The screens have a refined and forward-looking view around thermal coal, unconventional oil and gas, arctic oil, and shale production as a recognition that thermal coal production and power generation are being phased out and no longer can maintain a strong investment thesis for long-term investors. This thesis ties with the recent policy and regulatory developments around climate change, all of which emphasize the need to transition to low carbon technologies and the growing risk of stranded assets.

Our approach helps in managing both stranded asset and transition risks by integrating a combination of activity-based and forward-looking transition risk scores to exclude companies with high exposure to stranded asset risks and low preparedness in managing transition risks.

As part of NTAM's Net Zero commitment, evolving global climate regulations, and shifting client preferences, the custom ESG screens will continue to evolve to remain in alignment with our commitments and industry developments.

NTAM introduces investment solution to address climate change and natural capital

Overview: Our recently launched Northern Trust World Natural Capital Paris-Aligned Index Strategy efficiently integrates climate and natural capital considerations. It combines alignment with the 1.5°C decarbonization pathway¹⁷, alignment with the Paris Agreement, nature-aware tilts and proprietary NTAM Custom ESG exclusions, acknowledging the intrinsic synergies between climate change and biodiversity loss.



¹⁷The 1.5°C decarbonization pathway aims to limit the global temperature increase to 1.5°C above pre-industrial levels.

Building Blocks of the strategy: The strategy aims to closely match the risk and return characteristics of the MSCI World Natural Capital Paris-Aligned Equity Select Index, a customized index that screens companies linked to ecosystem loss and water pollution, and to those that are mis-aligned with UN SDGs¹⁸ 14 (Life Below Water) and SDG 15 (Life on Land). There is an uplift in exposure to companies with nature-related transition opportunities including those with environmental impact solutions revenue and positive transition preparedness considering land use and biodiversity, resource use and emissions, effluents, and waste.

Result: The strategy fosters Net Zero ambitions and create synergies to tackle both climate change and nature degradation.

NTAM CLIMATE STEWARDSHIP

Our engagement approach with investee companies on climate change

Climate-related stewardship plays a key role in meeting climate objectives across our strategies over the medium to long term. NTAM has incorporated climate considerations into its proxy voting and engagement policies, which are employed across the portfolio of companies where delegated to NTAM. More specifically, NTAM expects investee companies to incorporate climate-related issues into their business models, where relevant, and encourages them to provide transparency and disclosure around these actions.

NTAM prioritizes its engagements with purpose. That is, NTAM identifies the areas that represent the most significant threats to valuation and the sustainability of company business models. Climate change is one such area and is one of the key areas of priority in our engagement strategy. When a company has been identified for engagement, NTAM takes the following steps:

- NTAM contacts companies with its concerns and requests dialogue with representatives of the board of directors.
- If a company fails to make sufficient progress during the time period outlined, we may escalate by voting in support of a related shareholder resolution, voting against the re-election of certain directors, or taking some other investment action.

We are a founding member of Climate Action 100+, which brings together 700 investors representing \$68 trillion in assets. We support the ongoing effort calling for more than 160 companies with the highest greenhouse gas emissions to reduce their emissions to Net Zero by 2050.

In 2022, out of 3,945¹⁹ engagements undertaken, approximately 34% were environmentally focused. NTAM co-led engagements with companies such as CEZ AS, Glencore, and National Grid in Europe. Additionally, NTAM participated as collaborating investor on engagements with Boeing, Duke Energy, Exelon, ExxonMobil, General Electric, Ford Motor Company, Shell, South32 Ltd, Polska Group Energetyczna S.A. (PGE), Sasol, and Toyota Motor Corporation. NTAM joined the working groups for Coal India, Dangote Cement, and KEPCO. Also in 2022, NTAM joined The Institutional Investors Group on Climate Change (IIGCC) new Net Zero Investment Engagement Initiative aiming to expand our collaborative engagements on climate change issues.

¹⁸The United Nations Sustainable Development Goals (SDG) are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to climate change and environmental degradation.

¹⁹Total engagements include 86 direct engagements by NTAM and 3,859 engagements through outside engagement partner firm EOS at Federated Hermes.

Below is a case study on how NTAM engaged with CEZ Group to achieve a Net Zero milestone:

Case Study

THE CHALLENGE

Czech utility CEZ Group has historically generated much of its electricity from coal, a significant contributor to greenhouse gases. According to the Climate Action 100+ Net Zero Company Benchmark²⁰, CEZ hadn't set targets that aligned with the Paris Agreement goal of limiting the global temperature rise.

WHAT WE DID

As part of Climate Action 100+ and an owner of CEZ equities and bonds, we co-led the engagement in 2022, along with the two previous years, to encourage CEZ to set targets and goals to achieve Net Zero emissions.

THE OUTCOME

Climate Action 100+ confirmed in 2022 that CEZ Group's 2030 targets aligned with the Paris Agreement's goals. We applauded CEZ on reaching this key milestone, a positive outcome achieved through constructive dialogue over the years between CEZ and our engagements in collaboration with members of Climate Action 100+. We look forward to continuing the dialogue with CEZ on other climate priorities.

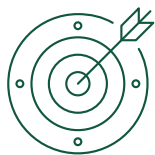
Proxy voting approach on climate change

As a large asset manager representing permanent capital in more than 10,000 companies globally, NTAM's voting is done in a manner consistent with the best interest of our clients and to optimize the value of the investment. In 2022, we voted in favor of shareholder resolutions when companies had not progressed sufficiently on priority issues. While supporting shareholder resolutions communicates our views clearly to company leaders, many resolutions are non-binding, which may hold little sway with management. We have found that executives are more likely to take our concerns seriously when we vote against directors who lead board committees, such as those responsible for ESG risks, climate change, or compensation. In 2022, we:

- Supported 83% of environmental shareholder resolutions based on ShareAction's Voting Matters 2022 report.
- Supported a majority of the shareholder climate-related resolutions such as adopting a policy consistent with International Energy Agency (IEA)'s Net Zero emissions by 2050 scenario and setting emission reduction targets aligned with Paris agreement goals. More details of our voting on climate-related proposals can be found in Appendix 2 of our [2022 Stewardship Report](#).

²⁰Net Zero Company Benchmark was launched in March 2021 to assess the performance of the world's largest corporate greenhouse gas emitters on their Net Zero transition.

EXHIBIT 10: A YEAR OF STEWARDSHIP

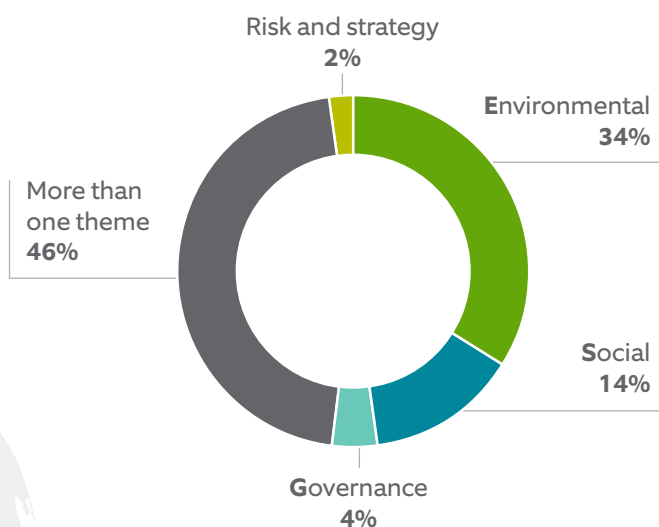


3,945
total engagements²¹

Top 25 global asset manager
on environmental, social and governance
shareholder resolutions

as ranked by responsible investing advocate ShareAction in its *Voting Matters 2022* report released in January 2023. The rankings included *Investment and Pension's Europe 2022* top 500 asset managers based on the following criteria: largest 35 asset managers based on AUM, next largest 35 European asset managers based on AUM, and next largest 12 U.K. asset managers based on AUM.

Themes of Direct Engagement



based on 86 direct engagements by NTAM

Supported

83%

of environmental shareholder
resolutions based on ShareAction's
Voting Matters 2022 report

Additionally, we have formalized [proxy voting policies](#), procedures, and guidelines to support a thoughtful approach to proxy voting. For more information on how our engagements and proxy voting makes an impact, please refer to our [2022 Stewardship Report](#).

Industry Advocacy

NTAM is involved with various industry organizations to better understand and support climate initiatives. These include a range of industry initiatives that are aimed at reducing systemic risks linked to long-term sustainability, including climate change. This includes our membership in the International Sustainability Standards Board's (ISSB) Investor Advisory Group, which promotes more complete corporate disclosure of material sustainable business practices. Such efforts underscore our commitment to engaging in policy and regulatory initiatives to promote high standards.

In addition to participating and supporting industry organizations, NTAM remains closely involved in ongoing policy and regulatory developments via active engagement with policymakers, industry and standard setting bodies.

For example, in 2022 we submitted letters to both the [ISSB](#) and the [U.S. Securities and Exchange Commission](#) in response to open comment periods regarding proposed disclosure rules by highlighting our support and providing suggestions on various topics, including raising ambition levels on climate disclosures by supporting the requirements to disclose material Scope 3 emissions.

²¹Total engagements include 86 direct engagements by NTAM and 3,859 engagements through outside engagement partner firm EOS at Federated Hermes.

We believe it is important to partner with industry organizations to enhance our understanding of market developments and support information-sharing and the development of industry standards on climate-related matters.

Below is a list of various climate initiatives in which we participate:

- Founding signatory of Climate Action 100+
- Signatory of Farm Animal Investment Risk & Return Initiative
- Signatory of Net Zero Asset Manager Initiative
- Signatory of One Planet Asset Managers Initiative
- Signatory of the Principles for Responsible Investing
- Member of ISSB Investor Advisory Group
- Member of Institutional Investors Group on Climate Change
- Supporter of Task Force for Climate-related Financial Disclosures

Note: The complete list of our participation in industry organizations can be found in Appendix 4 of our [2022 Stewardship Report](#).

Investing in Resources, Tools, and Technologies

NTAM has invested in various resources to support sustainable investing, including growing the Sustainable Investing and Stewardship Teams, investing in our ESG data and analytics resources and infrastructure to enhance the flow of ESG related information. This includes the launch of several climate-focused strategies, expediting ESG integration, creating proprietary ESG ratings covering 10,000+ companies, and investing in a multi-year technology project focused on developing a centralized ESG data hub and platform that enables enterprise-wide access to high quality and governed data. This platform includes many climate-related metrics critical for meeting our long-term climate commitments, including Net Zero, regulatory and client reporting (Sustainable Finance Disclosure Regulation and others), and facilitating integration of climate factors into our investment and risk process.

RISK MANAGEMENT

05

Identifying and Assessing Climate-related Risks

Climate In Our Capital Market Assumptions

Managing Climate-related Risks

Regulatory Risks



Risk Management

Potential systemic risks like climate change threaten to destabilize increasingly interconnected financial markets.

Identifying and Assessing Climate-related Risks

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

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

1. A comprehensive risk inventory
2. A static taxonomy of risk categories
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 business activities are cataloged into the following risk categories: credit, market and liquidity, operational, fiduciary, compliance, and strategic risk. Climate-related risks are a driver across all risk categories.

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.

Climate Risk in Our Capital Market Assumptions

Every year, our Capital Market Assumptions (CMA) working group, a subset of NTAM's Investment Policy Committee, develops long-term investment themes that take into account, among other factors, systemic market risks. These themes, published on our [CMA website](#), drive our long-term return expectations. These forward-looking investment themes and return forecasts, combined with our research on historic asset class volatility and correlations, are used to build the strategic asset allocation that sets the foundation for positioning multi-asset portfolio products.

For four years, the CMA five-year outlooks acknowledged climate-related risks as one of the prominent themes investors will face. NTAM expects the green transition to heighten investment risk over the long-term, as we expect that some companies will struggle with this change. NTAM does not expect climate-related risks to have a noticeable impact on economic growth and inflation over the next five years; however, we expect some transition risk to be priced in by financial markets in the most exposed asset classes.

The forward looking CMA themes are taken into account to develop the expected risk and return profiles across the asset classes, which have downstream implications throughout the investment process.

Example of how we think about climate-related risks and opportunities in relation to the energy system

Rising costs and potential insecurity of energy supplies have led some policymakers to prioritize meeting near-term energy demands, even if it means increasing carbon emissions. But over the medium term, climate initiatives are expected to remain an important consideration. On the demand side, a renewed focus on energy security may propel public and private investments in renewables and energy conservation beyond decarbonization merits alone. This will likely have the potential to accelerate the green transition in the medium to long term.

Digging deeper, we see regional differences in approaches. In Europe and Asia, where a significant part of the fossil fuel supply comes from external sources, the short-term implications are focused on meeting demand regardless of the carbon footprint of the source. In the US, the green transition is more politically charged with much discussion around staying committed to domestic fossil fuels versus renewables. However, with supply and demand likely to keep fossil fuel prices high, governmental subsidies may continue to facilitate a continued shift towards renewables.

Managing Climate-related Risks

In 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. To identify and assess material ESG and climate-related risks, we leverage our investment expertise in the fundamental, quantitative, and passive space, along with third party ESG data providers and our proprietary ESG ratings (also called NT ESG Vector scores). Our proprietary ESG ratings cover more than 10,000+ companies and uses an industry-first approach, which marries two leading sustainability disclosure standards and frameworks: the SASB Standards, which are industry-specific sustainability disclosure standards focused on financial materiality, and the thematic structure of the TCFD recommendations, focused on management of material ESG issues facing the operating industry. Please refer to our website for more details on our proprietary [ESG Vector score](#).

The teams across NTAM have the flexibility and tools to incorporate climate data from multiple sources (see Exhibit 11 for details) into investment research, portfolio management, risk and compliance functions.

EXHIBIT 11: OUR ESG DATA SOURCES AND TECHNOLOGY ENABLERS

ESG Research and Screening	Technology Enablers
<ul style="list-style-type: none">• Sustainalytics• ISS Climate Solutions• ISS SDG• MSCI ESG Research• S&P TruCost Environmental• TruValue Labs• Sell-side research• Equileap• GRESB• World Bank Worldwide Governance Indicators	<ul style="list-style-type: none">• ICE Data Services• FactSet• Bloomberg• Code Red• Aladdin• Snowflake• Microsoft Azure

The 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. NTAM's risk function draws on the benefits of the Corporate Risk Management Framework of NTC, and its enterprise resources and programs to provide a robust second line of defense. Risk Management is responsible for the design, delivery, and ongoing enhancement of climate-related investment risk monitoring in client portfolios. In EMEA, the results of portfolio-level monitoring of fund-specific metrics and targets for NTAM collective investment schemes are subject to review by the EMEA Business Risk Committee and by the investment committees of relevant fund boards. The nature of monitoring performed in each region in which NTAM operates, including the specification of metrics used, depends upon a range of factors such as the investment guidelines to which the portfolio is managed, specific product features, applicable regulations, and individual client requirements.

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

Regulatory Risks

Throughout 2022, NTC has been developing a Regulatory Change Framework (RCF) to provide a consistent approach to how we monitor, manage, and deliver regulatory change. The RCF will apply across the firm, including NTAM, and allows for the identification and assessment of changes in the regulatory requirements to address new or changing requirements along with continued compliance with existing regulations. Centralized monitoring allows us to identify jurisdictional developments across topic areas, including climate change, which in turn provides early-stage identification of impacts across entities, businesses, and regions as regulations develop. Appropriate governance structures are being implemented to challenge and oversight of regulatory change throughout the organization.

METRICS AND TARGETS

06

Climate Metrics
Targets



Metrics and Targets

Metrics and targets are critical in facilitating NTAM's management of climate and environmental risks and the measurement of our progress towards our goal of Net Zero by 2050.

Climate Metrics

NTAM uses a range of metrics to assess climate-related risks and opportunities across our global equities and corporate fixed income strategies, which enables the investment strategies to align with our clients' objectives. These metrics include the following:

- Total carbon emissions (also known as financed emissions) in line with Partnership for Carbon Accounting Financials (PCAF) recommendations²²
- Weighted Average Carbon Intensity (WACI)
- Carbon footprint
- Fossil fuel reserves
- Future potential emissions

NTAM values transparency with clients to raise awareness around portfolio-level exposure to climate-related risks. This is achieved through disclosing these climate metrics in our standard ESG reports and fund fact sheets as part of our reporting capabilities. An example of a fund fact sheet with selected carbon metrics is available [here](#).

In this inaugural TCFD report, we are reporting carbon exposure metrics only on corporate issuers (both equities and fixed income), which constituted about \$673.3 billion or roughly 65% of our AUM as of December 31, 2022. Other asset classes such as sovereign credit, cash, agency credit, municipal credit, asset backed credit, and derivatives are out of scope due to a lack of reliable frameworks and data challenges. NTAM aims to incorporate these asset classes in our future analysis as data accessibility, quality, and frameworks improve. We will continue to enhance our climate measurement capabilities to align with the evolving industry standards.

²²The Partnership for Carbon Accounting Financials (PCAF) is an industry led initiative enabling financial institutions to measure and disclose greenhouse gas (GHG) emissions of loans and investments.

EXHIBIT 12: NTAM 2022 CARBON METRICS²³

Metric	Unit	Scope	2022
Weighted Average Carbon Intensity (WACI)	tCO ₂ e per USD million revenue	Scope 1	111.35
		Scope 2	24.02
		Scope 3	1,045.75
Total Carbon Emissions (Financed Emissions) ²⁴	tCO ₂ e	Scope 1	26,701,333.38
		Scope 2	5,944,062.28
		Scope 3	283,167,403.35
Carbon Footprint	tCO ₂ e/ USD million AUM	Scope 1	40.68
		Scope 2	9.06
		Scope 3	431.40
Exposure to carbon-related assets ²⁵	USD million invested		86,937.64
	% of AUM		12.91

Source: ISS ESG, MSCI, NTAM holdings as of December 31, 2022

EXHIBIT 13: UNDERSTANDING CARBON METRICS

Metric	Unit	Description	Use Case
Weighted Average Carbon Intensity (WACI)	tCO ₂ e per USD million revenue	This metric calculates each portfolio company's emissions (measured in tonnes of CO ₂) per unit of revenue (measured in million USD), and then aggregates company's emissions using the percentage weight of the holding within the portfolio.	This metric allows for the greatest comparison between portfolios and allows for portfolio decomposition and attribution analysis.
Total Carbon Emissions (also called Financed Emissions)	tCO ₂ e	This metric apportions the total greenhouse gas (GHG) emissions of a portfolio based on the ownership of an issuer by its enterprise value including cash (EVIC).	Used to measure impact of investments through an absolute measure and to set emissions baseline
Carbon Footprint	tCO ₂ e/ USD million AUM	This metric is calculated by dividing total carbon emissions by the market value of the portfolio.	This metric can be used to compare portfolios to one another and/or to a benchmark and understand the link between money invested and its associated emissions.
Exposure to Carbon Related Assets	expressed in \$M or percentage of the current portfolio value	This metric focuses on a portfolio's exposure to sectors and industries considered the most GHG emissions intensive.	This metric can be applied across asset classes and does not rely on underlying companies' Scope 1 and Scope 2 GHG emissions.

²³Carbon metrics are calculated across NTAM's aggregated equity and fixed income (corporates only) portion of the AUM which is ~\$673.3 B of which ~\$656.4 B i.e. 97.5% by weight have coverage.

²⁴These metrics are calculated in line with PCAF standards using EVIC as the denominator.

²⁵Exposure to carbon related assets are calculated based on our holdings in the GICS Energy sector and MSCI data fields which identify any tie in a holding to fossil fuels reserves and energy application.

Currently, NTAM integrates transition and physical risks alongside climate solution metrics in several strategies which favor companies that are better prepared for, or already contributing to, decarbonization and are resilient in handling the long-term transition and physical climate-related risk impacts. As additional investment capabilities begin to consider climate-related metrics, NTAM will assess the materiality and investment time horizon of the investments to align with client objectives and TCFD recommendations on cross-industry climate related metrics. This will enable NTAM to develop a more holistic picture of climate-related risks and opportunities in the held companies and overall portfolio.

Addressing Data Gaps and Challenges

We have seen increased demand for carbon emissions data in recent years. 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 VaR (Value at Risk) 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 evolve. However, in order to address current gaps in data, we have taken the below actions:

1. We leverage multiple data providers including MSCI, ISS, and S&P Global Trucost for climate-related information. When companies do not report emissions, we use the estimated emissions supplied by the data providers. The data is stored in our centralized ESG data hub, 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. Where companies are not covered by third party data providers and exposed to material risks, we engage with investee companies to gain 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 in the 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.

This approach helps us to overcome data gaps and provide better 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 has established Net Zero targets in line with the Science Based Targets Initiative (SBTi) Sectoral Decarbonization Approach (SDA) and the IIGCC Net Zero Investment Framework (NZIF) for 10.8% of the overall AUM, which were chosen based on the investment approach of the committed assets. NZAMI allows for multiple approaches to Net Zero commitments. Below is a description of how NTAM has approached the Net Zero target setting and the targets in Exhibit 14²⁶:

1. **Sectoral Decarbonization Approach:** SDA is a sector level approach to set portfolio targets on emission-based intensity. NTAM has committed 3.5% of total AUM to be covered under the SDA. The usage of the NTAM Custom Screen in the portfolio construction process was used to define the initial commitment as NTAM has started the process of aligning the Custom Screens, described in the Strategy section, as per the SDA framework. The screen definition has evolved to identify companies with activities inconsistent with the SDA methodology in power generation, coal mining, and oil and gas production, and will be further enhanced for the industrial, transport, agriculture, and forestry industries as we move towards achieving a 50% reduction in financed emissions by the target date of 2030.
2. **Net Zero Investment Framework:** NZIF outlines a framework for increasing the percentage of AUM in high-emitting sectors that are achieving Net Zero or meeting the criteria to be considered aligned or aligning to Net Zero. Under the NZIF approach, NTAM will commit 7.3%, or approximately \$80 billion, of AUM to be managed in line with Net Zero and will achieve this through our direct and collaborative engagement activities via CA100+ and the IIGCC Net Zero Engagement Initiative.
3. **Scope of covered assets:** Separately managed client accounts (SMAs) and commingled funds, which have more traditional investment objectives such as tracking a market capitalization weighted index, are currently not part of the committed assets under the SDA. Our clients set their own decarbonization goals and asset allocations; we will work with our client base to increase the proportion of SMAs aligned with Net Zero by 2050. Additionally, in a similar manner to the assets measured in Exhibit 12, the non-corporate assets such as sovereign credit, cash, agency credit, municipal credit, asset backed credit, and derivatives are out of scope due to a lack of reliable frameworks and data challenges.

²⁶As of the TCFD publish date, NTAM has submitted the targets to the Net Zero Asset Manager Initiative and is awaiting final approval.

EXHIBIT 14: NTAM NET ZERO ASSET MANAGERS INITIATIVE TARGETS²⁷

AUM/ Proportion of AUM in Scope	\$112.08 billion/ 10.8 % of total AUM as of December 31, 2022 3.5% of total AUM will be covered under the SDA and 7.3% will be covered under the NZIF approach.
Methodology	SBTi for financial institutions using SDA and NZIF for portfolio coverage approach.
Asset Classes	We currently only consider portfolios invested in equities and corporate fixed income due to better established methodologies and more robust climate data availability in these two asset classes. As of December 31, 2022, these asset classes represent about 65% of our total AUM and are eligible for inclusion in scope for target-setting. We will reassess the coverage for other asset classes in the future, especially sovereigns as the Assessing Sovereign Climate-related Opportunities and Risks (ASCOR) Project matures over the next 12-24 months.
Baseline Year	2022
GHG Scopes Included	Our emissions reduction target will currently include only Scope 1 and Scope 2 emissions; Scope 3 emissions will be phased in over time when disclosure and methodology improve sufficiently.
Targets	<p>We have established the following targets for our in-scope AUM:</p> <p>1. Sector Decarbonization Approach: In-line with the SBTi recommendations, a 50% reduction in financed Scope 1 and 2 emissions per unit of owned enterprise value including cash (EVIC) in line with the recommendations of the PCAF by 2030 relative to 2022 baseline.</p> <p>2. Net Zero Investment Framework (NZIF): The targeted list of companies that fall within scope of CA100+ and Net Zero Engagement Initiative comes to 228, which represent just 1.5% of the companies NTAM invests in as at the end of 2022. However, these 228 companies represent approximately 50% of the owned Scope 1 and Scope 2 emissions, and 44% when including Scope 3. By 2030 we expect these 228 companies will have developed and communicated a plan aligning to Net Zero.</p>

We believe defining our interim Net Zero targets is an important first step to our long-term NZAMI commitment. We will continue our work by actively engaging with clients who choose to adopt Net Zero goals and consider strategies that are aligned with Net Zero. In addition, we will look to expand coverage to other asset classes (e.g. sovereigns, municipal bonds) as methodologies and data evolve in the future.

²⁷As of the TCFD publish date, NTAM has submitted the targets to the Net Zero Asset Manager Initiative and is awaiting final approval.

LEGAL ENTITY ADDENDUM

07 Entity-level Reporting



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 has elected to utilize the global TCFD Strategy and Risk Management Frameworks outlined in the main report. NTGIL also benefits from the global Governance and Metrics and Targets, but has prepared this addendum to highlight the separate legal entity Governance and Metrics to provide relevant disclosures for the UK’s Financial Conduct Authority’s (FCA) PS 21/24.

As of December 31, 2022, NTGIL had \$143 billion in assets under management (AUM).

GOVERNANCE

Board Oversight

The NTGIL Board of Directors (Board) 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) and are subject to training and competence requirements to ensure requisite knowledge and skills evolve in line with both the business and client needs. A key component of the Board’s remit is managing regulatory risk through overseeing the successful implementation of regulatory change and by staying abreast of future regulatory expectations. Such horizon scanning enables strategic discussions on financial and other potential material impacts to allow the NTGIL to keep pace 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 and Stewardship.

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

Board / Committee	Roles and Responsibilities
NTGIL Risk & Audit Committee	The Risk and Audit Committee is responsible for the oversight of risk management (including climate risk management) on behalf of the NTGIL Board.
NTAM EMEA Business Risk Committee	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.

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

Management Oversight

NTGIL benefits from the same management oversight mechanisms as described in the NTAM Report. In particular, the Sustainable Investing Council (SIC), Proxy Committee and regional ESG working groups 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 ESG integration and implementation of ESG regulations in relevant products and services managed by NTGIL. It considers the provision of portfolio management services to new and/or existing clients, including how to incorporate their increasing data and reporting needs, particularly in relation to ESG more broadly including climate-related metrics and targets.

Management Groups	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.	Monthly

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 ESG criteria enhances our forward-looking view of risks and opportunities.

NTGIL adopts the same strategy 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.

Approach to Climate-related Scenario Analysis

NTGIL is exploring solutions and developing a stronger understanding of the use of climate scenario analysis before formal integration in the investment and risk management process. To continue the progress, members of the sustainable investing, risk, and investment teams have explored various climate scenarios to better understand the evolution of the measurement and management of transition and physical risks and opportunities across sectors, regions, and time horizons. To date, the work has been focused on use within individual strategies and providing additional disclosures to our clients. We look to expand upon these use cases in the future across the broader business. Refer to the [Strategy section](#) of the NTAM TCFD Report under [Scenario Analysis](#) for more information.

Statement of Delegation of Functions

Whilst NTGIL is responsible for the management of \$143 billion in assets, some of these 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 with no material deviations. No assets are sub-delegated to third parties outside of NTAM.

RISK MANAGEMENT

Potential systemic risks like climate change threaten to destabilize increasingly interconnected financial markets. We take our responsibility to identify and integrate these risks into our risk management seriously, as doing so enhances our ability to preserve investors' capital and, ultimately, enable them to achieve their long-term financial objectives.

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.

METRICS AND TARGETS

As noted in the main report, we use a range of climate metrics to get an informed view on climate-related risks and opportunities to ensure that our investment strategies align with our 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 from MSCI, ISS and S&P Global Trucost in our investment and risk analysis across our global equities and corporate fixed income capabilities. More information, including Exhibit 13 on 'Understanding Carbon Metrics' can be found in the [Metrics and Targets](#) section of the main report.

In this inaugural TCFD report, we are reporting carbon exposure metrics for our AUM for the first time with an explanation of each of the climate metrics and how we use them in our analysis.

This year, we have focused our analysis only on the corporate issuers (both equities and fixed income) constituting circa \$100.11 billion, roughly 70% of our AUM (as of December 31, 2022). Other asset classes like sovereign credit, cash, agency credit, municipal credit, asset backed credit, and derivatives are out of scope due to a lack of reliable frameworks and data challenges. NTGIL will look to incorporate these asset classes in our future analysis as data accessibility, quality, and frameworks improve. We aim to incorporate these asset classes in our future analysis as data accessibility, quality, and frameworks improve. We will continue to enhance our climate measurement capabilities to align with the evolving industry standards.

The following metrics have been prepared for NTGIL's corporate issuer exposure (listed equity and fixed income) circa \$100.11 billion as at December 31, 2022; spilt as follows:

EXHIBIT 15: NTGIL 2022 CARBON METRICS²⁸

Metric	Unit	Scope	2022
Weighted Average Carbon Intensity (WACI)	tCO ₂ e per USD million revenue	Scope 1	97.63
		Scope 2	27.44
		Scope 3	936.07
Total Carbon Emissions (Financed Emissions) ²⁹	tCO ₂ e	Scope 1	4,326,937.36
		Scope 2	1,075,500.30
		Scope 3	43,359,200.25
Carbon Footprint	tCO ₂ e/ USD million AUM	Scope 1	43.31
		Scope 2	10.76
		Scope 3	433.98
Exposure to carbon-related assets ³⁰	USD million invested		11,866.36
	% of AUM		12.02

Source: ISS ESG, MSCI, and NTGIL holdings as of December 31, 2022

²⁸Carbon metrics are calculated across NTGIL's aggregated equity and fixed income (corporates only) portion of the AUM which is ~\$100.11 B of which ~\$99.91 B i.e. 99.8% by weight have coverage.

²⁹These metrics are calculated in line with PCAF standards using EVIC as the denominator.

³⁰Exposure to carbon related assets are calculated based on our holdings in the GICS Energy sector and MSCI data fields which identify any tie in a holding to fossil fuels reserves and energy application.

Targets

We believe that investors should be compensated for the risks they take in all market environments and investment strategies and climate change risks are no different. The risks posed by climate change and the opportunities associated with efforts to reduce emissions are critical for us as an organization. In-line with our commitments to tackle climate change, NTAM, which includes NTGIL, made the decision to join the Net Zero Asset Manager Initiative in 2022 and set initial interim targets in 2023. Refer to Exhibit 14 in the [Metrics and Targets](#) section of the report.

Compliance Statement

This Northern Trust Global Investments Limited addendum should be read in conjunction with the full Northern Trust Asset Management TCFD Report.

The disclosures for Northern Trust Global Investments Limited, including those in the Northern Trust Asset Management TCFD Report, comply with the requirements under the FCA's Policy Statement PS21/24.

Richard Bartholomew

Director, Northern Trust Global Investments Limited

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 – Definition of Scope 1, 2, and 3 Emissions

Scope Type	Description
Scope 1	Scope 1 covers emissions from sources that an organization owns or controls directly.
Scope 2	Scope 2 are emissions that a company causes indirectly and come from the energy it purchases and uses.
Scope 3	Scope 3 encompasses emissions 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.

IMPORTANT INFORMATION

Northern Trust and its affiliates may have positions in and may effect transactions in the markets, contracts and related investments different than described in this information. This information is obtained from sources believed to be reliable, and its accuracy and completeness are not guaranteed. Information does not constitute a recommendation of any investment strategy, is not intended as investment advice and does not take into account all the circumstances of each investor. Opinions and forecasts discussed are those of the author, do not necessarily reflect the views of Northern Trust and are subject to change without notice.

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All data is as of December 31, 2022 unless otherwise stated.