



Climate-related financial disclosures 2023

Assembled in response to the
Task Force on Climate-related
Financial Disclosures



What you'll *find*

A letter to stakeholders	3
The scope of this report	4
Summary of our climate approach aligned with the TCFD recommendations	8
Our climate-related financial disclosure	12
Governance	13
Strategy	20
Risk management	32
Metrics and targets	45
Looking ahead	74

A letter to stakeholders

There has never been a more critical moment in our history to take serious action on climate change. Since global records have been kept, 2023 was the warmest year yet,¹ and the 10 warmest years in that 170-year span have all occurred in the last decade. As a society, we find ourselves at a crossroads: We either recognize climate change for the systemic risk that it is and make efforts to mitigate while adapting to it or we choose to ignore it and suffer the consequences. At Manulife Investment Management, we choose the former.

The Task Force on Climate-related Financial Disclosures (TCFD) offers a critical framework to help market participants and regulators to understand the impact—both positive and negative—that a company may have on the Earth’s climate or that it’s exposed to by virtue of its business operations. By publishing our fifth TCFD report, we’re reaffirming our commitment to this critical global initiative, but we also recognize the progress being made by other organizations and regulators to align and enhance climate reporting standards. We’re committed to continue enhancing our reporting so that all our stakeholders can get a clear picture of our climate impact and risk exposures.

True to our goals, we’re incredibly proud of the progress we’ve made in 2023. For example, this year, we reached a milestone in our global real estate equity portfolio, of which 90% is certified to a green building standard, such as LEED, ENERGY STAR, or BOMA BEST. The forests and farms we operate continue to be diversifying, nature-positive assets for our clients, and they’ve helped remove an estimated annual average of 1.5 million tons of CO₂e from the atmosphere over the trailing five-year period. We also launched—with impressive investor interest—the Manulife Forest Climate Strategy, which prioritizes carbon sequestration over timber production in sustainably managed forests.

It goes without saying that we cannot fight climate change alone. As a global challenge, it requires global collaboration. We partner with global actors that are helping tackle climate change as a systemic risk—such as Ceres, Climate Action 100+, and the Finance for Biodiversity Foundation to name a few—but we’re also committed to being a source of knowledge for others as they begin their climate disclosure and mitigation/adaptation journey.

As ever, we welcome questions and feedback on our climate-related disclosure, and we hope it proves to be a useful guide to our governance, strategy, risk management, and results with respect to climate concerns.

Sincerely,



Brian Kernohan

Chief Sustainability Officer
Manulife Investment Management

¹ [National Oceanic and Atmospheric Administration \(NOAA\) Annual 2023 Global Climate Report.](#)



The *scope* of this report

Manulife Investment Management is the unified global organization that represents the global wealth and asset management arm of Manulife Financial Corporation (Manulife). This disclosure sets out how we incorporate climate-related risks and opportunities into investment oversight through appropriate governance, strategy, risk management, and metrics and targets.

Manulife Investment Management functions as part of the broader Manulife group, not a stand-alone entity and, as such, parts of this report must necessarily refer to processes at a wider corporate level while other sections relate only to Manulife Investment Management. That said, this document doesn't purport to reflect Manulife's overall climate initiatives or to comprehensively disclose its approach to climate risks and opportunities. It seeks to holistically cover Manulife Investment Management's capabilities across asset classes and may be supplemented by Manulife's climate-related risks and opportunities (or TCFD) disclosure, which is published as part of Manulife's annual [sustainability report](#), as well as Manulife's [climate action plan](#) and [climate action implementation plan](#), for a broader perspective.

Manulife Investment Management published its first disclosure aligned with the TCFD in 2019 and issued its climate change statement in 2020.

The disclosures in this report cover the activities of the investment management teams within Manulife Investment Management. In this report, 'we' refers to Manulife Investment Management. The report does not cover the activities of nonaffiliated investment managers who manage some client assets on our behalf, or the activities of CQS, which is a wholly owned multi-sector alternative credit manager acquired by Manulife Investment Management in 2024. All information in this report is as of December 31, 2023, unless otherwise indicated. This report was published in July 2024.

Highlights

Taking action on climate and nature

We published our first nature-related disclosure for timberland and agriculture, informed by the recommendations of the Taskforce for Nature-related Financial Disclosures (TNFD).

90%

of our global real estate equity portfolio is certified to a green building standard, such as LEED, ENERGY STAR or BOMA BEST.²

1.5 million tCO₂e

is the estimated amount of CO₂e removed from the atmosphere by our managed forests and farms on a five-year rolling average.

92%

is the percentage of shareholder proposals supported with respect to reporting on climate change and greenhouse gas (GHG) emissions.

² Based on square footage of the gross floor area or building size of properties in the global portfolio. Totals from different certification standards do not sum as properties with multiple certifications are only counted once. Certifications are provided by LEED, ENERGY STAR Certification, BOMA BEST, GBCA Green Star, BCA Green Mark, NABERS, CASBEE, BOMA 360, and Fitwel.

Engagement on climate and deforestation

In 2023, our public markets investment teams continued to engage with two issuers within their portfolios that were identified as most exposed to either physical or transition risk associated with climate change.

Through this engagement process, we aim to influence these issuers to increase their public disclosures, which will in turn reduce risks to them, while increasing clients' portfolios' resilience to climate change risk. We've also begun to engage with a subset of issuers on deforestation risk to understand our exposure across portfolios and their progress on the issue.

Global collaboration

To help inform our sustainable investing practices, we engage with sustainability-focused organizations, including:

AIGCC—We chair the Physical Risk and Resilience Working Group, which seeks to integrate physical risk and resilience considerations into portfolio management. We also participate in the Asian Utilities Engagement Program, which focuses on some of the largest emitters in Asia that aren't currently covered by the Climate Action 100+ initiative and helped launch, and now chair, the Energy Transition Working Group, which is set up to respond to energy transition developments and topics in Asia.

CDP—We're a member of this initiative. We continued to support disclosure through the CDP Non-Disclosure Campaign on nature to focus on climate risk, water, and forests.

Ceres—We're a participant of the Investor Network on Climate Risk and Valuing Water Finance Initiative as well as a member of the Private Equity Working Group.

Climate Action 100+—We've been founding member since 2017, we've continued to participate in several engagements in both North America and Asia and to encourage improvements to climate risk management. We've also participated in trainings and provided input into next phase of the initiative.

Climate Engagement Canada—We're a founding member. We're engaged across the industrials and transportation sectors to encourage Canadian issuers to address climate risk.

Climate Smart Land Network—We're a member of the corporate governance work group.

Emerging Markets Investors Alliance—We continued to interact with emerging-market issuers and investors as a member of the alliance.



Finance for Biodiversity Pledge—We're a member of the advisory board.

Hong Kong Green Finance Association—We're part of the Greater Bay Area Green Finance Alliance Working Group with a focus on regulatory cooperation toward the development of sustainable finance and harmonization of standards in Hong Kong.

Nature Action 100—We're a participant in this initiative.

PRI—We're a member of several working groups. A full list can be found in our [stewardship report](#).

PRI Spring—We're a member of the Signatory Advisory Committee and a member of the initiative.

TCFD Consortium (Japan)—As a member, we collaborate with other investors and Japanese regulators to develop guidance on market best practices in climate reporting.

WBSCD—We're a council member and liaison delegate. Our timber and agriculture teams actively participate in the WBCSD's Forest Solutions Group, Scaling Positive Agriculture, and Nature Action projects. Our real estate teams participate in the Built Environment projects.



Please see our [stewardship report](#) for more information on industry groups and initiatives through which we collaborate on sustainability issues.





Summary of our climate approach aligned with the TCFD recommendations

Governance

- **Board oversight**—Manulife’s climate strategy is overseen by its executive sustainability council (ESC), which is in turn overseen by the corporate governance and nominating committee (CGNC) of the Manulife board. The CEO and President of Manulife Investment Management Paul R. Lorentz is a member of the ESC. This council brings together representatives from multiple businesses and functional areas across Manulife to drive the development of the firm’s overall climate strategy, risk management activities on climate-related matters, performance tracking, and disclosures.
- **Management’s role**—Manulife Investment Management’s climate strategy for third-party clients is set by our two sustainable investing committees (SICs), one for public markets investments and the other for private markets investment. The heads of public and private markets investments chair their respective SICs with membership drawn from Manulife Investment Management’s leadership team. The SICs oversee our teams’ sustainable investing activities and support the implementation of our sustainable investing and sustainability risk statement.
- **Accountability**—Sustainability-related key performance indicators (KPIs) are factored into our annual employee performance review and remuneration metrics. Accordingly, each team is expected to contribute to the firm’s advancement in sustainable investing overall and adhere to research processes that integrate sustainability considerations where financially material and in line with our fiduciary duty to clients.

Strategy

- **Accurately measuring climate risks and opportunities**—We aim to identify climate risks and opportunities over various time frames, in alignment with our fiduciary responsibility, and reflect their financial or other impact in our investment analysis while mitigating the impact through our stewardship approach.
- **Sustainability integration**—We take a variety of actions to appropriately account for climate-related factors in each asset class according to its internal investment process, technical, and market dynamics along with its regional expression. This work occurs throughout our sustainability integration process, engagement strategies, and the development of climate-focused investment frameworks.
- **Building resilience**—We conduct scenario analysis across uncertain future pathways and seek to understand the potential impact of different climate scenarios on our investment strategies and assets we manage and operate. We engage with regulators and policymakers, investee companies, and our peers in financial markets to address climate change systematically. We believe this builds resilience into our portfolios and for all our stakeholders, from our employees to our clients and the communities in which we operate.

We take an active approach to sustainable investment management

We take a variety of actions to appropriately account for climate-related factors throughout our sustainability integration processes, engagement strategies, and the development of climate-focused investment frameworks.

Risk management

- **Identifying climate risks**—Our processes for identifying climate risks are supported by our policies and engagement practices. Manulife Investment Management's [climate change statement](#) outlines our position on identifying, managing, and integrating climate risks and opportunities in our investment processes. In parallel with this statement, Manulife's [environmental risk policy](#), updated in 2023, sets out an enterprisewide framework for the management of environmental risks within our operating business activities and owned assets.

Manulife Investment Management identifies and assesses climate risks in our clients' investment portfolios through public disclosure and third-party sources, as well as through our own research, company engagement, and collaborative initiatives. As a component of risk management, we also conduct climate scenario analyses.
- **Managing climate risks**—As stated in Manulife Investment Management's [climate change statement](#), we may take a variety of actions toward managing climate-related risks and opportunities across our investments. Broadly summarized, and in line with our fiduciary duty to clients, our available actions relate to asset allocation and selection, investment analysis and research, proxy voting, mitigating direct GHG emissions, deploying sustainability management best practices for operated assets, and participating in collaborative engagements focused on climate initiatives.
- **Integrating climate risks**—Climate risks are integrated into our overall approach to risk management, with overlapping lines of defense. We believe this approach helps ensure that we understand the extent of these risks in our clients' portfolios and for the assets we manage and operate.

We're committed to identifying and managing the climate-related risks and opportunities

We engage with investee companies to encourage best practices in climate-related disclosure. Material climate-related risks are managed taking into account the asset class, geography, and underlying investment strategy.

Metrics and targets

- **A range of useful metrics**—We use a variety of metrics to manage climate alignment, including green investments, corporate carbon footprinting, emissions reduction targets, climate value at risk (climate VaR) and portfolio warming potential, sovereign climate risks, and monitoring strategy-level emissions.
- **Emissions and risks**—As an investor and operator of assets, we assess climate risk and seek to reduce our emissions or use our influence to encourage the companies we invest in to reduce their GHG emissions and align their business models with the realities of a changing climate, where financially material. We also partner with other investors and industry experts to tackle climate change on a broader scale. By working collaboratively with peer investors, we're strengthening our potential ability to reduce systemic climate change risks and realize the economic benefits of the low-carbon transition.

We also use various tools to manage physical and transition risk, such as scenario analysis and carbon footprinting.

- **Targets**—Manulife Investment Management will continue building on our sustainable investing capabilities, increasing the number and variety of sustainable investing options available to our clients, including climate-focused strategies.

We seek to improve sustainability metrics

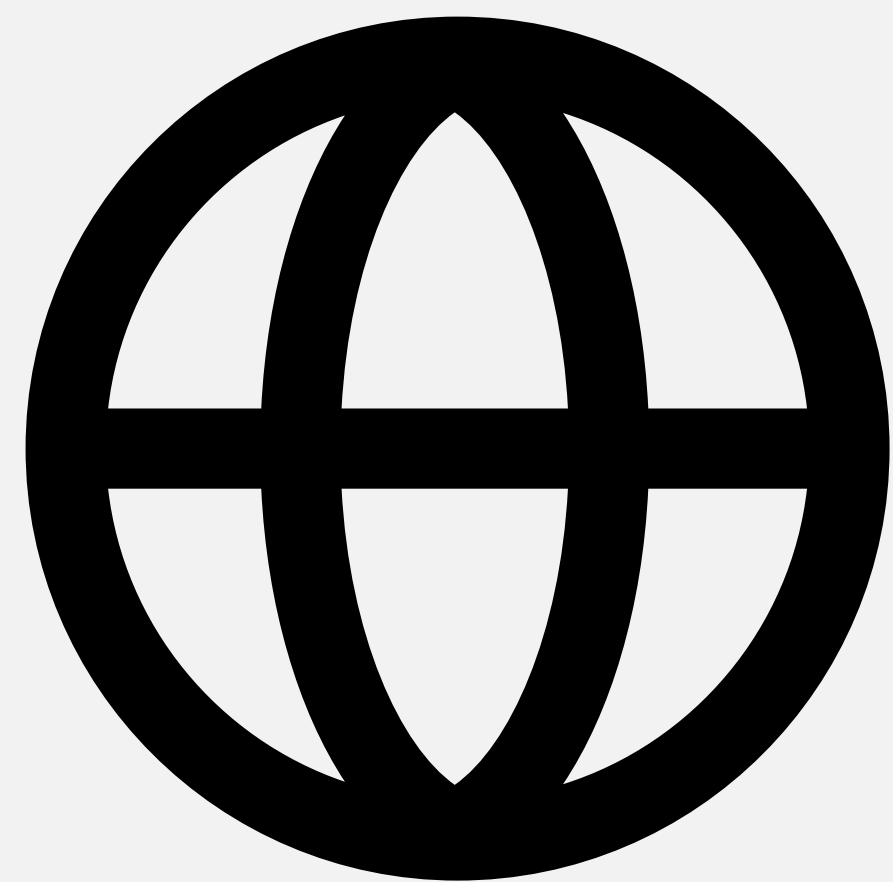
We're participating partners in some of the world's most innovative initiatives to help evolve the standard metrics for sustainable asset management.

We seek to standardize an approach using more forward-looking metrics, location-specific data, and scope 3 emissions.

We continue to build out carbon footprinting, such as weighted average carbon intensity (WACI), as well as a variety of other climate-related metrics.

An aerial photograph of terraced rice fields, showing a series of curved, stepped fields filled with green rice plants, separated by narrow water channels. The fields are arranged in a pattern that follows the contours of the land, creating a rhythmic, wavy appearance. The lighting is bright, highlighting the vibrant green of the rice and the dark, reflective water in the channels.

Our climate-related financial disclosure



Governance

Board oversight

Manulife's climate strategy is overseen by Manulife's ESC, which is in turn overseen by the CGNC of the Manulife board. The ESC is chaired by Manulife's chief sustainability officer. The CEO and President of Manulife Investment Management Paul R. Lorentz is a member of the ESC. This council brings together representatives from multiple businesses and functional areas across Manulife to drive the development of the firm's overall climate strategy, risk management activities on climate-related matters, performance tracking, and disclosures.

The president and CEO of Manulife Investment Management is joined by other senior Manulife leaders on the Manulife ESC, and the leaders of our sustainable investing teams in Manulife Investment Management work closely with Manulife's chief sustainability officer. In this way, Manulife Investment Management's governance structure is well connected to the broader sustainability community and leadership across Manulife.

The ESC is responsible for the climate strategy, risk management, and disclosures for Manulife, and Manulife Investment Management's policies and governance practices are aligned with the ESC's mandate. Manulife Investment Management develops statements that articulate its approach to delivering the best risk-adjusted investment outcome for clients, which are approved by the SICs.

Our sustainability governance

■ Manulife ■ Manulife Investment Management

Corporate governance and nominating committee		Audit committee			Management resources and compensation committee			Risk committee	
Executive sustainability council									
General counsel	Chief marketing officer—chair	Chief human resources officer	Chief executive officer	President and CEO, Manulife Investment Management	Chief sustainability officer	Chief financial officer	Chief operations officer	Chief investment officer	Chief risk officer
Sustainability center of expertise					Legal and compliance center of expertise				
<ul style="list-style-type: none">Composed of sustainability professionals across public markets, private markets, the general account, and the Manulife organizationProvides a forum for information sharing and consultation on sustainability initiatives, performance, and reporting					<ul style="list-style-type: none">Composed of legal and compliance members from each business unit and regionLegal, compliance, and regulatory affairs consultationProvides a forum for information sharing and consultation on legal and compliance related to Manulife sustainability matters				
Our committees and working groups are convened to enable regular decision-making oversight									
Public markets sustainable investing committee			Proxy voting working group			Private markets sustainable investing committee			
<ul style="list-style-type: none">Integral to public markets strategic oversightFocuses on key sustainability initiatives and strategyComprises senior cross-functional leads and sustainability team members			<ul style="list-style-type: none">Members include cross-functional business heads in public marketsReviews escalated voting decisions			<ul style="list-style-type: none">Supports sustainability integration across private marketsLed by the global head of private marketsIncludes global heads of private asset classes, sustainability specialists, and representatives from strategy, risk, distribution, legal, and marketing			

Our governance structure includes SICs and working groups that provide oversight, conduct ongoing risk assessments, and help steer our sustainability initiatives across global capital markets.

We view the involvement of leaders in all asset classes, as well as representatives from functional areas such as operations, legal, compliance, risk, and technology, to be crucial to supporting our sustainable investing activities across the organization and ensuring the buy-in and commitment required for success.

Our committees are convened to enable regular decision-making oversight. The heads of the public and private markets investments chair their respective SICs, which enables regular decision-making oversight of sustainable investing activities appropriate to specific asset classes. In turn, chairs of these SICs communicate directly with other leaders of the global wealth and asset management arm of Manulife, such as our retirement and retail businesses.

Related to proxy voting specifically, Manulife Investment Management has a proxy voting working group to act as a control against conflicts of interest in the proxy voting process and ensure alignment with the global proxy voting policy and procedures. This working group comprises functional experts from across the organization, including the investment and sustainable investing teams. Climate change-related topics are typically discussed on a weekly basis during the proxy season regarding a range of voting proposal types, including shareholder proposals, advisory votes on climate risk management, and director elections.

Our sustainable investing policies and statements

Our policies, statements—also available on our institutional website—and governance practices guide our sustainable investment activities. We use our policy and statement framework below to guide our activities from integration to investment stewardship. While our climate change statement outlines our approach to climate change in our investment practices, our full catalogue of policies and statements may also touch on aspects of our approach to the issue.

Global policies and statements

- [Sustainable investing and sustainability risk statement](#)
- [Climate change statement](#)
- [Nature statement](#)
- [Cluster munitions policy](#)
- [ESG engagement policy](#)
- [Global proxy voting policy and procedures](#)
- [Executive compensation statement](#)
- [Responsible contracting statement](#)
- [Timberland and agriculture deforestation policy](#)
- [Water statement](#)³
- [Client exclusions framework](#)⁴

Asset class-specific frameworks

- [Real estate sustainability framework](#)
- [Timberland and agriculture sustainable investing framework](#)
- [Infrastructure sustainable investing framework](#)
- [PE&C sustainable investing framework](#)

Management's role

Management directs the firm's climate strategy

The governance structure established enables oversight of our teams' sustainable investing activities and supports the implementation of our sustainable investing policies; this governance structure also applies to the oversight of climate-related issues. The SICs are responsible for supervision and decision-making related to sustainable investing activities, including oversight of climate-related issues, at the appropriate levels of the firm. These committees, which meet at least quarterly, include representatives from across different business functions who are stakeholders in implementing the approach to sustainable investing.

Management stays informed with the support of dedicated sustainability teams

The SICs are supported by teams of sustainable investing professionals who facilitate the implementation of Manulife Investment Management's approach to sustainable investing. This occurs through a variety of activities and projects, including:

- Preparing annual business plans
- Identifying and developing sustainable investing leading practices
- Supporting investment teams to develop tools and methodologies to adopt leading practices across the investment lifecycle
- Leading the participation in external initiatives and collaborative industry engagement

Our sustainable investment teams support investment professionals in their consideration of climate risks and opportunities

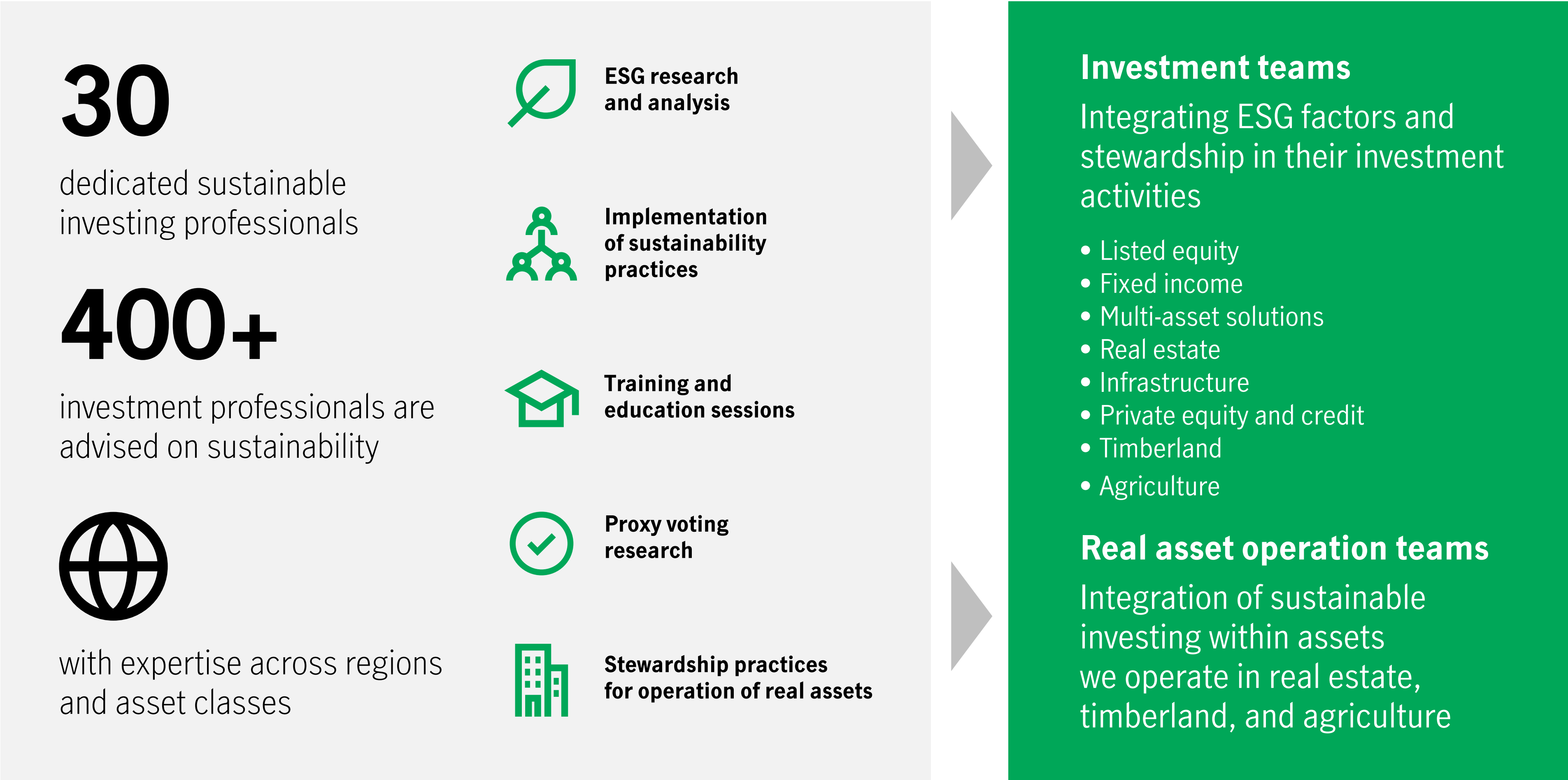
Our sustainability professionals work with investment teams to consider sustainability factors, including climate, throughout the investment process, from due diligence through to investment stewardship decisions. Our sustainable investment teams provide training, tools, and analytical frameworks, among other support. Some examples of how the sustainable investment teams' supported investment teams:

- Developed a tool to evaluate climate risk at a portfolio and issuer level for public markets asset classes. This tool is housed on a central global research platform to which all investment teams and professionals have access.
- Enabled the public markets investment teams with an updated ESG research framework, which identifies issuers where physical or transition risks associated with climate are most financially material. Investment teams can use this framework to review and analyze sustainability risks at individual issuers.
- Created a new tool, providing a portfolio view of our emissions data within real estate and updated our sustainable building standards framework, which defines requirements and best practices for our third-party property managers and encourages improvement while addressing the need for advancement, guidance, tools, and consistency.

- Collaborated with our real estate third-party property managers and industry consultants to support our decarbonization road map. As of December 31, 2023, over half of our global real estate emissions footprint—comprising 42% of our real estate assets under management—have detailed decarbonization plans to guide our asset managers’ decision-making.
- Added a new physical climate risk tool within our infrastructure, timberland, and agriculture businesses and made progress on decarbonization plans, collaborating across asset classes to leverage expertise and charting the path forward.
- Within infrastructure, we conducted forward-looking physical climate risk assessments and engaged with underlying portfolio company management teams on these assessments and analyses

While we operate as a community of specialist investment teams—with each team incorporating sustainability factors into the investment process in a manner that aligns best with their investment decision-making approach—those teams continue to have access to emerging training and information on climate risks and opportunities through our sustainable investing professionals.

Our sustainability-focused professionals support our asset management teams globally



We seek to incorporate material sustainability considerations throughout the stages of our investment and asset ownership lifecycles, taking into account the characteristics of the asset class and investment process in question, as well as industry and geography, among other factors. Each investment team operates in different markets and with different nuances to its approach to investing. Accordingly, each team integrates sustainability factors into its investment process in a manner that best aligns with its investment approach. Exception to this are strategies where sustainability integrated investment approach is impractical or impossible, for example in relation to certain instrument types where sustainable comparable alternatives are unavailable, passive products, funds that invest in derivative instruments, products managed in accordance with specific client objectives, and delegation to third-party investment managers. Refer to Manulife Investment Management’s sustainable investing and sustainability risk statement for more detail.

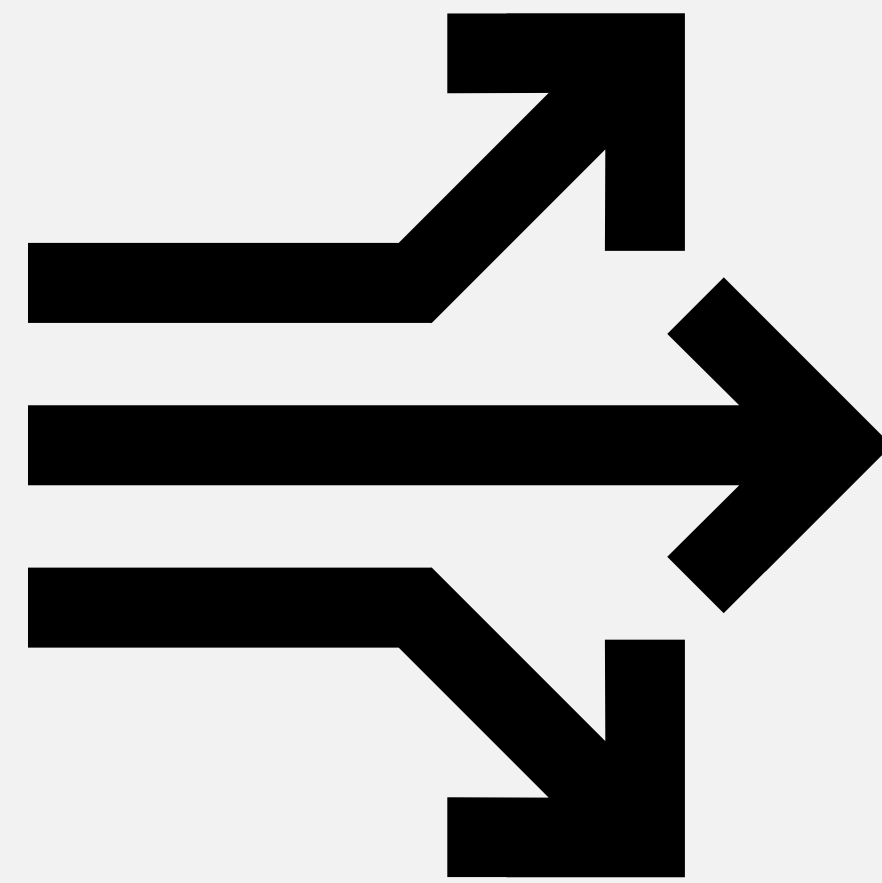


Accountability

Sustainability-related KPIs are factored into our annual employee performance review and remuneration metrics

At Manulife Investment Management, we recognize that sustainable investing is a critical driver of success within the asset management industry. We've set a clear target to be at the forefront of this industry evolution, further defining our value proposition and strengthening our competitive advantage.

Across all public and private markets asset classes, the contribution of investment to sustainable investing and stewardship forms part of the discretionary bonus decision-making process each year. Accordingly, each team is expected to contribute to the firm's advancement in sustainable investing overall and adhere to research processes that integrate sustainability considerations where financially material and in line with our fiduciary duty to clients.



Strategy

We believe that unmitigated climate-related risks will present a systemic threat to societal and financial stability—and, therefore, to our business and our clients’ financial objectives—over the coming decades.

It’s too early to tell how rapidly the world will reduce GHG emissions and what the associated environmental impact will be. This makes it imperative to assess, to the best of our ability, the actual and potential material impacts of climate-related risks and opportunities in our portfolios and ensure that they’re as climate resilient as possible.

We also believe that the understanding of climate change across capital markets remains varied, leading to potential mispricing of assets, and that many companies may be inadequately prepared to respond to the risks and opportunities that a low-carbon transition could present. A key element of our overall strategy is to identify and incorporate these risks and opportunities in our portfolios.

Our [climate change statement](#) explains that to understand the impact of climate change on investment decisions, asset managers should assess the transition risk, physical risk, and opportunities posed by climate change to the assets and companies in which they’re invested. We recognize that climate change could have an economic impact, which will vary from company to company and asset to asset. The varying degree will depend on the exposure level of each sector, industry, and geography.

Climate risks and opportunities over time

Accurately measuring climate risks and opportunities: We aim to identify climate risks and opportunities over various timeframes and to reflect their financial impact in our investment analysis.

Climate change is already occurring, and it's likely to intensify over the coming decades. In this context, we prioritize sustainability criteria when it comes to the assets we manage and operate. And we believe the companies we invest in must respond to the challenges of climate change by adopting new technologies, responding to changing policy, adapting to changing consumer preferences, and preparing for the threat of physical consequences, both acute and chronic. These conditions and imperatives create risks and opportunities that have financial impacts that we need to act on today.

Although there's no set rule for short-, medium-, and long-term time horizons for climate-related issues, short term usually refers to 1 to 5 years, medium term refers to 5 to 10 years, and long term refers to 10+ years.

The TCFD classifies climate-related risks relevant to investors over these timeframes as physical (associated with acute or chronic changes in weather patterns) and transition related (effects resulting from the transition to a low-carbon economy, including policy, legal, technological, and market changes to address mitigation and adaptation requirements). The TCFD framework also emphasizes that efforts to mitigate and adapt to climate change produce opportunities for companies, industries, and investors. We recognize that these risks and opportunities vary by sector and geography.

These risks and opportunities will have financial impacts over these short-, medium-, and long-term time horizons. Policy and legal risks can be short term, as they aim to help mitigate climate change before it happens; the promise of a new technology can also sometimes be quickly recognized in the market. Reputational damage can have more lasting medium-term impacts, similar to the effects of changing customer behavior. The severity of physical risks tends to be more certain over the longer term, but acute weather events can be unpredictable and may happen in the near term. The prospect of stranded assets is also more predictable over the long term but is increasingly priced into financial markets today; examples of stranded assets could be due to GHG regulations, such as a carbon tax, innovation driving rapid technology switching, or physical climate risks (chronic and acute) that may render the operation of an asset uneconomical.

We aim to identify these risks in our research, which is reflected in our investment selection, valuation, and portfolio construction. We also believe that scenario analysis is a meaningful tool to understanding the impact of climate change. In those asset classes in which we've developed scenario analysis, most portfolios show that climate transition risk—or the general cost associated with moving from a current business-as-usual scenario in the direction of reduced emissions and toward a carbon-neutral future—represents a significant portfolio risk. Physical hazard risk, or the cost impact associated with extreme weather events, which we identified in our initial analysis as extreme heat, coastal flooding, and tropical cyclones, is also critical to assess at a portfolio level. These risks may be mitigated through climate-related opportunities such as nature-based solutions, climate resilience measures, and adaptation.

Impact of climate risks and opportunities

Sustainability integration: We aim to incorporate identified financially material climate risks and opportunities throughout our investment processes.

Where we identify climate-related risks and opportunities as financially material, we seek to integrate these into our investment process and manage them as part of our business strategy and planning. In our integration process, we focus on attractive risk-adjusted returns and resiliency over the long term. We factor in differences across asset classes, industries, geographies, and operating models, and as climate science evolves, so too does our approach.

There's no single dataset that perfectly captures the risks of climate change effects. For this reason, we apply an active approach to internal and third-party data and use tools that we complement with our own industry knowledge and firsthand experience. This expertise is built through engagement to understand companies' vulnerabilities and strengths and through our own stewardship efforts in which we seek to understand the full spectrum of risks and opportunities related to the assets we manage and operate.

We develop differentiated analytical techniques, including scenario analysis, to inform our security selection and valuation; scenario analysis can also inform portfolio positioning. Within the firm, investment teams that use scenario analysis typically apply the 1.5°C, 2°C, 3°C, and 4°C scenarios; in many instances, these are complemented by the inclusion of carbon pricing and assessment in their analysis. However, we also go beyond buy and sell decisions to include engagement focused on climate action and active stewardship in our investment process.

We share sustainability goals with our clients. We've been building our sustainable investing capabilities to help clients guard against climate risks while seeking to invest in companies with appropriate risk-adjusted return profiles that we believe contribute to sustainable climate solutions. In addition, we continue to develop thematic products and investment strategies as potential options for investors. Because we view climate-

related risks as systemic, we also contribute to external initiatives and collaborative industry engagements as appropriate.

We seek to communicate transparently with our clients about our climate-related investing strategy and process, and we believe this may help support our clients in responding to their own stakeholders. In 2020, we made our [climate change statement](#) publicly available, and since 2021, we've outlined our evolving climate-related efforts and activities in our annual [stewardship report](#). For interested clients, we've developed a client-reporting template, which contains a variety of sustainability metrics, including portfolio carbon footprints, for equity and fixed-income investors.

Supplemental guidance for asset managers

We take a variety of actions to appropriately account for climate-related factors in each asset class according to its internal, technical, and market dynamics along with its regional expression. This work occurs throughout our sustainability integration process, engagement strategies, and the development of climate-focused investment frameworks.

Assessing the risks and opportunities related to climate change across asset classes is critical to preserving and enhancing the value of our investment strategies and mitigating against potential impacts risks and opportunities have on our business model and strategies.

With our wide reach across the globe, we can monitor climate policies, technological advancements and environmental initiatives, and the progress made by various organizations in reducing their carbon footprint. Our collaborative approach between asset classes enables mutual learning and the sharing of evolving best practices around climate-related factors material to our business. While we assess climate risk and opportunities across all asset classes, the approach may vary to tailor the approach to each asset class and investment strategy since what is material and a useful approach for one may not be relevant for another.

Climate change assessment is a critical part of our investment process and our corporate engagement program, which is particularly relevant in hard-to-abate sectors. Our global presence enables us to track climate regulations, consumer sentiment related to technology innovation and climate action, and the decarbonization efforts of individual companies. We believe our global view is an important differentiator that sets us apart from many of our peers.

Timberland and agriculture

Climate-related risks to the biological assets we manage include wildfire, drought, high winds, flooding, pest outbreaks, and increased costs (transition risk associated with carbon pricing), among others. These risks may vary in prevalence and magnitude depending on location and asset type but may also be directly influenced by climate-related weather changes such as temperature or precipitation extremes or volatility. We have a variety of levers at our disposal to mitigate these risks, such as crop or tree genetics, species diversification, nursery practices, planting density, forest thinning, automation, fuel switching, and insurance. We account for such risks, as well as our ability to mitigate them, from investment due diligence all the way through asset management. Importantly, this also includes the imperative to reduce our contributions to climate change, which is why in 2023 we established decarbonization working groups in both our timberland and agriculture businesses to focus on identifying and implementing practical solutions to reduce our operational carbon footprint.

Climate-related opportunities also influence our timberland and agriculture business strategy. Forests and farms are both natural capital assets. They represent natural stocks of value that produce flows of benefits, or ecosystem services, to both their owners and society at large. In addition to the basic ecosystem services they provide in the form of food and fiber, they also provide a host of other services, such as climate change regulation, water filtration, and recreational opportunities. In particular, carbon sequestration is a key capability for trees. We see considerable opportunity to leverage the natural capital assets we manage to help our investors reduce their carbon footprints, and increasingly so as markets for carbon sequestration and other payments for ecosystem services develop and mature.

Infrastructure

As long-term infrastructure investors, we recognize that climate change can present systemic risks that could affect our ability to create long-term value for our clients. While acknowledging that climate change is one of the biggest challenges of our time, it also presents unique opportunities for investors to support the transition to a lower-carbon economy through large-scale decarbonization required across infrastructure sectors. Incorporating climate risks and opportunities into our strategy and investment process enables us to assess, manage, and monitor material climate-related risks while capitalizing on climate opportunities.

The physical effects of climate change and risks related to the transition to a lower-carbon economy could impact the assets in which we invest. To that end, we've formalized our process for identifying and assessing physical climate risks—alongside our due diligence work focused on evaluating material ESG considerations—for all new investments. We use a third-party natural hazard and physical climate risk assessment tool, which provides asset-specific and total portfolio physical risk exposure over the short-, medium-, and long-term time horizons and across various climate scenarios. Our infrastructure investment team works collaboratively with our sustainable investing team to leverage their expertise on climate and will then consider engaging technical consultants to dive deeper on physical risks identified through the assessment and deemed material to the investment. Through our active stewardship approach, we partner with the management of our portfolio companies to engage on material findings from our ESG due diligence, including physical climate risks, to better understand mitigants in place and actions planned to address such risks. We monitor such potential risks over the holding period through our board seats and board observer rights as well as regular engagement with asset management teams.

Furthermore, we assess climate transition-related risks through our annual portfolio carbon footprint assessment. In 2023, we enhanced our methodology and saw improved reporting of GHG emissions from our portfolio companies, with year-on-year data building on our first carbon footprint assessment in 2022. Quantifying the financed emissions of our investments and carbon footprint of our portfolio helps us to assess our exposure to high-emitting sectors and to inform active discussions with our portfolio companies on their transition planning.

Real estate

As a manager of real estate investments, our business is exposed to risks and opportunities from the environment in which we operate, and we recognize that physical climate risk has progressively become a core real estate issue. As the impact of climate change is increasingly felt, it's vital for our investors, employees, and tenants to understand the importance of addressing the issue. We seek to integrate climate considerations into each stage of the real estate investment lifecycle. We use a stepwise process to ensure that teams are putting into place essential measures to make our portfolios more resilient.

While we continue our efforts to mitigate climate change by transitioning our operations and supply chain to low carbon, we also recognize that we must build climate resilience within our real estate portfolios and across our management practices.

The nature and level of risk are dependent on structural forces that will shape the short- and long-term decisions, and we expect our business will be affected in both positive and negative ways by the climate transition. The opportunities that emerge will likely depend on our action and response. Reducing our carbon footprint is critical to our transition to a low-carbon economy and a sustainable future.

Private equity and credit

Assessing the risks and opportunities related to climate change is an integral part of our sustainable investment approach for our private equity and credit (PE&C) businesses.

In 2023, we established an SIC to support the implementation of Manulife Investment Management's [sustainable investing and sustainable risk statement](#) within PE&C. The SIC approved PE&C's inaugural climate strategy, which outlines near-term priorities and longer-term objectives for evolving how we integrate climate considerations across the investment cycle and into each PE&C investment strategy. Core pillars include monitoring our portfolio carbon footprint, enhancing our investment teams' climate knowledge, generating climate-focused market insight, and partnering and engaging with industry groups and private equity peers through external initiatives.

Within PE&C, we assess climate-related risks primarily during our pre-investment due diligence process. On an annual basis, we update and monitor the sustainable investing performance of our investments using our proprietary framework, which incorporates climate-related issues that may be deemed material for a particular investment. In 2023, we conducted a carbon footprint assessment inclusive of all PE&C strategies, with year-on-year data building on our first carbon footprint assessment in 2021. We've enhanced our methodology through the annual collection of GHG emissions data from our portfolio companies and sponsors. Through our membership in the ESG Data Convergence Initiative (EDCI), we continue to advance for improved, standardized ESG data disclosures from the private equity industry, including core metrics such as GHG emissions.

Equity and fixed income

Within public markets asset classes, we assess transition risk by using a blend of qualitative analysis and quantitative sustainability metrics such as climate VaR, which seeks to quantify the estimated financial impact of climate change. The severity of physical risks tends to be more certain over the longer term (apart from acute weather events, which can be unpredictable) and typically depends on where an asset is physically located. Scenario analysis, in which the effect of climate change can be modeled through a range of possibilities, is one of the key tools we use to place a financial value on climate risk based on the rate of global decarbonization.

We've also developed climate change-themed investment strategies for both equity and fixed income, with a focus on portfolio resilience.

While climate risks exist, as do opportunities, including the promise of new technologies: Green hydrogen, biofuels, and batteries are good examples of these opportunities. We attempt to identify issuers who are leveraged to these themes and track their competency to capture the opportunities. One way we measure this is by assessing the value of low-carbon technology patents filed by issuers, which we believe can provide useful insight in regard to innovation and progress.

Understandably, tackling climate change is an integral part of our corporate engagement program, particularly when it's a material factor for an issuer or industry. We aim to share our knowledge and findings with investee companies in the hope that this can help them strengthen their sustainability footprint and reduce climate risk. Our collaborative approach with issuers enables mutual learning and the sharing of evolving best practices around climate-related disclosure and management.

Building resilience

We conduct scenario analysis in an effort to understand the potential impact of different climate outcomes on our investment strategies and operated assets. We believe this will enhance our portfolios' resilience and is in the interest of all our stakeholders, from our employees to our clients and the communities in which we operate.

We identified a number of areas in which we could be more effective in our efforts to address climate change in 2020. Since then, we've developed models and tools to assess the potential impact on our business of the four Intergovernmental Panel on Climate Change (IPCC) scenarios. In addition, we made progress in assessing climate risk and resilience in our real estate portfolio by enhancing our internal assessment process and through third-party portfolio review.

The third-party climate assessment tool that we use applies a multi-year time horizon to assess risks and opportunities based on direct emissions, covering both physical and transition risks and opportunities. Policy risk is calculated based on nationally determined contributions, while technology opportunities are based on the International Energy Agency's (IEA's) Energy Technology Perspectives model (superseded by the IEA's Global Energy and Climate Model in 2022). Several teams at Manulife Investment Management also apply other scenarios and carbon pricing estimates into their models, including the development of worst-case cost scenario assumptions. We also use a proprietary model that allows investment teams to assess their climate exposure across their portfolios.

Timberland and agriculture

We recognize that despite well-known risks and opportunities, the actual impact of climate change is far from certain. As such, we plan for multiple possible futures through climate scenario analysis. In 2022, we acquired a tool that has enabled us to conduct scenario analysis for potential acquisitions and we're currently working on integrating the information it provides into our longer-term planning.

Case study scenario analysis insight: California agriculture

High-carbon scenario	
Physical impacts	Business impacts
Increased average temperatures (global mean increase of 3.7°C by 2100)	<ul style="list-style-type: none">• The impact of warmer winters on bee colonies needs to be monitored• Consideration of what may need to be moved northward
Increased wildfire risk	<ul style="list-style-type: none">• Risk of smoke-tainted vineyards• Risk of smoke blocking out sunlight and affecting almond drying rates
Changes to natural areas and biome shift	Risk of biome shift is more likely to be felt by the ecosystem surrounding farmland, rather than directly on the assets; these impacts would need to be monitored
Changes in precipitation, water availability, and quality <ul style="list-style-type: none">• Increased variability in availability• Earlier snowpack melt• Aquifer depletion• Increased precipitation• Increase in the intensity of rainfall	<ul style="list-style-type: none">• Crops will require increased amounts of water; snowpack is an important natural water reservoir that may become depleted• More intense storms may result in precipitation being washed out to sea rather than seeping into the ground, preventing aquifer replenishment• Water stress is likely to increase; in severe cases, insufficient water may require transitioning some assets to areas with more water
Mean global sea level rise of 0.63 meters by 2100	Little to no impact on current assets; may increase salination of some aquifers—to be monitored
Transition impacts	Business impacts
Increased likelihood of regulatory developments affecting water use	Water regulation will likely become prevalent in California over the coming decades, which may increase operational costs but may also present water banking opportunities
Low-carbon scenario	
Transition impacts	Business impacts
Carbon pricing (\$100/tCO ₂ by 2030 and \$140/tCO ₂ by 2040 in advanced economies)	<ul style="list-style-type: none">• Risk of higher operational costs from carbon pricing, which may be passed on to consumers, depending on price pressures (e.g., substitution-related price ceilings)• Opportunity for monetizing soil carbon sequestration as carbon prices rise
Renewable energy (increased deployment, including bioenergy)	<ul style="list-style-type: none">• Increased biofuels demand presents the opportunity to expand into new crops and serve a new market• Projected reduction in renewable energy prices could present the opportunity to install on-site microgrids to reduce energy costs

Case study scenario analysis insight: New Zealand timberland

High-carbon scenario	
Physical impacts	Business impacts
Increased average temperatures <ul style="list-style-type: none">Global mean temperature increase of 3.7°C by 2100Higher elevation warming relatively more than lower elevation	<ul style="list-style-type: none">Opportunity for gaining increased share of Mainland China’s timber market as European timber regions may be subject to more extreme climate changes with attendant impacts on their productivityIncreased average temperatures may extend the range for pine to higher altitudes should land ownership opportunities become available
Changes to natural areas <ul style="list-style-type: none">Rise in snowlineBiome shift	Most of Manulife Investment Management Timberland and Agriculture Inc’s (MIMTA) New Zealand plantation forests are radiata pine, which is fairly resilient to biome shift
Changes in precipitation and storms <ul style="list-style-type: none">Increased flood damageIncreased risk from hurricanes/cyclones	Risk of heavy rainfall, wind, and cyclones, leading to forest loss and possible debris washout
Mean global sea level rise of 0.63 meters by 2100	Rising temperatures and sea levels are unlikely to affect New Zealand radiata pine
Low-carbon scenario	
Transition impacts	Business impacts
Carbon pricing and growth of the carbon market (increasing carbon pricing to \$100/tCO ₂ by 2030 and \$140/tCO ₂ by 2040 in advanced economies)	<ul style="list-style-type: none">Higher carbon prices would increase shipping costs, which may be offset by a projected increase in global demand for lumberMIMTA has monetized most carbon offsets available for its New Zealand properties and afforestation opportunities are currently scarce, making generation of new carbon offsets unlikely
Increased bioenergy (grows to 7% of power generation by 2050)	<ul style="list-style-type: none">Industrial shift toward biofuels may provide an opportunity if demand for wood pellets increases, although growing fiber demand for newer uses and in building materials may offer a higher price pointCarbon pricing may increase the costs for fossil fuels, making biofuels more attractive and potentially an opportunity for MIMTA
Renewable energy (increased deployment of wind and solar)	There’s likely little opportunity to provide new renewable energy capacity due to the New Zealand energy grid’s low emissions profile



Real estate

Identifying and understanding the climate risk to a company or portfolio enables the development of resources and tools to manage that risk and improve resilience effectively. We keep a record of our existing resilience practices and features and identify improvement opportunities for climate change management. Our approach includes conducting an evaluation at both the portfolio and asset levels.

Transition risks (the general costs associated with moving from a current business-as-usual scenario to a low-carbon economy) and physical risks (the impacts associated with extreme weather events and changing climatic conditions) present the greatest climate-related challenges and opportunities to our real estate assets. We consider the following risks as having potential impacts on our business across either short-term (1 to 5 years), medium-term (5 to 10 years), or long-term (10+ years) time horizons.

Identified transition risks and opportunities⁵

Risk	Timeline	Mitigation and opportunity
Regulation —Climate-related regulations, including carbon pricing, regional efficiency, or emissions standards, and disclosure requirements are increasing. Regulation changes could lead to increasing operating and compliance costs.	Short to long term	We continue to monitor emerging regulations and incorporate assessment of building performance and efficiency in our due diligence to stay ahead of carbon pricing and minimum efficiency requirements.
Market —Shift in capital away from high-emitting products and services may potentially affect tenant demand, asset value, and fund-raising.	Short to long term	Improving portfolio efficiency could create new avenues for financing and increase investor and tenant demand. We continue to certify and build assets to green building standards such as LEED , ENERGY STAR , CASBEE , and BOMA BEST , implement energy and emissions reduction programs, and collaborate with tenants and clients on shared climate goals.
Technology —There’s a cost to move to a low-carbon economy, including capital upgrades to retrofit assets, advanced technologies for buildings, demand for high-quality transactable ESG data, real-time metering, and shifting to renewable energy sources.	Short to long term	Short-term capital costs are expected to be offset from paybacks on lower operating costs and meeting tenant demand. Our ongoing energy, water, GHG, and waste programs support our team in allocating capital toward low-carbon technology and improving property performance.
Reputation —Failure to act or the perception of not acting on climate change could affect our reputation as a global real estate leader and risk our relationship with tenants, employees, communities, and investors.	Short to medium term	To communicate our climate change action and impact, we disclose our objectives and performance annually through several independent and industry frameworks, including the Principles for Responsible Investment (PRI) , GRESB , our annual real estate sustainability report , and this climate disclosure report. We also support Manulife’s disclosure to CDP .

⁵ This table is a nonexhaustive list of the main risks and opportunities currently identified across our real estate portfolio. Risks and opportunities are subject to change over time and are ultimately addressed on a case-by-case basis depending on the individual characteristics of each property.

Identified physical risks and opportunities⁵ (continued)

Risk	Timeline	Mitigation and opportunity
Acute risks		
Flooding —Flooding can cause asset damage, downtime, and incurred costs through insurance premiums and deductibles. Flooding may affect our ability to obtain insurance in vulnerable markets.	Short to long term	Our insurance team reviews portfolio flood exposure annually to understand insurance implications. Properties have regular site assessments completed by our insurer, which include recommendations for protection measures.
Extreme storms —Climate change is expected to increase the frequency and severity of extreme storms, high winds from hurricanes, typhoons, snowfall, or ice storms from extreme temperature fluctuations. This can cause asset damage and downtime from power loss.	Short to long term	We prepare properties for storms through our emergency management planning and seek to minimize downtime by using on-site backup power generators.
Wildfires —Wildfires can not only cause asset damage, but may also affect occupant health through reduced air quality.	Short to long term	Our teams consider various resilience measures, including fire-resistant building materials, on-site emergency water supplies, and high-efficiency air filters to protect indoor air quality.
Chronic risks		
Heat stress —Rising global temperatures can affect employee and tenant productivity and increase operational costs to maintain safe and comfortable building conditions.	Short to long term	We seek to identify opportunities to improve cooling efficiency and costs through capital upgrades, building commissioning, and operating procedures.
Water stress —Water scarcity can affect water availability and increase operational costs.	Short to long term	We seek to maximize operational efficiencies while minimizing consumption through practices such as water audits and installing low-flow appliances and faucets, and minimizing landscaping water requirements where applicable throughout our portfolio.
Sea-level rise —Rising sea levels can present similar challenges to flooding while also risking failed development approvals and stranded assets in vulnerable areas.	Long term	We review and consider exposure to sea-level rise in acquisition and new development decisions as well as across our existing portfolio. We invest in preventative infrastructure and consider underwriting where applicable.



In 2023, we conducted a climate scenario analysis to further understand how climate change might affect the real estate business and what actions we can take to prepare. The workshop, which included members from real estate senior leadership, identified risks and opportunities based on two future scenarios:

- **Scenario 1: failure to act (>4°)**—Participants believe that physical climate risks will increase costs and reduce value; supply chain disruptions and market variability from changing climate conditions will also affect our business.
- **Scenario 2: Paris-aligned (<2°)**—Participants expect sizable investments to overcome transition risks; despite these costs, participants identified significant opportunities in being an early mover in transitioning to net zero.

The study identified risks and associated business implications from future climate states and assessed current and potential preparedness strategies to address climate risks. The results of the assessment were shared and presented to senior leadership and will be used to inform internal processes, as well as responses to industry frameworks.



Risk management

Manulife Investment Management is committed to developing a risk management approach and framework that articulates how we identify and manage the climate-related risks and opportunities to which we're exposed. We integrate the consideration of material sustainability factors, including climate-related issues, into the investment process of our investment teams, as we seek to deliver long-term resiliency and sustainable investment outcomes for clients.

As an asset manager, we operate and invest within the constraints of our client mandates. Meanwhile, we bear responsibility toward shareholders, clients, and stakeholders to assess, report on, and manage climate-related risks, and we continue to assess climate-related risks and manage our own businesses' impact on climate change. We're developing strategies that support sustainability goals, including strategies oriented toward investors who wish to achieve structurally lower carbon emissions and want to identify with companies that are making strong progress on climate change goals.

For example, we continued to offer thematic strategies such as our forest climate strategy, global climate equity strategy, and global climate bond strategy, while adding new product capabilities and offerings such as our global environmental transition strategy, which invests in the equity of companies that positively contribute to environmental transition by providing low-carbon solutions or through products and services that enable energy efficiency, promote electrification, or improve resource use.

Climate change and risk management

We acknowledge that climate change is one of the most material long-term risks to our business model, and its effects are already being felt. We seek to remain abreast of the best available science on climate change and to understand its impact on our investments.

The IPCC urges action to limit global warming to 1.5°C in order to prevent the destabilization of the climate system and reduce the risk of impending extreme weather events, changes to global food systems, biodiversity loss, and greater poverty.

According to a previous [IPCC report](#), “limiting global warming to 1.5°C would require rapid and far-reaching transitions in land, energy, industry, buildings, transport, and cities.” Additionally, as noted by the [World Resources Institute](#), “\$5 trillion will be needed annually by 2030 to finance the systemwide transformations needed to limit global warming to 1.5°C. But to meet this target, annual increases in total funding from public and private sources must accelerate by a factor of 13.” Such profound changes present significant risks and opportunities for all institutions, including those in the private sector.

This combination of sustainability-focused activities in assets we manage and operate, rigorous fundamental research, proprietary ESG assessments, use of third-party providers, and direct collection of climate-related data enables us to manage climate-related risks within the parameters of each specific product or investment strategy.

How we identify climate risks

Our process for identifying climate risks is supported by our policies and engagement practices. In addition, we identify climate risks through public disclosure and third-party sources, as well as through our own research, company engagement, and collaborative initiatives.

Our processes for identifying climate risks are supported by our policies and engagement practices. Manulife Investment Management’s climate change statement outlines our position on identifying, managing, and integrating climate risks and opportunities in our investment processes. In parallel with this statement, Manulife’s [environmental risk policy](#), updated in 2023, sets out an enterprise-wide framework for the management of environmental risks within our operating business activities and owned assets.

In parallel with this framework, Manulife Investment Management identifies and assesses climate risks in our clients’ investment portfolios through public disclosure and third-party sources, as well as through our own research, company engagement, and collaborative initiatives. As a component of risk management, we also conduct climate scenario analyses.

To better identify and assess climate-related risks for our investee companies, as well as for assets we operate, we consider and incorporate external assessments and information from different sources. We apply tools designed to analyze carbon emissions, conduct scenario analysis, examine fossil fuel reserves, and formulate conclusions about physical and transition risks, along with other topics across the climate-related risk spectrum.

We also obtain climate risk data from companies’ publicly disclosed documents. We also engage with companies where we seek additional disclosure and in cases

in which data providers have information gaps. Manulife Investment Management has participated in a wide range of climate change-focused associations and organizations that contribute to more robust efforts at climate disclosure, including:

- [AIGCC](#)
- [CDP](#)
- [Ceres Investor Network on Climate Risk and Sustainability](#)
- [Ceres' Valuing Water Finance Initiative](#)
- [Climate Action 100+](#)
- [Climate Engagement Canada](#)
- [EDCI](#)
- [Institutional Investors Group on Climate Change](#)
- [GRESB](#)
- [ISSB Investor Advisory Group \(IIAG\)](#)
- [Sustainable Forestry Initiative \(SFI\)](#)
- [Sustainable Finance Action Council Taxonomy Technical Experts Group](#)
- [TNFD](#)
- [TCFD Consortium \(Japan\)](#)
- [UN PRI](#)
- [WBCSD](#)

Supplemental guidance for asset managers

We host sustainability education and training across the firm on a variety of sustainability issues, including climate-related topics. For all investment staff, our sustainable investing teams host periodic training on thematic sustainability issues for which the content and medium can vary. Training is either led by our internal sustainable investing teams or leveraged from external service providers and experts. Investment staff attendance at such training events is strongly encouraged. For example, we've previously hosted a policy and practitioner expert session, Climate science and policy response—a discussion with the Union of

Concerned Scientists. In 2023, our infrastructure investment team held a session on climate strategy, and the team's sustainability training program includes a section on physical climate risk.

Another key example is the training that occurs in our global engagement research initiative (GERI) discussions. This program consists of bimonthly meetings with public markets equity, fixed-income, and sustainable investment professionals. Each GERI meeting has a sector theme with related internal professionals as well as outside speakers invited to present pertinent research for the given sector; in 2023, for example, one focus topic was dedicated to climate disclosure in the financials sector.

The sustainable investing teams also conduct training for specific investment teams on an as-needed basis. For example, training has been provided to the liability-driven investment team on broader topics such as climate change in addition to specific topics such as GHG emissions breakdown by sector, climate VaR, and climate scenarios. In portfolios of public markets asset classes, we engage with investee companies to encourage best practices associated with climate-related disclosure. We also use CDP data to assess the potential impact in terms of costs and benefits of climate change for our investee companies.

Our fundamental investment process goes beyond financial statement analysis and involves ongoing monitoring of the strategies, capital structure, and management of sustainability risks and opportunities of a given company or entity. For public markets asset classes, within the daily risk report encompassing each strategy, climate metrics are provided to describe those issuers with a higher climate risk exposure; additional specifics are also provided in climate tools that are available to those investment teams.

Asset class/tools	Listed equity	Fixed income	Timberland and agriculture	Real estate	Infrastructure	PE&C
Carbon footprint analysis	Yes	Yes	Yes	Yes	Yes	Yes
Company transition assessment	Yes	Yes	N/A	N/A	—	Yes*
Scenario analysis	Yes	Yes	Yes	Yes	—	—
Climate risk tool kit	Yes	Yes	Yes	Yes	Yes	Yes

* For PE&C portfolio companies, we undertake a company transition assessment where material.

Climate tools

- 1

Portfolio carbon footprint—We actively measure the portfolio carbon footprint that enables portfolio managers to comprehend portfolio carbon intensity and provides a baseline for benchmarking and decarbonization strategies.
- 2

Robust transition company assessment—A dedicated internal team uses various tools and data points to assess whether a company has a credible climate strategy and transitional plan. Those tools include the Transition Pathway Initiative, CDP, the Science Based Targets initiative (SBTi), Trucost GHG emissions data, Bloomberg ESG tools, and IEA scenario analysis data.

- 3

Climate scenario analysis—We provide climate risk data aligned to multiple climate scenarios within our daily risk reports that encompass those investee companies with the highest climate risk exposure at an individual portfolio level.
- 4

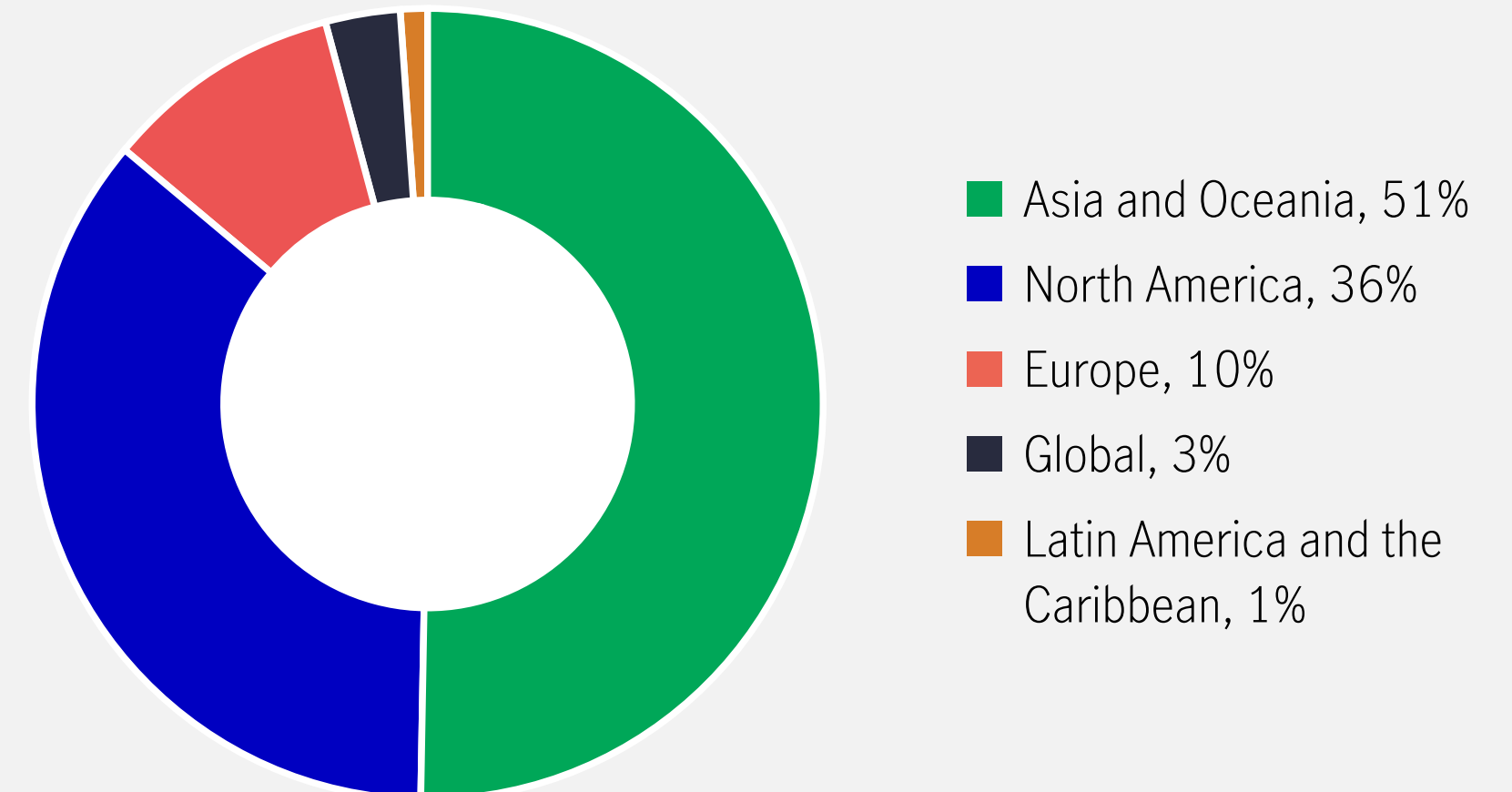
Climate risk tool kit—This allows public markets investment teams and professionals to evaluate climate risk at a portfolio and issuer level. The tool is housed centrally on our global research platform.

Linking climate exposure to active ownership, we may seek to engage with companies/entities/investors both before and after we invest in order to enhance the long-term value of our clients' investments. One topic we often engage on is helping companies to provide effective disclosure, including climate-related information. We apply a materiality-based approach to our investment decision-making process, but we recognize that some factors can have material effects across industries and geographies; for example, we believe that climate change and nature are topics to be considered for investments in all asset classes, geographies, and sectors.

We believe that investors can also play a strategic role, not only in the identification and analysis of the systemic risks from climate change, but by using our voice to improve outcomes for our clients, as well as for the economy, environment, and society. Through our sustainability analysis, we identify both the key barriers to effective stewardship and the immediate improvements we recommend to promote the smoother functioning of financial markets. This helps our own climate risk assessment, but it also advances the market overall and we believe can help reduce systemic risk.

800+ unique issuers
25+ vendors, nongovernmental organization, governments, and industry bodies
1,250+ unique interactions

Unique entities engaged by region



The global category includes vendors, nongovernmental organizations, and influencers with a worldwide focus and coverage. Mexico is included in the Latin America and Caribbean category. Percentages may not add up to 100% due to rounding.

Top sustainability engagement discussion topics 2023

Discussion topics	Total interactions
GHG emissions	21%
Energy management	17%
Human capital management, employee engagement, and DEI	9%
Collective bargaining and labor relations	8%
Sustainable sourcing practices	7%
Management of the legal and regulatory environment	5%
Board diversity (gender/ethnicity)	5%
Executive compensation	5%
Physical impacts of climate change	5%
Biodiversity	4%
Water and wastewater management	3%
Product design, lifecycle management, and/or packaging	3%
Human rights	3%
Product complaints, litigation, and recalls	3%
Employee health and safety	3%
Waste and hazardous materials management (e.g., tailings, effluents)	2%
Net zero/decarbonization targets and strategy	2%
Data security	2%
Customer privacy and rights	2%
Board chair/CEO independence	2%
Access and affordability	2%
Transition business opportunities	2%

Source: Manulife Investment Management, as of December 31, 2023. This list relates to engagements with public markets issuers and was compiled using data from our proprietary engagement tracker. A single engagement may be represented across multiple topics as a single engagement often covers a range of issues. The list above reflects topics that we track that were discussed in at least 2% of our total engagements.

Managing climate risks

We manage climate risks throughout the different stages of our investment process

As put forth in our [climate change statement](#), we may take a variety of actions toward managing climate-related risks and opportunities across our businesses and investments to appropriately price climate risk. Broadly summarized, our available actions relate to asset allocation and selection, investment analysis and research, proxy voting, mitigating direct GHG emissions, deploying sustainability management best practices for operated assets, and participating in collaborative industry climate initiatives.

Material sustainability factors throughout the investment lifecycle

Our investment teams are empowered to make decisions in line with their respective investment philosophies and client objectives. Each investment team has responsibility for its own investment process, from research through implementation. The integration of material sustainability factors into investment processes aligns with this approach, ensuring that our analysis is relevant and meaningful to each team's investment process. The global heads or chief investment officers of each asset class have oversight of the investment processes of the individual investment teams, which includes responsibility for evolving our sustainable investing approach over time.

We look to incorporate material sustainability risks and opportunities throughout the stages of our investment lifecycle, taking into account the characteristics of the asset class and investment capability in question as well as industry and geography, among other factors.

Partnering with clients on their climate-related goals

We aim to deliver long-term resiliency and sustainable investment outcomes for clients, including by partnering with them on their climate-related goals. We also aim to engage with our investee companies to accomplish these outcomes using a variety of internal initiatives.

- Training for investment staff on topics such as climate science, analysis, and available tools
- Engagement with companies in relation to their climate disclosure, business strategies, governance, and emissions reduction plans/progress
- Development of strategies that support sustainability goals
- Education and reporting for our clients on climate risks and opportunities
- Operations and emissions reduction targets within Manulife's real estate, timberland, and farmland assets

Supplemental guidance for asset managers

Material climate-related risks are managed by considering asset class, geography, and underlying investment strategy.

As we have investment teams operating in varied markets, this results in different applications of sustainability analysis. Accordingly, a team integrates material sustainability factors into its investment process in a manner that best aligns with its investment approach. Each team bears responsibility for the evaluation of financially material sustainability factors throughout due diligence, decision-making processes, and ongoing stewardship. Integration within each asset class or investment strategy always focuses on material sustainability risks, as we believe that identifying and assessing material sustainability issues help us protect and enhance the value of the assets we manage and operate.

Determining the materiality of sustainability factors requires a certain level of judgment from the investment team based on its understanding of the asset or company and the industry in which it operates. We generally feel that it's unlikely that any asset or company will be unaffected by climate change; however, some industries may have a higher risk exposure than others, and the assessment identifies those industries.

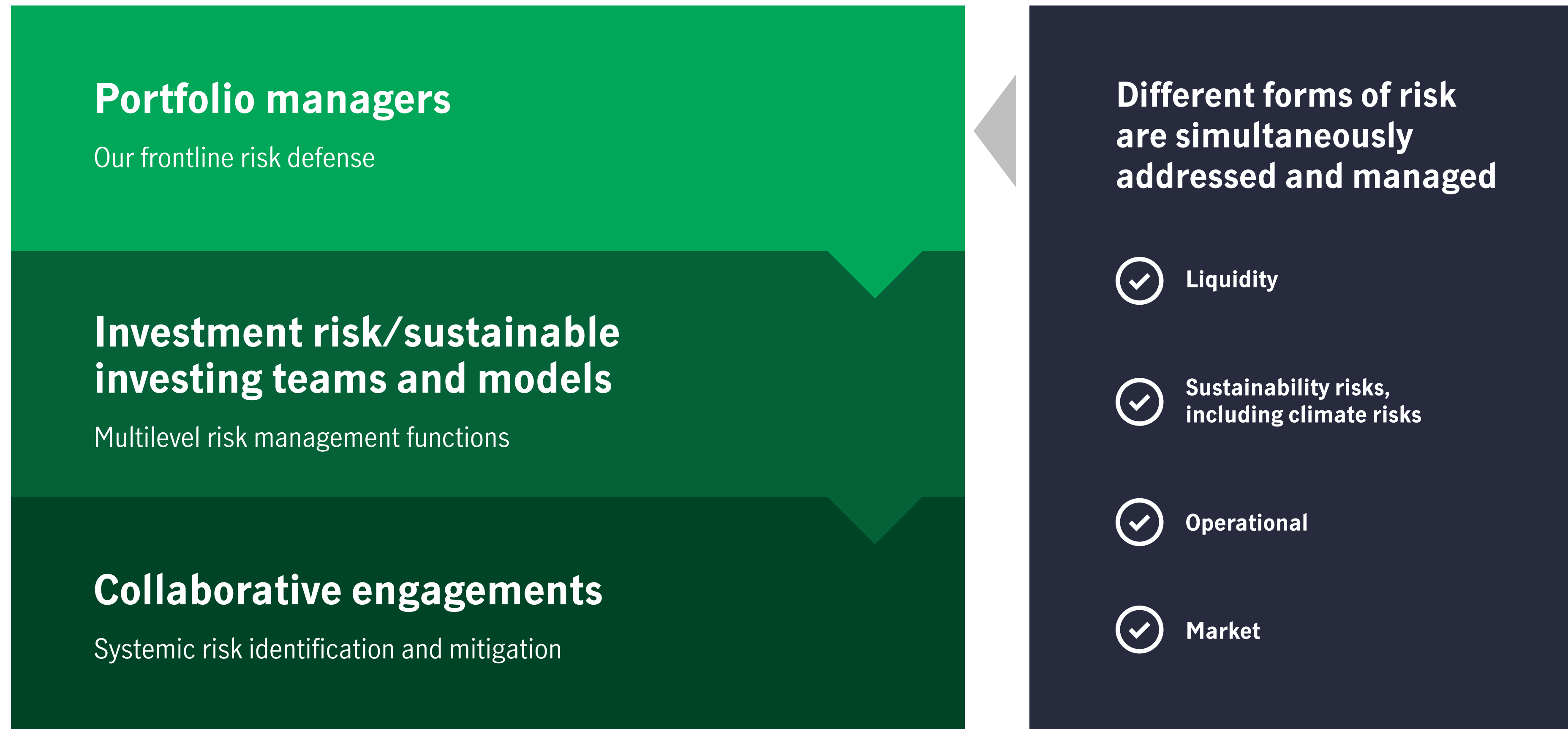
Integrating climate risks

Climate risks are integrated into our overall risk management framework.

Manulife Investment Management deploys a risk management approach that comprises three layers, beginning with our investment professionals. This is followed by compliance and risk management teams acting as the second layer, with our internal audit team constituting the third. All three layers have entirely separate management structures and reporting authorities to ensure independence.

Across our investment capabilities, portfolio managers are ultimately responsible for managing risks in their portfolios. Our public markets and private markets teams are aided by an investment risk group and a dedicated sustainable investing team, together with models that assist in the monitoring of market risk. Our sustainability professionals participate in collaborative engagements in connection with a variety of systemic risks related to material sustainability factors. The latter activity helps us amplify our impact across global capital markets.

We rely on both quantitative and qualitative risk management inputs



For illustrative purposes only.

Across our investment capabilities, portfolio managers are ultimately responsible for managing risks in their portfolios. Our public markets teams are aided by an investment risk group, a sustainable investing team, and models that together help monitor market risk. In connection with a variety of systemic risks commonly defined in terms of ESG factors, we participate in collaborative engagements, which help us amplify our impact across the global capital markets.

Risk forums in public asset classes

Forum	Risk discussion	Key participant(s)
Portfolio risk monitoring	<ul style="list-style-type: none">• Stock-specific risk• Tracking error as well as sources of common factor risks• Portfolio construction• Sector/regional allocation• Position size and liquidity	Investment risk team
North America and Asia fixed-income ESG task force	<ul style="list-style-type: none">• Tracking implementation of ESG framework within research and portfolio management• Raising portfolio-specific ESG concerns and review of ESG fixed-income assessment• Sharing ESG engagement activities• Education sessions on key sustainability issues led by external experts	Chaired and overseen by portfolio managers and analysts
SIC	<ul style="list-style-type: none">• Raising risks to senior management, including the CEO• Tracking progress of sustainable investing activities	Global CIO public markets, senior cross-functional leads, and sustainable investing team members
ESG portfolio quarterly review	<ul style="list-style-type: none">• Identifying portfolio- and stock-level ESG risks and opportunities• Performing and monitoring climate scenario analysis for portfolios and discussing high-risk companies• Updating individual company ESG-related engagements	Portfolio manager

Does not represent all risk forums where climate-risk management is discussed.

Real estate

Manulife Investment Management's real estate platform has built a risk management approach and framework that lay out how we identify and manage the climate-related risks and opportunities to which we're exposed. Our three-step approach involves raising awareness, evaluating risk and opportunities, and integrating best practices.

1 Raise awareness

Raising awareness is vital to educating our property and asset management teams and stakeholders about the science of climate change and builds internal capacity to manage climate risk and improve resilience. We've implemented two key approaches to improving climate risk and resilience awareness: training and access to climate data.

2 Evaluate risks and opportunities

Identifying and understanding the climate risks within portfolios enable the development of resources and tools for effectively managing those risks and improving resilience. We inventory our existing resilience practices and features and identify improvement opportunities for climate change management. Our approach includes an evaluation on both the organizational and portfolio levels.

3 Integrate best practices

Once opportunities for climate change management have been identified, it's necessary to develop operational standards to enhance the resilience of current practices. We seek to integrate best practices into each stage of the real estate investment lifecycle. We use a stepwise process to ensure that investment and asset management teams are putting into place essential measures to make our portfolios more resilient, which we supplement with training, guidance, and tools to support action while incorporating new initiatives to help teams to progress and improve.

Assessing both our physical climate risks and resilience aligns us with the recommendations of the TCFD and keeps us focused on delivering attractive

risk-adjusted performance across our global portfolio. More information on our approach to climate-related risk management can be found in our [sustainable investing real estate](#) report.

Timberland and agriculture

Comprehensive, portfolio-wide scenario analysis for our farmland and timberland assets requires accurate, long-term, site-specific data and sector-specific transition models. While globally recognized and peer-reviewed data for timberland and agriculture assets is still limited, we continue to explore ways to obtain or develop information tailored to sector-relevant scenarios to achieve fuller results both now and in future years.

Timberland scenario analysis

We integrate climate risk management throughout our due diligence and our asset management.

Since 2021, we've used a proprietary question-based tool kit co-developed in house by our sustainability, acquisitions, and operations teams to identify, assess, and score ESG components (including climate) of every deal we consider. We call this our sustainability tool kit. This tool kit highlights both potential risks and opportunities, and it enables us to quantify risk using stoplight indicators to rate inherent risk, risk mitigation potential, and residual risk. We then aggregate these upward to produce an overall numerical sustainability score for the asset, which can be used in our underwriting. The completed tool kit assessment is provided in every deal package presented to our natural resource investment committee to ensure that investment decisions explicitly consider relevant sustainability risks and opportunities. Together with our policy on deforestation, carbon principles, and carbon tool kit (used specifically for forest carbon project evaluation), this approach is designed to systematically consider all identified material sustainability considerations in our investment process.

Agriculture: improving our capabilities

Integrating climate-related risk management into our farmland management requires high-quality data that enables an accurate quantification of our existing emissions and removals because decarbonization plans and progress monitoring require measurement against a reliable baseline. Straightforward and scalable methods for calculating emissions—and especially soil carbon sequestration—have historically been lacking, so we’ve spent the past three years progressively improving our capabilities in this area, and it’s an essential supporting element of our decarbonization plan.

Learn more about our approach to climate-related risk management for timberland and agriculture in our [natural capital report](#).

Private equity and credit

Within PE&C, climate-related risks (both transition and physical) and opportunities are assessed as part of the underwriting process and monitored post-investment, where material to the underlying investment. We also monitor core climate metrics, including GHG emissions, climate governance and oversight, and the existence of a decarbonization strategy at our portfolio companies and sponsors through our annual ESG questionnaire.

As discussed in the strategy section of this report, we conduct an annual carbon footprint assessment to analyze the financed emissions and carbon risk exposure of our PE&C strategies. This annual exercise allows us to monitor the emissions profile of our portfolio companies and the financed emissions of our portfolios over time, with the goal of managing potential climate-related risks to our platform. We’ve enhanced our annual ESG monitoring activities and reporting questionnaire to survey our general partners and portfolio companies on their decarbonization plans, including short- and long-term emission reduction targets. We plan on incorporating this insight into our carbon footprint assessment to inform climate risk management and future assessments of transition risk readiness.

Infrastructure

Our Infrastructure team applies the following approach to identify, assess, and manage climate-related risks as part of our overall risk management.

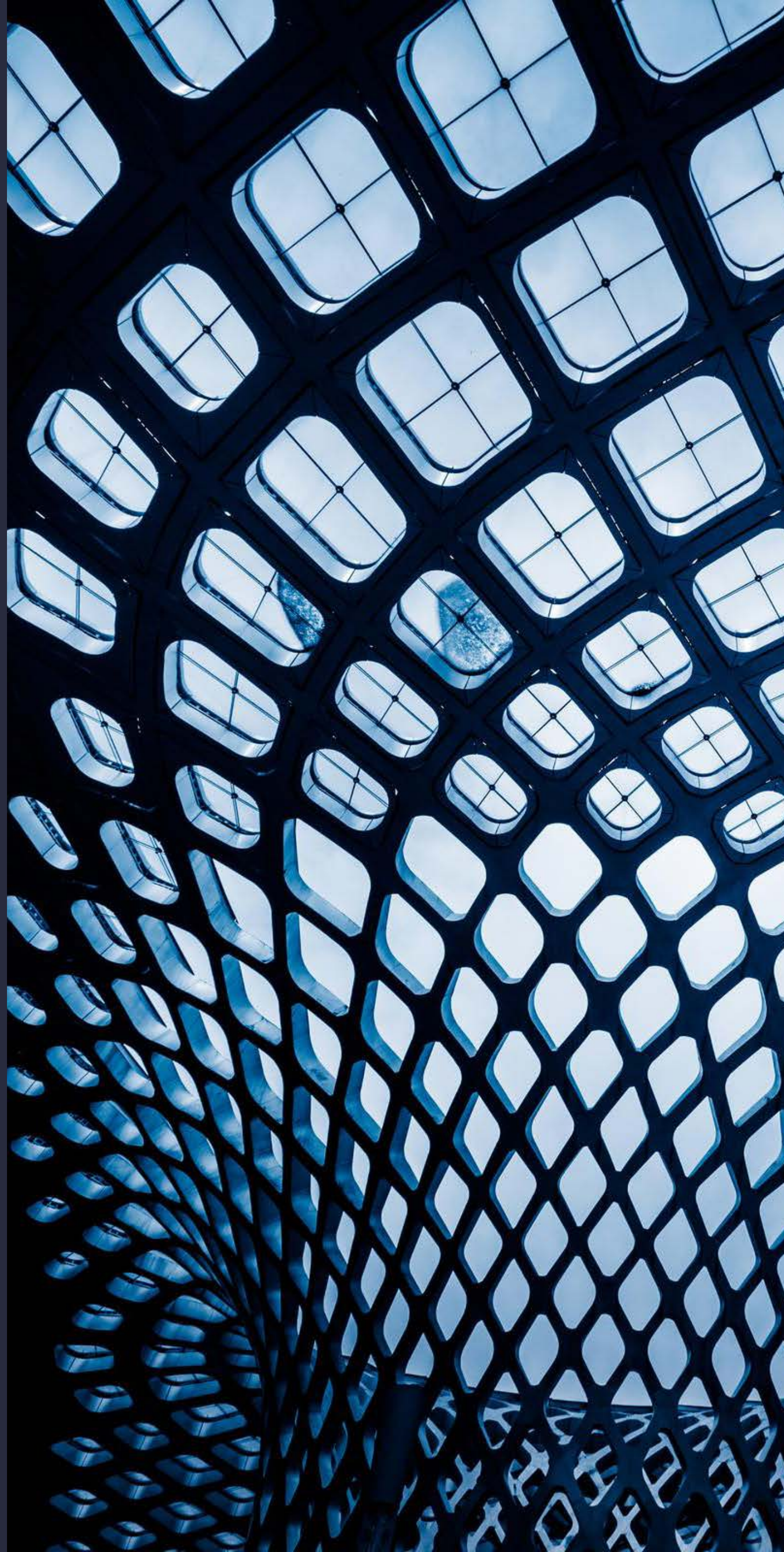
Identification and assessment

Climate-related risk factors are incorporated into ESG due diligence. We apply a materiality-based approach to identify ESG and climate risk and opportunity factors that are most relevant to a specific investment.

Our assessment of climate-related risks may include, but is not limited to, consideration of the following factors:

- Impacts of existing or anticipated regulations and standards pertaining to GHG emissions and climate policy
- Company GHG emissions (scope 1, 2, and 3)
- Renewable and nonrenewable energy consumption and generation
- Climate change readiness, including a review of existing transition plans
- Decarbonization initiatives under way and/or planned

Moreover, we’ve formalized our process for identifying and assessing physical climate risks—alongside our due diligence work focused on evaluating material ESG considerations—for all new investments. We’ve contracted a third-party natural hazard and physical climate risk assessment tool, which provides independent assessment of asset-specific and total portfolio physical risk exposure over the short-, medium-, and long-term and across various climate scenarios.

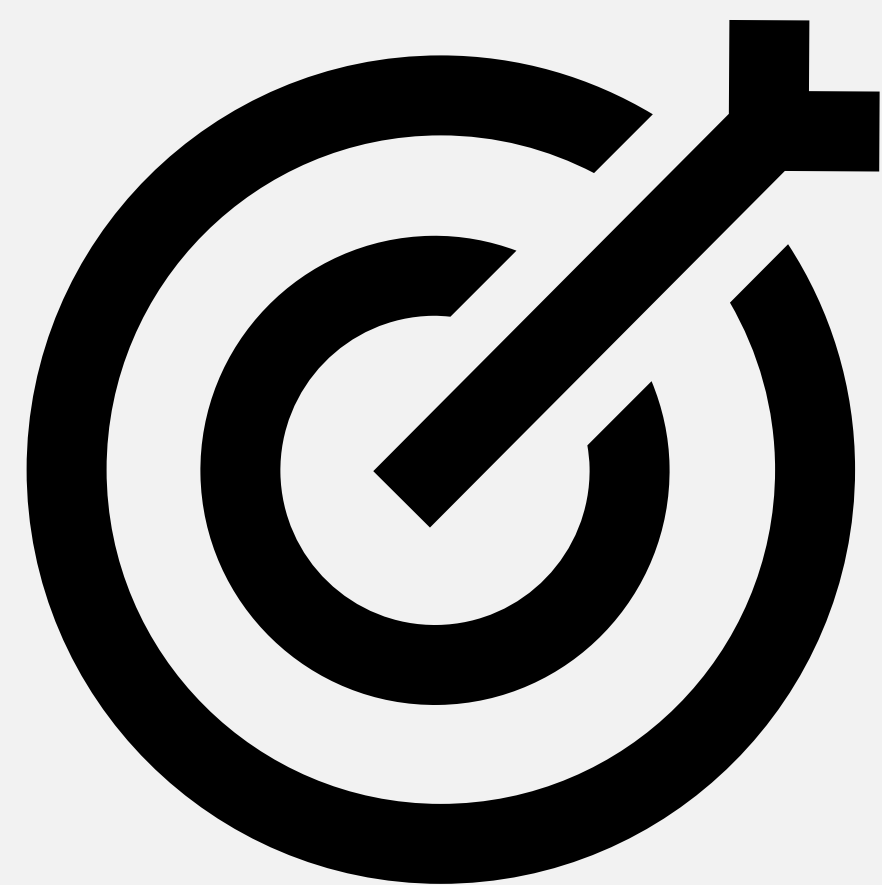


Risk management

We take an active approach to investment stewardship to manage potentially material risks to our investments, including potential climate-related risks identified during due diligence.

Post-investment, we work closely with our portfolio companies to advance sustainability initiatives that can meaningfully contribute to value creation activities. In 2022 and 2023, we worked with select portfolio companies on ESG risk management and GHG emissions data collection and target setting, among other initiatives, which contributed to advancing the maturity of their climate risk management practices.

Moreover, we conduct an annual carbon footprint assessment to analyze and monitor the carbon risk exposure of our portfolio. We continue to enhance our portfolio carbon footprint assessment each year to develop a deeper understanding of our exposure to high-emitting sectors and to incorporate quantitative data and qualitative insight on portfolio companies' decarbonization plans and transition readiness.



Metrics and targets

Metrics used

Where appropriate, we use a variety of metrics to manage climate alignment, including green investments, corporate carbon footprinting, portfolio warming potential, sovereign climate risks, and strategy-level emissions.

Where appropriate and relevant to clients' investment objectives, we manage and monitor our alignment and that of our investee companies and assets with the [Paris Agreement](#)'s goal of limiting the global average temperature rise to well below 2°C compared with preindustrial levels. We also use these metrics to manage and monitor the potential financial effects associated with climate change on our business. By understanding the benefits and limitations of the tools we use, we're better able to analyze the risks and opportunities available. Some of the metrics we use include:

- **Green investments**—We track our investments in certified real estate, certified timberland and agriculture assets, and renewable energy infrastructure; our sustainable Asia bond strategy also has a dedicated allocation to green bonds.
- **Direct data collection**—Since 2021, we've collected data directly from portfolio companies in our infrastructure and PE&C portfolios to gain a better understanding of their ESG performance. In infrastructure, we collection emissions data, number of companies with targets or transition plans, and calculate avoided emissions. We also track asset-level decarbonization in the real estate equity portfolio.
- **Carbon footprinting**—We calculate annual GHG and carbon inventories for invested timberland, farmland, infrastructure, private equity, and credit and real estate portfolios. In addition, for some public markets portfolios, we may use exposure to fossil fuel reserves, emissions disclosure to assess exposure to a potential increase in carbon pricing or transition risk, or WACI data in metric tons of carbon dioxide equivalent (tCO₂e/\$M sales) to assess the relative efficiency of emissions.

Use of these metrics may vary by investment team and strategy and may differ between clients.

- **Implied portfolio warming potential**—We use implied temperature rise metrics to assess our listed equity and fixed-income portfolio alignment with the Paris Agreement. This warming potential methodology captures all emissions of issuers (scope 1, scope 2, and scope 3) as well as revenues from low-carbon technology to provide an aggregate forward-looking perspective versus the carbon budget at 2°C warming to compute an implied temperature in the year 2100.
- **Sovereign ESG model**—Our proprietary sovereign ESG model allows us to track climate-related risks—including the momentum of these risks—for around 200 countries and territories. It also seeks to identify those countries that are taking adaptation measures against physical risk.
- **Strategy-level emissions monitoring**—We measure emissions at a strategy level to better understand and incorporate risks related to business disruptions, stranded or impaired assets, and regulatory risk, among other physical and transition risks that stem from climate change.

We're working closely with peers, academics, professional bodies, regulators, governments, and international agencies to further develop our tools and approaches. For example, we're a member of the [Investment Leaders Group](#) convened by the Cambridge Institute for Sustainability Leadership.

Supplemental guidance for asset managers

As these metrics change over time, we expect to incorporate more forward-looking metrics, location-specific data, and scope 3 emissions data.

Another metric added to our thematic equity portfolio focusing on climate change is the tracking of portfolio companies that have set targets using the SBTi. Our global climate equity strategy specifically uses this data to assess forward-looking climate metrics in addition to current and past emissions.

This incorporation of forward-looking metrics is an area we expect to build on going forward; specifically, we expect to continue reviewing the high-emitting sector pathways needed to meet the goals of the Paris Agreement and net zero ambitions. Sector-level emissions intensity metrics at a unit level, rather than at a revenue level, will likely be one area of further development.

Physical climate risk is another area that we expect to continue evolving, and this is often dependent on location-specific data and existing asset resiliency. We've therefore engaged with data providers by offering input and feedback as they develop these databases. Additionally, as more companies measure and report on their scope 3 emissions, we expect the quality of that data to improve.

Emissions and risks

We use a variety of tools and participate in an array of engagements to assess the spectrum of climate-related risk across public and private markets asset classes.

As an asset operator and investor, we assess climate risk and use our influence to encourage our assets and the companies we invest in to reduce their GHG emissions and align their business models with the realities of a changing climate in line with our fiduciary duty to clients and where financially material. We also partner with other investors and industry experts to tackle climate change on a broader scale. By working collaboratively with peer investors, we're strengthening our potential ability to reduce systemic climate change risks and realize the economic benefits of the low-carbon transition.

We also use various tools to manage physical and transition risk across our portfolios. These tools include scenario analysis and carbon footprinting.

Emissions and removals

We define our organizational boundary using the operational control approach for scope 1 and scope 2 emissions per the GHG Protocol. This boundary approach is aligned with Manulife's GHG accounting guidance. Under the operational control approach, a company accounts for 100% of the GHG scope 1 and scope 2 emissions from entities over which it has operational control, regardless of financial ownership of the entity. It doesn't account for GHG emissions from operations in which the company owns an interest but has no operational control; therefore, Manulife Investment Management discloses emissions from real assets (timberland, agriculture, and real estate), as these are under our operational control.

Manulife's GHG-related disclosure

Manulife reports its GHG emissions in its annual [sustainability report](#) and to the [CDP](#), a global database of corporate carbon emissions. This disclosure includes:

- Manulife scope 1 and scope 2 emissions from businesses in which Manulife has operational control
- Scope 3 emissions from business travel (includes car and air travel), Manulife Investment Management timberland and agriculture, corporate real estate leased properties, purchased goods and services (i.e., paper and third-party data center electricity usage), capital goods (IT infrastructure), and waste generated in operations.)

Manulife's emissions are calculated according to the GHG Protocol and are reviewed by a third party using a limited assurance procedure.

Timberland emissions and carbon removal data

We provide a comprehensive suite of metrics illustrating our timberland portfolio’s impact on the climate, including emissions, as well as carbon sequestration. For transparency, we also break down the individual components of the emissions and sequestration, as well as metrics relating to our tree planting and harvesting activities and the ultimate end uses of our harvested wood products.

Metric	2023	2022	2021
Total standing forest carbon stock (tCO ₂ e)	614,618,666	638,506,302	615,204,003
Scope 1 GHG emissions (tCO ₂ e) ⁶	17,936	11,744	27,717
of which: fertilizer (N ₂ O) emissions (tCO ₂ e)	14,578	8,642	24,838
of which: fuel combustion emissions	3,388	3,102	2,879
Scope 2 GHG emissions (tCO ₂ e) ⁶	0	0	0
Scope 3 GHG emissions (tCO ₂ e) ⁶	413,249	482,445	195,330
Biogenic stock change (tCO ₂ ; +ve = sequestration; -ve = emissions) ⁷	1,251,072	-1,339,974	3,179,520
Managed fire emissions (tCO ₂ e)	46,862	37,489	52,318
Carbon stored in harvested wood products (tCO ₂ e) ⁸	2,426,167	2,557,633	2,979,656
Net sequestration (tCO ₂ ; +ve = sequestration; -ve = emissions) ⁹	3,199,162	686,164	5,883,811
5-year average sequestration (tCO ₂ ; +ve = sequestration; -ve = emissions) ¹⁰	1,355,590	1,791,934	2,747,187
Percent net productive area ¹¹	82.1%	82.3%	82.9%
Percent of net productive area harvested	2.8%	2.8%	2.9%
Percent of net productive area planted ¹²	2.5%	2.7%	2.6%
Percent of harvest to solid wood	59.1%	63.4%	59.2%
Percent of harvest to fiber	40.7%	35.6%	40.7%
Percent of harvest to biomass	0.2%	1.1%	0%
38-year history number of trees planted	1,354,509,684	1,304,430,265	1,253,935,422

Source: Manulife Investment Management, 2023.

6 Scope 1: According to the GHG Protocol, scope 1 emissions are all direct GHG emissions, which are “emissions from sources that are owned or controlled by the reporting entity.” Scope 2: According to the GHG Protocol, scope 2 emissions are “indirect GHG emissions from consumption of purchased electricity, heat or steam.” Scope 3: According to the GHG Protocol, scope 3 emissions are “other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc.” Fluctuations in scope 1 and 3 emissions from year to year are related primarily to increases or decreases in harvesting and silvicultural operations, which are themselves related to dynamic timber markets. Large increase in scope 3 emissions from 2021 to 2022 is due to inclusion of emissions associated with shipping logs from our Australasian operations, which had not previously been accounted for. **7** Net change in total forest carbon stocks over calendar year 2023. Positive values indicate more forest grew than was harvested (net sequestration); negative values indicate more forest was harvested than grew (net emission). **8** Quantity of carbon assumed to be stored in harvested wood products (from trees harvested over calendar year 2023) after 100 years. Represents long-term storage and calculated using market-specific (geography/species) conversion factors. It is a fraction of biogenic stock change, as only some of the carbon transferred from forest carbon pool to wood products pool goes into long-lived wood products. **9** Biogenic stock change, plus carbon stored in harvested wood products, minus scope 1, 2, and 3 emissions. **10** The average net sequestration per year over the last five years. **11** Fractional area of timberland under management that is managed for commercial production of wood products. Area not managed for commercial production of wood products may include areas with high conservation value, old growth forest, buffer zones, conservation easements, threatened and endangered species habitat, or areas with historical or cultural significance. **12** Fractional area of timberland under management that is managed for commercial production of wood products. Area not managed for commercial production of wood products may include areas with high conservation value, old growth forest, buffer zones, conservation easements, threatened and endangered species habitat, or areas with historical or cultural significance.



Agriculture emissions and carbon removal data

Our agriculture portfolio’s climate impacts are broken down by scope with major scope 1 emissions sources listed. We also track biogenic removals and sequestration, and we report on additional land use metrics to add context to the climate information.

Metric	2023	2022	2021
Properties managed	259	263	269
Scope 1 GHG emissions (tCO ₂ e) ¹³	40,588	33,131	47,072
of which: fertilizer, urea, and lime emissions (tCO ₂ e)	18,285	12,469	20,073
of which: fuel combustion emissions (tCO ₂ e)	22,303	17,724	26,999
Scope 2 GHG emissions (tCO ₂ e) ¹³	20,703	18,935	17,922
Scope 3 GHG emissions (tCO ₂ e) ¹³	107,432	193,092	195,684
Biogenic removals (tCO ₂ e) ¹⁴	310,215	329,853	293,046
Net sequestration (tCO ₂ ; +ve = sequestration; -ve = emissions)	141,491	84,681	32,368
Number of crop types grown	26	24	25
Percent net productive area	84%	87%	88%

Source: Manulife Investment Management, 2023.

13 Scope 1: According to the GHG Protocol, scope 1 emissions are all direct GHG emissions, which are “emissions from sources that are owned or controlled by the reporting entity.” Scope 2: According to the GHG Protocol, scope 2 emissions are “indirect GHG emissions from consumption of purchased electricity, heat or steam.” Scope 3: According to the GHG Protocol, scope 3 emissions are “other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc. Fluctuations in scope 1 and 3 emissions from year to year are related to several factors including global commodity prices, weather patterns, and irrigation requirements, among others. Large reduction in scope 3 emissions from 2022 to 2023 is due primarily to data quality improvements that enabled greater usage of primary data, which indicated actual emissions were in many cases lower than estimated emissions. **14** Estimated soil carbon sequestration over the reporting period (calendar year 2023), using publicly available crop-specific soil carbon sequestration rates.



Real estate emissions

Metric	2023	2022	2021
Scope 1 emissions (tCO ₂ e)	34,786	39,149	35,642
Scope 2 emissions (tCO ₂ e)	87,677	99,775	106,154
GHG intensity (kgCO ₂ e/SF)	2.1	2.3	3.1
Scope 3 emissions	36,797	N/A	N/A

Source: Manulife, as of December 31, 2023. GHG refers to greenhouse gas. SF refers to square feet. Scope 1 includes emissions from natural gas, diesel, and refrigerant emissions. Scope 2 includes emissions from purchased electricity and steam. Scope 3 emissions associated with downstream leased assets which are not under Manulife Investment Management’s operational control, including tenant natural gas combustion, tenant electricity, tenant landfill waste disposal, and tenant recycled material disposal.

To help mitigate the impact of climate change, Manulife is committed to reducing its GHG emissions and transitioning toward low-carbon energy sources. In our real estate portfolio, we’re advancing asset-level solutions to reduce absolute scope 1 and scope 2 emissions by 40% by 2035 (based on the 2019 baseline). In 2023, we broadened our emissions reporting to include scope 3 emissions in addition to our continued monitoring and reporting of scope 1 and scope 2 emissions. Further, all three scopes have received external third-party verification. We’ll seek to provide an analysis of our total emissions across all three scopes in future reports.

In 2023, GHG emissions decreased by 11.8% when comparing scope 1 and scope 2 emissions on a year-on-year basis. This is in part due to property operations efficiencies, property-level energy retrofits, and electrification of building systems, as well as a number of dispositions that occurred during the 2023 reporting year (sold properties will be removed from the baseline in the subsequent reporting year in accordance with the GHG Protocol). In our buildings, we’re focused on aligning equipment replacement cycles, including HVAC, lighting, and heating infrastructure, with the objective of finding low-carbon solutions.

In addition to GHG emissions, we monitor property and portfolio energy, water, and waste performance annually through our proprietary Sustainable Building Standards. Our Sustainable Building Standards include a 6% energy and water reduction target over a rolling three-year period and a 65% waste diversion rate target for buildings where Manulife has operational control.

Asset-specific targets—We set asset-specific targets in our Sustainable Building Standards program, and performance against these targets is monitored semiannually. We also encourage teams to include both utility and Sustainable Building Standards targets in their annual performance objectives to drive improvement and encourage action to meet our goals.

Physical risk data—We track property resilience scores, which combine third-party physical risk data with property resilience survey results. We also track the number of properties located in 100-year flood zones and report in alignment with the Sustainable Accounting Standards Board (SASB) through our insurance program.

PE&C and infrastructure

Since 2021, we've collected data directly from companies in our infrastructure and PE&C portfolios to gain a better understanding of their ESG performance.

We ask portfolio companies to provide data across key categories, including GHG emissions, renewable energy, and climate policy, in line with the framework established by the ESG Data Convergence Initiative. This initiative is an industry-led project launched in September 2021 to standardize the reporting and collection of ESG data in private markets, thereby enabling greater transparency and comparability of ESG data across the industry.

To complement these efforts, we also engaged an external consultant to support the estimation of financed emissions (i.e., scope 3 emissions) for our infrastructure and PE&C asset portfolios to obtain an initial view of the carbon footprint of these asset classes.

In 2023, we completed our second portfolio carbon footprint exercise, using a combination of reported emissions and third-party estimates. Our portfolio carbon footprint assessment enables us to better assess and manage potential carbon-related risks to our portfolio and helps inform our near- and longer-term climate priorities.

Listed equity and fixed-income investments

Investment strategies are exposed to different sustainability risks and opportunities based on geography, geopolitics, industry, issuer size, and thematic focus. For this reason, we believe sustainability issues should be analyzed, managed, and prioritized in connection with the unique profile of each investment. An example of a risk and opportunity that may materially affect the enterprise value of an investment is exposure to climate change. The overwhelming consensus among scientists is that there's a limited amount of carbon dioxide that the world can afford to emit into the atmosphere if we're to limit the global average temperature rise to 1.5°C.

Consequently, we live in a carbon-constrained world, so we believe it's important to analyze the emissions of the portfolios we manage on behalf of our clients. This will help us understand our current contribution to global climate change mitigation and where we have opportunities to do more in line with our fiduciary duty to clients.

Defining the scope of our analysis

Our portfolio carbon analysis includes all equity and fixed-income portfolios for which carbon emissions data is available for the underlying holdings.

Scope of the analysis and our approach to selecting key performance metrics

For the purposes of this report, we’ve chosen to use an array of emissions calculations. We believe this allows us to get at different facets of climate issues, including disclosure, and provide a more granular analysis when it comes to managing portfolio-level climate risks and opportunities.

Accordingly, we’ve calculated our portfolios’ GHG emissions profile based on multiple calculation methods as well as different combinations of the emissions categories. We regard this as particularly important for two reasons: First, direct emissions are known to be more easily measured and are easier for companies to control and, second, indirect emissions are larger and involve a higher degree of estimation. As a result of their indirect nature, companies might argue that their ability to control these categories of emissions is more attenuated. For these reasons, we believe it’s critical to employ several methods of measuring emissions and to use these in dialogue with investee companies.

How to measure responsibility for emissions within the capital structure

Carbon performance metrics have evolved from using market capitalization as a denominator for calculating and normalizing GHG emissions, which previously dominated industry practice, to using enterprise value, including cash (EVIC). The former methodology held only shareholders to account for all the emissions of a company while the latter enables accounting for issuer debt as part of the emissions allocation/apportioning practice. In effect, this means that those providing finance to companies through equity ownership or through lending are assigned emissions responsibility, but in subtly different ways. Equity is measured by current market value, whereas debt is measured based on book value.

Carbon footprint calculation methods

1 Equity ownership only

Total carbon emissions for a portfolio normalized by the market value of the portfolio, expressed in tons CO₂e/\$M invested.

$$\frac{\sum_n^i \left(\frac{\text{Current value of investment}_i}{\text{Issuer's market capitalization}_i} \times \text{Issuer's scope 1 and scope 2 GHG emissions}_i \right)}{\text{Current portfolio value (\$M)}}$$

2 Equity ownership and debt holder

Equity carbon footprint

$$\frac{\text{Current value of investment}}{\text{Issuer's enterprise value + Cash}}$$

Debt holder carbon footprint

$$\frac{\text{Book value of investment}}{\text{Issuer's enterprise value + Cash}}$$

Source: [tcfdhub.org](https://www.tcfhub.org/), October 2022.

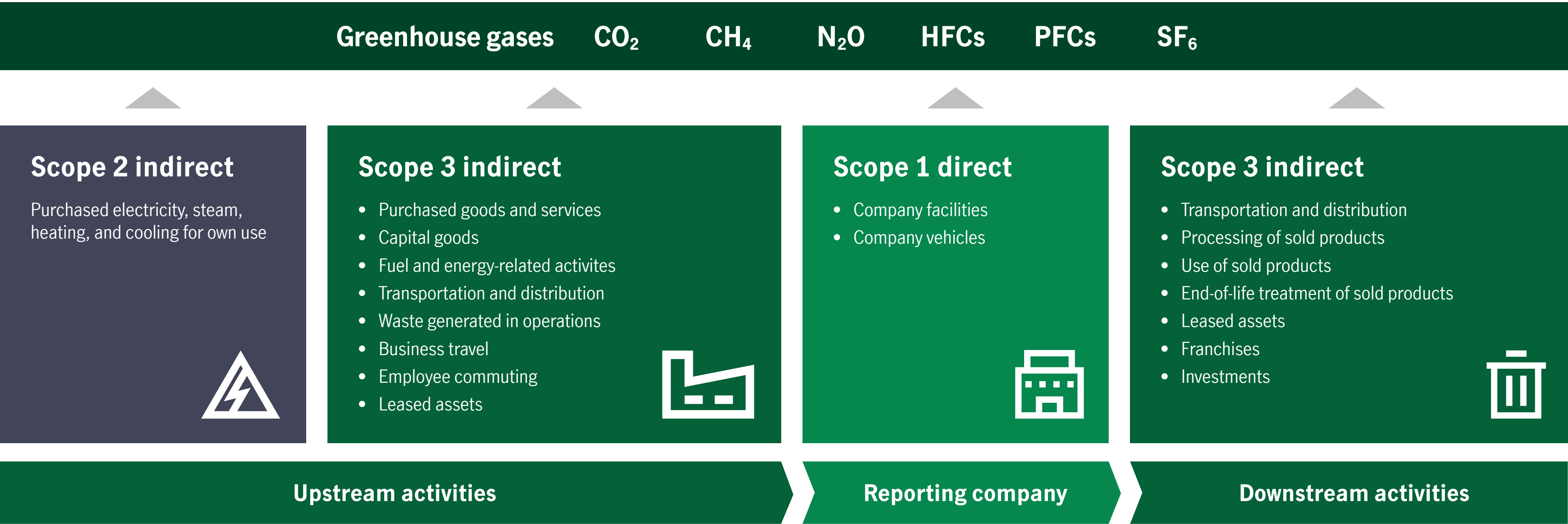
GHG emissions performance

As we increase the scope of GHG included in calculations—moving from scope 1 to scope 2 and scope 3 (both upstream and downstream indirect emissions)—emissions quantities increase, as do carbon footprints. Companies have widely adopted the GHG Protocol to report GHG emitted from their activities. The various scopes of emissions are defined by the protocol to explain the levels of control and ownership, whether the emissions are direct or indirect relative to the company.

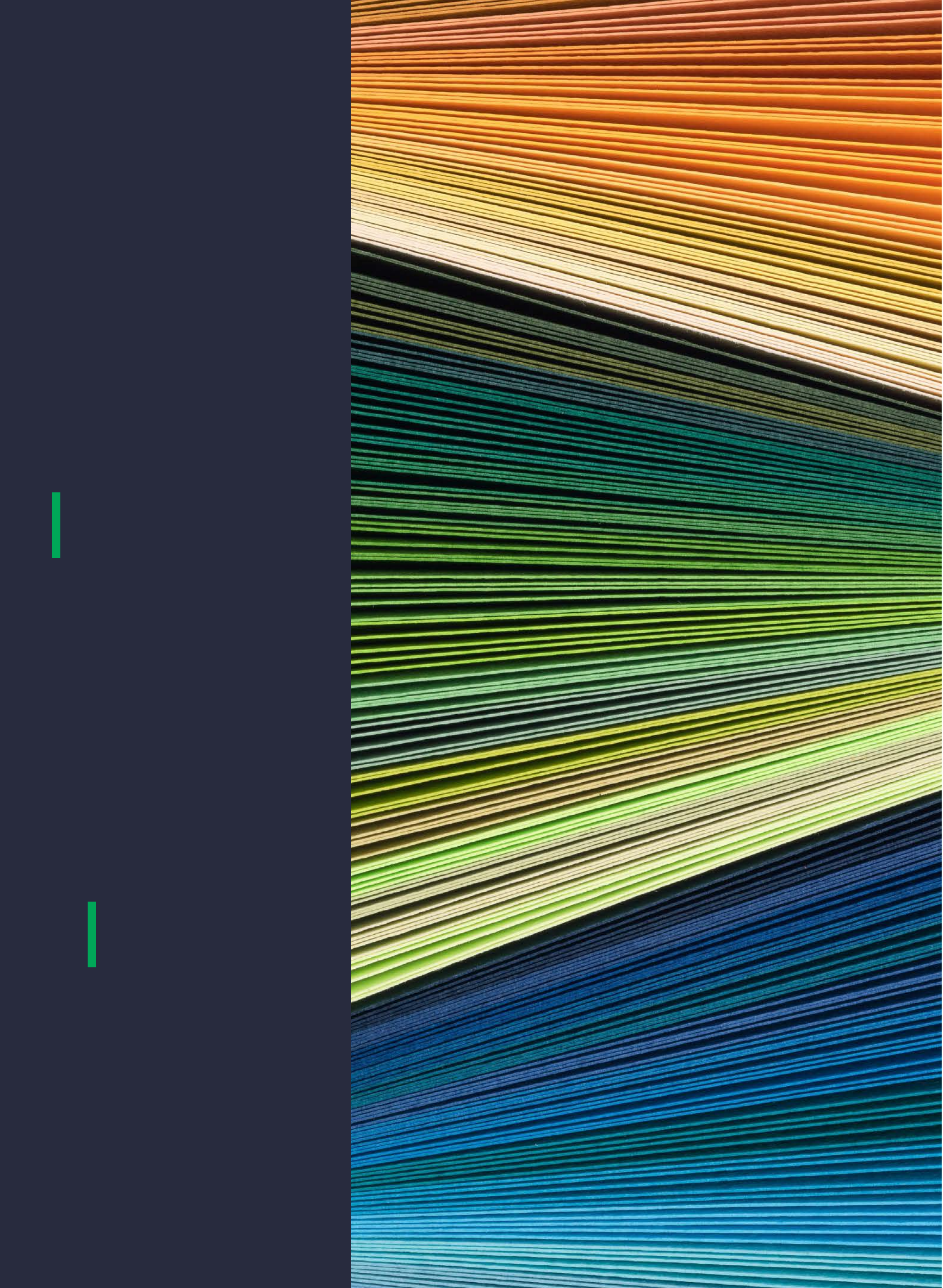
Scope 1 is considered direct GHG emissions from sources that are owned by the entity; fuel used in owned/controlled assets such as combustion, furnaces, and company vehicles is included in scope 1.

Emissions associated with scope 2 are considered indirect and comprise the emissions that come from purchased electricity, steam, heat, and cooling. Based on the GHG Protocol, scope 3 is broken out into 15 categories of emissions across upstream and downstream activities. Upstream activities include category 1 purchased, while downstream emissions include category 11 use of sold products. These two categories represent the largest categories of scope 3 emissions for the vast majority of companies.

An overview of scope 1, scope 2, and scope 3 emissions



Source: [GHG Protocol](#), 2016.



Generally speaking, firms have the most control of—and therefore the greatest hope to make a short-term reduction impact on—scope 1 emissions, but for many companies these are the smallest part of total emissions. CDP found, for example, that upstream scope 3 emissions that suppliers reported for 2022 were, on average, 11.4 times greater than those produced through their direct operations.

Downstream scope 3 emissions are also particularly material across a variety of industries. Consider, for example, the combustion of gasoline by consumers within internal combustion engines as use of sold products for an oil and gas major. Or, to take an example from banking, consider the financed emissions implicit in a bank's total loan portfolio—also part of the investments category of downstream scope 3 emissions per the GHG Protocol. Under a holistic approach to emissions disclosure, scope 3 additions can indicate enormous carbon footprints, which is the primary reason scope 3 is such an important facet of emissions reduction. Indirect emissions such as scope 2, but particularly scope 3, are commonly the hardest elements for companies to influence in the short term; however, there's a variety of strategies companies can employ to manage these emissions.

For example, they can redesign their products to have a lower emissions profile, or they can collaborate with downstream companies to reduce their emissions profile, including advocating for a more efficient use of products. Of course, these efforts take time—and further investment—to support such innovation and emissions reduction efforts. This is one reason we believe it's important to adopt a balanced approach to engagement with companies, trading off easier but smaller shorter-term opportunities against larger but potentially more significant longer-term gains.

Our carbon footprint and carbon exposures

We believe that engaging with companies on their most material sustainability issues can enhance their long-term competitiveness and profitability, generating collective prosperity for investors, companies, and society as a whole. Consequently, we engage with companies over a wide variety of sustainability issues, including climate-related concerns. In this regard, we engage with issuers to understand their transition plans and help them set targets for emissions reductions across their operations as well as in their upstream and downstream indirect emissions.

Total carbon emissions—In terms of absolute emissions by ownership, our clients' representative fixed-income and equity portfolios were collectively responsible for 9.2 million metric tons of CO₂e of scope 1 and scope 2 in 2023 on a weighted-average basis. As a percentage of the world's total absolute emissions of 37.4 gigatons in 2023, this equals a fraction of a single basis point. While this is obviously a small share of global emissions, it's important to recognize that whenever an investee company reduces emissions, the impact applies across the total emissions of that firm, not just the financed portion of those emissions. Through engagement with investee companies, we can potentially have a stronger influence on emissions reduction than what's suggested by the size of our individual positions or by our public markets AUM.

Carbon intensity—We believe it's important to consider data on emissions intensity as well as total emissions. Clearly, it's unrealistic to expect two companies that are broadly identical but one being twice the size of the other to have the same amount of absolute emissions. But it's reasonable to measure their emissions per unit of sales or other standardized metric, as this provides insight into the emissions efficiency involved in each company's operations, product development, and/or service execution.


That said, we must remind ourselves that limiting total emissions is the real-world outcome we're trying to achieve; therefore, too much emphasis on intensity figures carries the risk of missing a critical sustainability objective. So while a company may indeed get

more efficient in reducing carbon emissions per unit of production or per \$1 million of sales it generates, its absolute emissions could be increasing at a faster rate than the rate of its intensity reduction. For this reason, we believe the rate of absolute emissions reduction should be considered alongside changes in carbon intensity.

We calculate our carbon footprint using the Partnership for Carbon Accounting Financials methodology, which has gained traction in the market and among standards-setting bodies. To achieve a more representative footprint, we removed securities that lack emissions data, such as cash, derivatives, and other noncorporate issues, and focused the calculation on securities that have underlying carbon and EVIC figures. This weight is then redistributed to the remaining investment holdings.

WACI—WACI is the standard metric used by investors to assess the emissions management efficiency of investee companies. We show our equity and fixed-income carbon intensity figures versus a general representative benchmark for each asset class. While these benchmarks aren't the applicable benchmarks for many of the strategies, they provide a barometer against which we measure our carbon exposure. We chose these benchmarks as we believe they provide an unbiased view of the carbon intensity for the companies globally. It also enables us to evaluate portfolio intensity in a global context and identify portfolios that may require closer monitoring, which tend to be Asia focused.

For our equity portfolios, we've presented information against the MSCI All Country World Index (MSCI ACWI). The WACI (scope 1 and scope 2) of our equity portfolios, based on AUM per portfolio, is 24.6% higher than that of the MSCI ACWI. The median carbon intensity of our equity portfolios is higher than that of the benchmark by 17.9%. A key difference in the variance to the MSCI ACWI benchmark is the weighting in the U.S. technology sector, which is outside of the investable universe for our Asia-based strategies. Technology stocks in general have a lower carbon intensity versus many other sectors.



For our fixed-income portfolios, we've presented information against the Bloomberg Global Aggregate Corporate Index (BGACI). The WACI of our fixed-income portfolios is roughly 49% higher than that of the BGACI, with median carbon intensity remaining higher than the representative benchmark as well. There are three key reasons why our carbon intensity is higher. First, the financials sector weight in the benchmark is 36%; the diversification of our portfolios, by contrast, results in a lower weight in financials. Financial entities tend to have lower scope 1 and scope 2 emissions and are typically still in the process of building out their modeling capabilities to report scope 3, or financed, emissions. The second reason, which also speaks to diversification, is that our portfolios generally have larger weights in the energy sector. Third, the carbon intensity of our Canadian fixed-income funds is higher, as Canada has a higher exposure to natural resource companies, which operate with higher relative levels of carbon intensity.

Emissions estimates can vary substantially between corporate disclosures and index providers

In our view, it's important to acknowledge that comparing portfolios using a metric such as WACI isn't as straightforward as it may seem for the simple reason that underlying emissions estimation methodologies may differ. For example, some of the major index providers have proprietary ESG research and data capabilities; therefore, they source emissions and compute carbon estimates based on their own expertise and information access. By contrast, other index providers may rely on third-party providers that are dedicated to providing raw data and carbon estimates that use different methodologies.

The variation in output can be illustrated using actual data for an auto manufacturer whose emissions disclosure for 2021 highlights its differences relative to three separate index providers' estimated emissions data for the same company. Data omissions for indirect emissions are one problem encountered here, as are the underlying assumptions used to determine estimates—including for direct emissions.

Global automobile manufacturer

Metric	Company reported figures (reported for the first time in FY 2021)	Provider A's estimated data (FY 2020)	Provider B's estimated data (FY 2020)	Provider C's estimated data (FY 2020)
Scope 1	185,000	420,156	108,395	208,662
Scope 2	403,000	341,906	236,126	557,082
Scope 3—upstream	N/A	840,237	24,408,344	N/A
Scope 3—downstream	1,954,000	6,498,345	6,197,633	N/A
Scope 3—upstream and downstream	N/A	14,636,365	30,605,978	N/A

For illustrative purposes only. Estimated emissions are in absolute metric tons. FY refers to fiscal year.

As a result of these variances, comparing portfolios with each other and portfolios with an index using a seemingly simple figure such as WACI may not be a very meaningful exercise. Over time, we believe these comparison challenges will be reduced as more companies disclose the full scope of their carbon emissions.

In the meantime, financial markets will continue to use available figures—preferably with caveats regarding missing, incomplete, or variable data, but realistically not always with a full appreciation of the underlying characteristics related to different industries and geographies.

Our listed equity and fixed-income portfolios’ carbon exposures

Absolute carbon emissions and equivalents

The absolute quantity of emissions that our equity and fixed-income portfolios are responsible for based on the amount invested (vs. EVIC) in the portfolio companies.

Metric	Fixed income (millions MtCO ₂ e)	Equity (millions MtCO ₂ e)	Weighted average of fixed income and equity (millions MtCO ₂ e)
Scope 1 + Scope 2	10.8	6.0	9.2
Scope 1 + Scope 2 + Scope 3 (upstream)	28.0	15.8	23.8
Scope 1 + Scope 2 + Scope 3 (upstream and downstream)	44.4	47.5	45.5

Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023. Figures in each column represent absolute emissions based on aggregate assets under management of all portfolios. EVIC refers to enterprise value, including cash.

Carbon footprint/EVIC

Carbon footprint normalized to value invested (apportioned by EVIC) enables us to compare carbon intensity across different portfolio sizes.

Metric	Fixed income (millions MtCO ₂ e)	Equity (millions MtCO ₂ e)	Weighted average of fixed income and equity (millions MtCO ₂ e)
Reweighted based on data availability			
Scope 1 + Scope 2	122.2	82.0	108.5
Scope 1 + Scope 2 + Scope 3 (upstream)	182.0	143.2	168.8
Scope 1 + Scope 2 + Scope 3 (upstream and downstream)	600.7	667.0	623.3

Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023. Figures in each column represent carbon footprint based on aggregate assets under management of all portfolios. EVIC refers to enterprise value, including cash.

Our listed equity and fixed-income portfolios’ carbon exposures (continued)

WACI

Weighted average GHG intensity per \$1 million of sales that underlying securities generate enables us to conduct GHG attribution analysis.

Metric	Fixed income (MtCO ₂ e/\$1M sales)	Equity (MtCO ₂ e/\$1M sales)	Weighted average of fixed income and equity (MtCO ₂ e/\$1M sales)
Scope 1 + Scope 2	298.5	177.6	257.2
Scope 1 + Scope 2 + Scope 3 (upstream)	416.2	300.8	376.8
Scope 1 + Scope 2 + Scope 3 (upstream and downstream)	1,309.1	1,363.7	1,327.7

Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023. Total coverage is 81% for fixed income and 95% for equities for the data in the analysis.

Geographical comparison

As a global investment manager, investing across different geographies gives us a perspective on emissions quantities across countries as well as sectors. Using our equity and fixed-income businesses, we compared weighted average emissions across each of the climate metrics of absolute emissions, carbon footprint, and WACI.

Absolute carbon emissions and equivalents

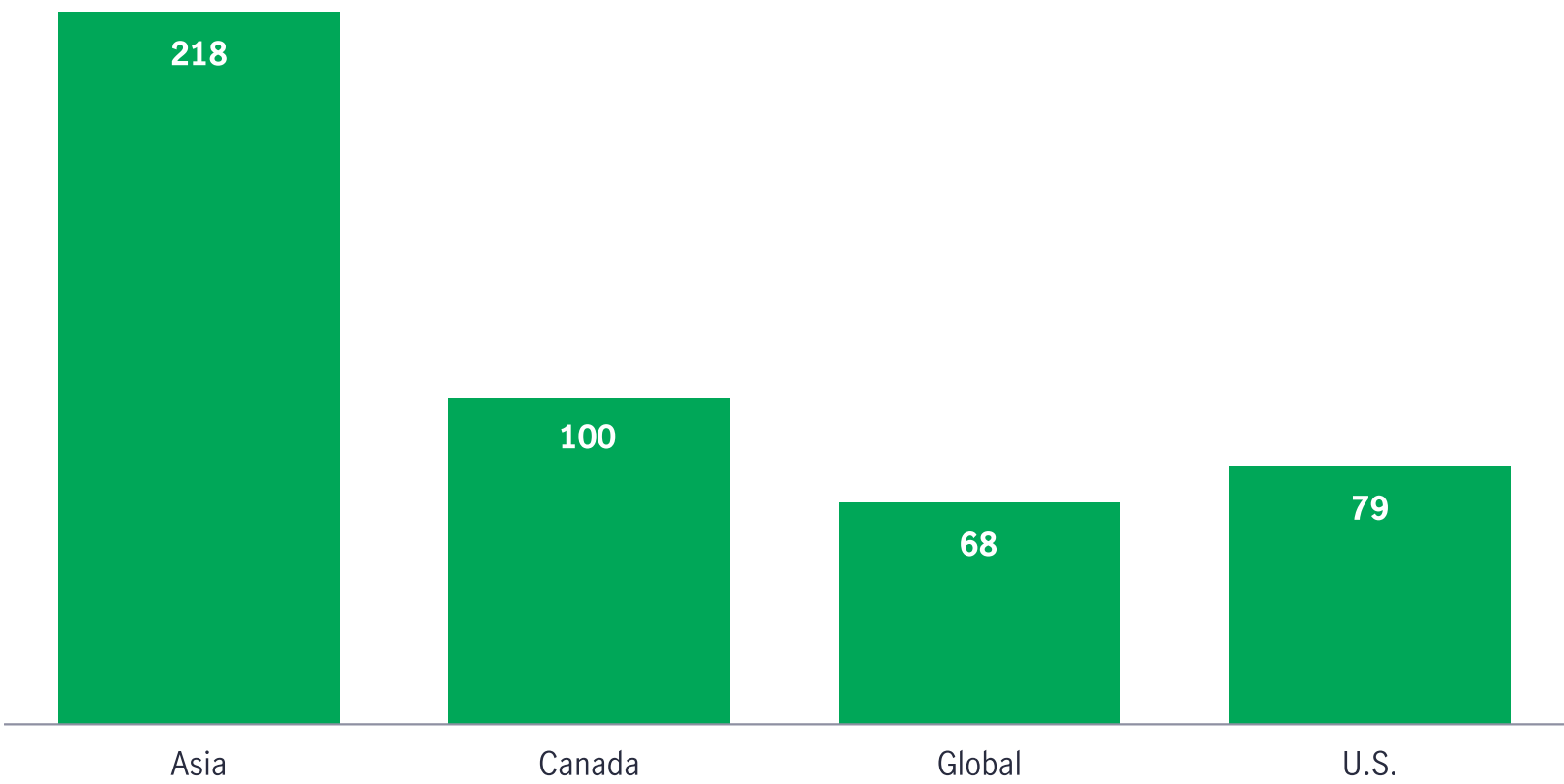
From an absolute financed emissions metric, we can see that there’s a dichotomy for those assets based in the United States. From an equity perspective, the

financed emissions are low relative to other regions, while for fixed income, the United States ranks as financing the highest level of emissions. A key reason for this is a larger allocation of assets to the utilities and energy sectors, which is a sector with high scope 1 and scope 2 emissions. In addition, in our portfolios we tend to have a larger weight in U.S. fixed-income AUM.

The following charts illustrate finance emissions for scope 1 and scope 2 on a simple average based on region.

Financed emissions: equity

Thousands Mt of CO₂e



Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023.

Financed emissions: fixed income

Thousands Mt of CO₂e



Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023.

Carbon footprint/EVIC

From a portfolio footprint perspective for equity, Asia ex-Japan has a higher carbon footprint on a regional basis and when compared with the MSCI ACWI.

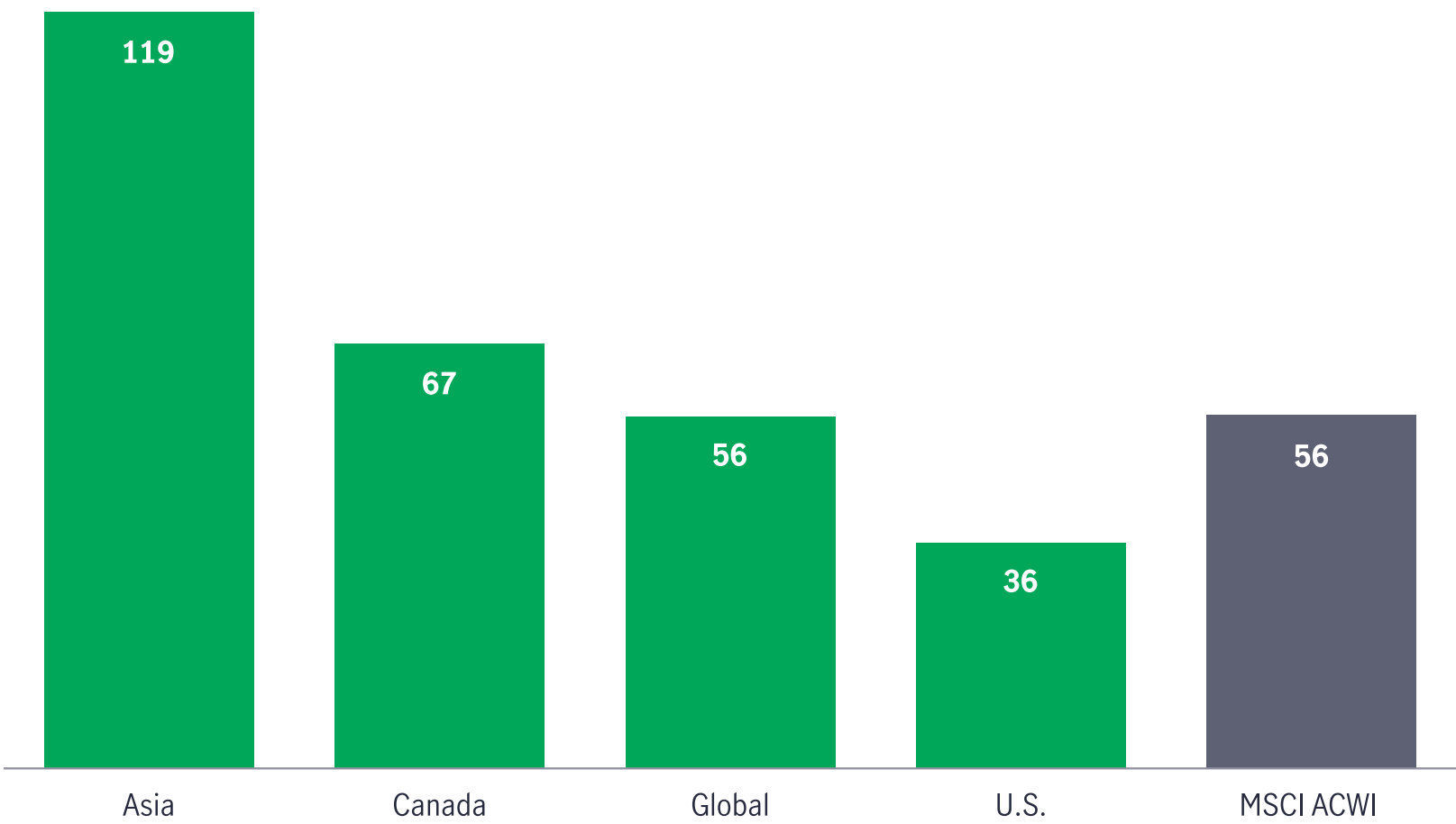
For fixed income, all regions are below the benchmark except for the United States and global, which possess a high carbon footprint. This exposure comes from hard-to-abate sectors such as utilities, materials, and chemicals. Additionally, we see that our portfolio

footprint is reasonably consistent between Asia and Canada. Our global category is higher driven by exposure to emerging markets in hard-to-abate carbon industries.

The following charts illustrate the carbon footprint on a weighted average based on AUM by region.

Absolute emissions/carbon footprint: equity

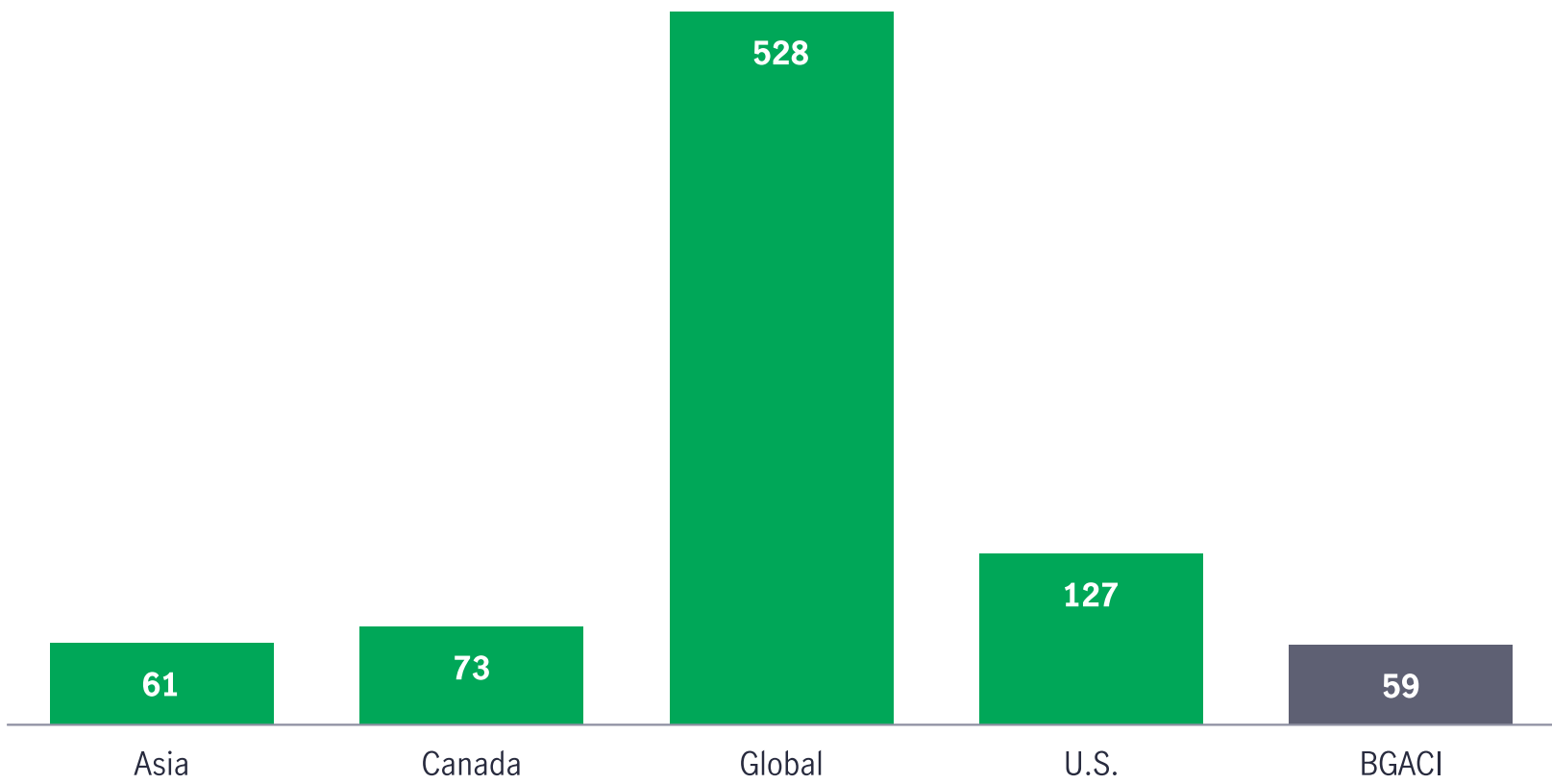
Scope 1 + scope 2 footprint



Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023. MSCI ACWI refers to the MSCI All Country World Index. It is not possible to invest directly in an index. Values in the bar chart have been rounded while bar chart heights reflects true underlying values.

Absolute emissions/carbon footprint: fixed income

Scope 1 + scope 2 footprint



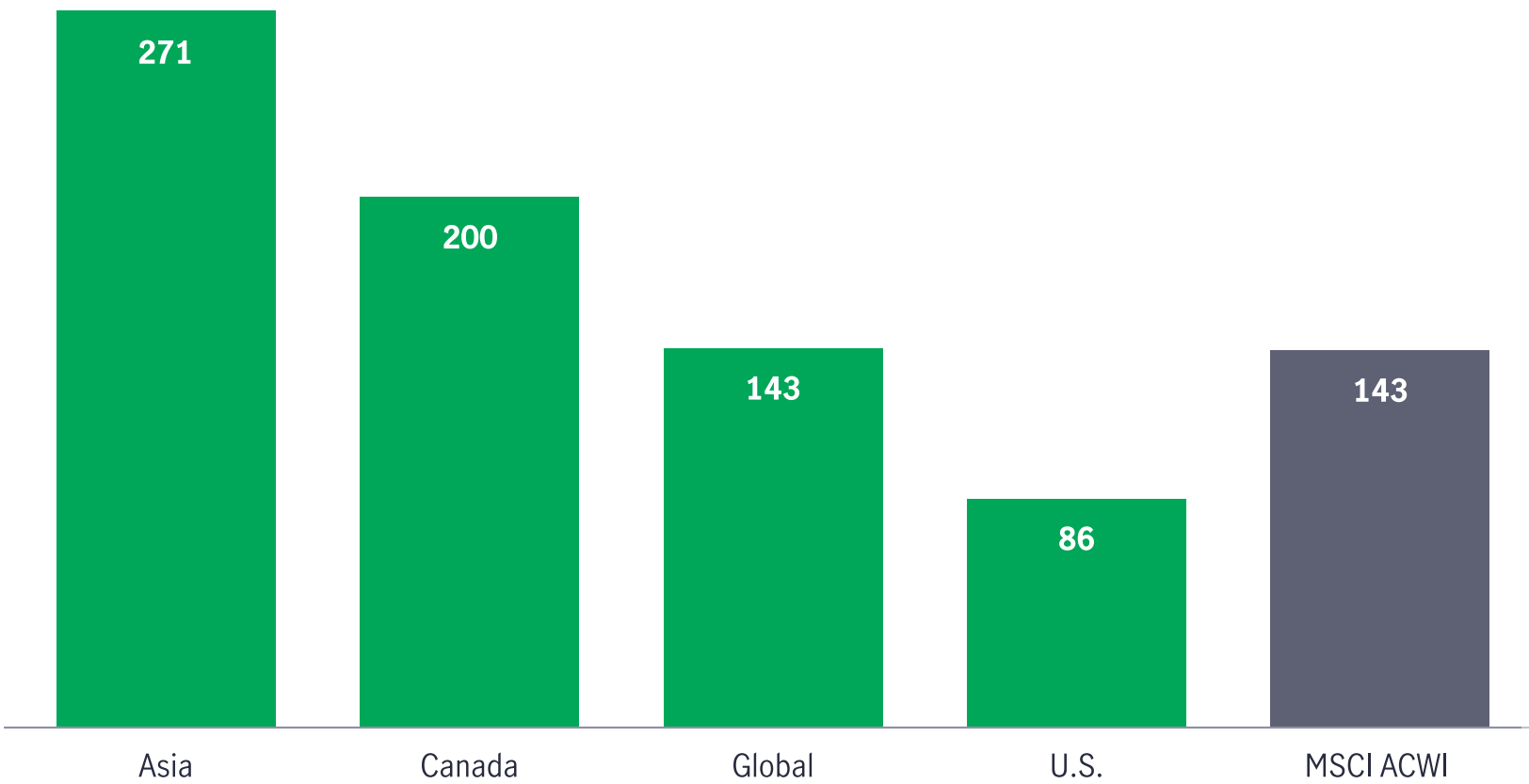
Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023. BGACI refers to the Bloomberg Global Aggregate Corporate Index. It is not possible to invest directly in an index.

WACI

From a carbon intensity perspective, our global strategies are aligned to the benchmark, while our U.S.-based strategies are on the lower end of WACI for equity and fixed-income portfolios. Within fixed income, our exposure to energy and utilities with an underweight to financials continues to be reflected in the carbon intensity figures.

Weighted average carbon intensity: equity

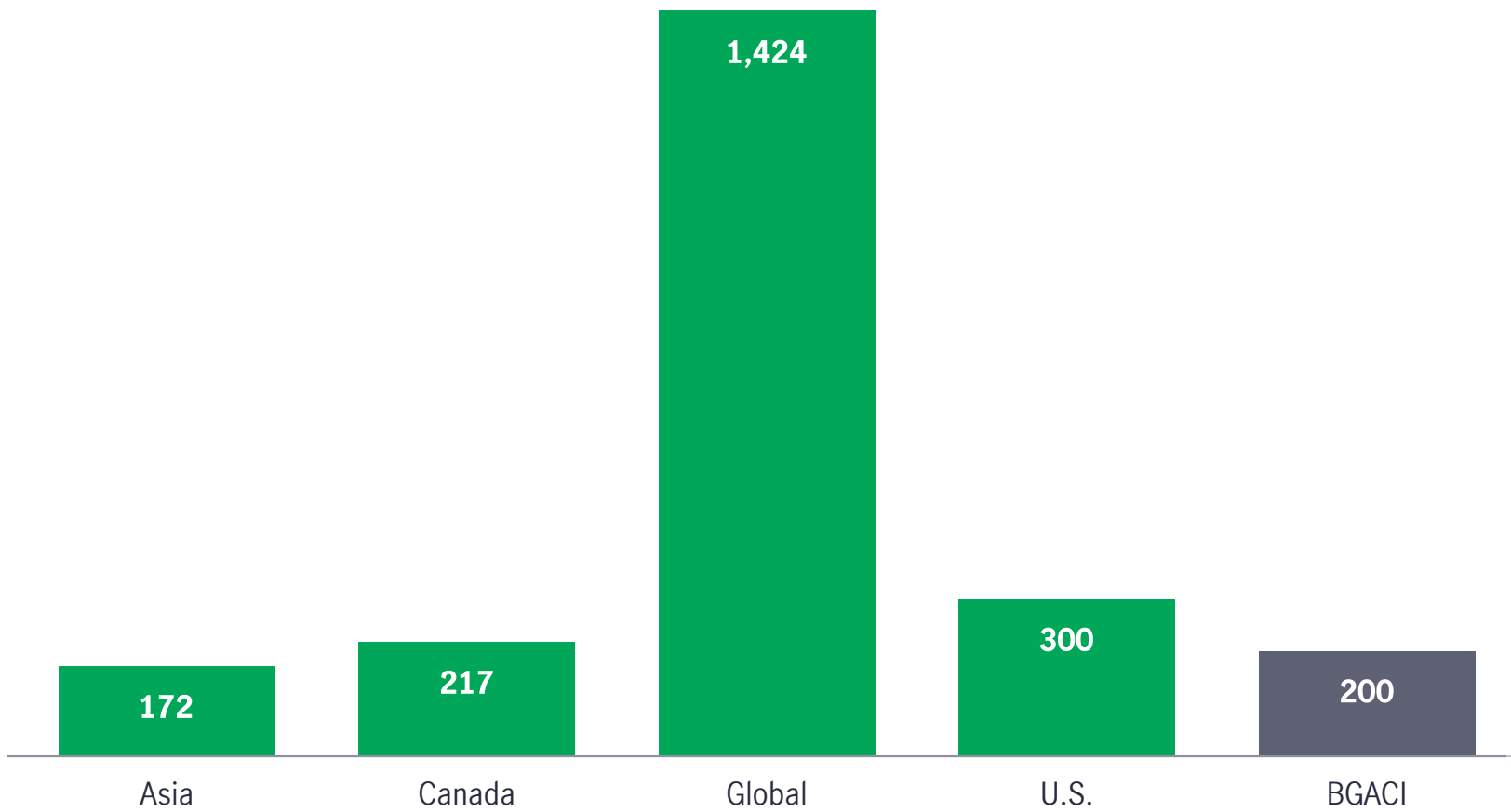
Scope 1 + scope 2 carbon intensity



Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023. MSCI ACWI refers to the MSCI All Country World Index. It is not possible to invest directly in an index. Values in the bar chart have been rounded while bar chart heights reflects true underlying values.

Weighted average carbon intensity: fixed income

Scope 1 + scope 2 carbon intensity



Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023. BGACI refers to the Bloomberg Global Aggregate Corporate Index. It is not possible to invest directly in an index.

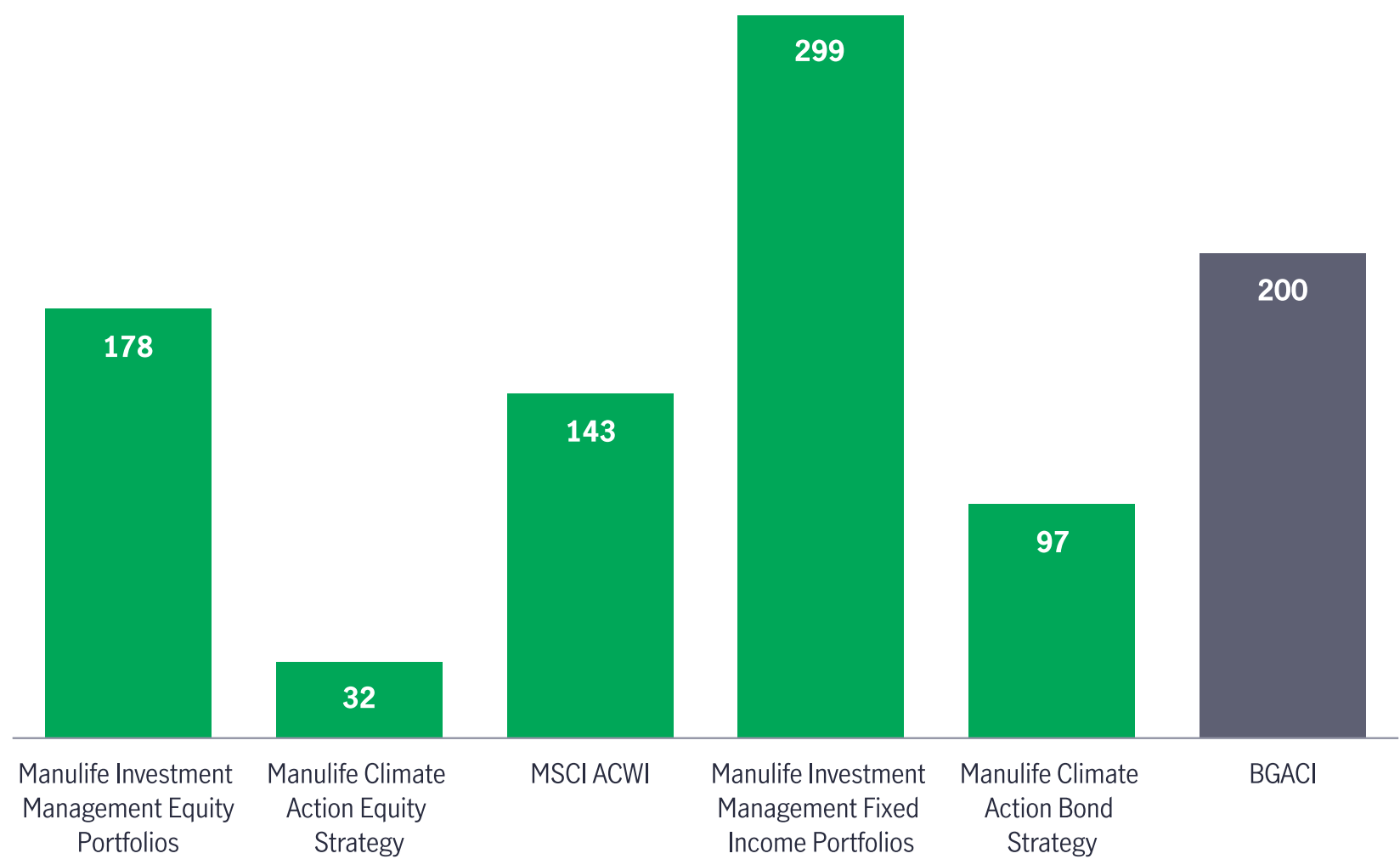
Climate-themed equity and fixed-income strategies

We’ve presented an analysis of WACI and carbon intensity related to our climate-themed equity and fixed-income strategies, and broader industry benchmarks. As evidenced, there’s a significant reduction in the carbon intensity compared against the asset class representative benchmark and the overall average of the asset class

we presented earlier in this report. Where appropriate, and in line with our fiduciary duty to clients, our investment teams specifically seek to find attractive investment opportunities with lower-carbon investment profiles.

Weighted average carbon intensity

CO₂e/revenue



Source: Manulife Investment Management. Analysis used cross-sectional data as of March 31, 2023. GHG refers to greenhouse gas. MSCI ACWI refers to the MSCI All Country World Index. BGACI refers to the Bloomberg Global Aggregate Corporate Index. It is not possible to invest directly in an index.



Supplemental guidance for asset managers

Using data to address climate change risks and opportunities across asset classes, we continue to build out carbon footprinting, including WACI and a variety of other climate-related metrics.

The following case studies illustrate how we implement this across asset classes and geographies in our real asset, fixed-income, and equity strategies as well as in thematic and ESG-integrated strategies.

The case studies shown here are for illustrative purposes only; do not represent all of the investments made, sold, or recommended for client accounts; and should not be considered an indication of the ESG integration, performance, or characteristics of any current or future Manulife Investment Management product or investment strategy.

Manulife Investment Management conducts hundreds of ESG engagements each year but does not engage on all issues or with all issuers in our portfolios. We also frequently conduct collaborative engagements in which we do not set the terms of engagement but lend our support in order to achieve a desired outcome. Where we manage and operate physical assets, we seek to weave sustainability into our operational strategies and execution.

The case studies shown are a sampling across issues and geographies. Our approach to ESG investing and incorporation of ESG principles into the investment process differs by investment strategy and investment team. It should not be assumed that an investment in the company discussed was or will be profitable. Actual investments will vary, and there is no guarantee that a particular fund or client account will hold the investments or reflect the characteristics identified. Please see our [ESG policies](#) for details.

Case study—building climate resilience

As a manager of real estate investments, our business is exposed to risks and opportunities from the environment in which we operate, and we recognize that climate risk is a core real estate issue. As the impact of climate change is increasingly felt, it's vital for our investors, employees, and tenants to understand the importance of addressing the issue. We seek to integrate climate considerations into each stage of the real estate investment lifecycle. We use a stepwise process to ensure that teams are putting into place essential measures to make our portfolios more resilient.

While we continue our efforts to mitigate climate change by transitioning our operations and supply chains to low carbon, we also recognize the need to build climate resilience within our real estate portfolios and across our management practices. The nature and level of these risks are dependent on structural forces that will shape our short- and long-term decisions, and we expect our business will be affected in both positive and negative ways by the climate transition—the opportunities will depend on our action and response. Reducing our carbon footprint is critical to managing our clients' risk and improve their overall financial returns. In 2020, our real estate team set a long-term GHG-reduction target of 80% by 2050, using 2018 as the baseline.

In 2023, we made the following enhancements to our approach:

- **Decarbonization road map:** We conducted an analysis of our existing real estate portfolio to identify priority regions and specific assets for decarbonization implementation and specified which regionally aligned project types will drive the most impact. The accompanying historical emissions analysis highlighted the materiality of Manulife's corporate owned and occupied real estate assets against the global

portfolio, resulting in a key focus in our reduction strategy. To distill the analysis into tangible next steps, we set out multi-year objectives related to each of the key project types identified to maximize GHG impacts within our portfolio such as data coverage, efficiency, electrification/fuel switch, and renewables.

- **Decarbonization progress (72% of studies complete):** There was a clear need for a standard approach for property-level decarbonization plans to direct our consultants toward a consistent set of objectives and metrics when evaluating carbon reduction projects. At the end of 2023, over 70 building reports were completed (around 50% of real estate's scope 1 and scope 2 footprint). By the end of 2024, the aim is to have detailed decarbonization plans covering 80% of real estate's scope 1 and 2 footprint.
- **Incentive program:** Manulife Investment Management now includes decarbonization metrics as part of our real estate platform's annual incentive plans and we've engaged partners to support our road map for the global decarbonization of our portfolio. In our buildings, we are focused on aligning equipment replacement cycles, including HVAC, lighting, and heating infrastructure, with the objective of finding low-carbon solutions.

At Manulife Investment Management, we believe that developing a comprehensive approach to addressing climate change risk across the organization is key. While we have processes in place, our goal is to further integrate considerations to strengthen climate-related risk management. This includes property resilience improvement plans, incorporating resilience into preventive maintenance, budgeting and capital planning, continuing to develop and refine the long-term GHG management strategy, monitoring and tracking GHG reductions, and supporting new initiatives to achieve energy, GHG, and cost savings.



Case study—decarbonization working groups

In 2023, both our timberland and agriculture businesses convened global decarbonization working groups to develop pathways to reduce GHG emissions and increase CO₂ removals in a manner consistent with global and corporate decarbonization goals as articulated in the Paris Agreement and Manulife's Journey to Net Zero, respectively. More specifically, this will entail contributing to Manulife's climate target to reduce scope 1 and 2 emissions 40% by 2035 relative to a 2019 baseline.

Both groups gathered information on potential opportunities, completed high-level assessments, and prioritized for opportunities for further exploration. This resulted in identifying focus areas for 2024 where we will progress detailed research, develop project plans, and consider piloting or scaling the most promising decarbonization pathways.



Case study—launching our forest climate strategy

As an asset class, timberland provides investors with an opportunity to invest in a manner that contributes to sustainability goals, enables the pursuit of positive outcomes for the environment and local communities, and contributes to solutions to some of the greatest challenges facing the world over the long term, including climate change and nature loss. We launched our forest climate strategy to provide investors with the opportunity to promote climate change mitigation through sustainably managed forests, where carbon sequestration is prioritized over timber production. The strategy seeks to invest in a globally diversified portfolio of sustainably managed timberland assets with strong carbon sequestration potential and high conservation value in the United States, Canada, Australia, New Zealand, and select countries in Europe and South America. The main objectives of the strategy include sequestering carbon, ensuring long-term protection of sensitive habitats, creating additional environmental and social impact through non-timber activities, and providing attractive risk-adjusted returns to investors.

Specifically, the strategy seeks to:

- Generate a durable, high-integrity stream of carbon credits, in addition to implementing sustainable forest management plans
- Pursue conservation easement sales where appropriate
- Prioritize investment in contiguous tracts of land
- Implement sustainable forestry management and value-added services that support ecological and social benefits
- Maintain long-term climate and impact objectives on asset disposition

One of the core features that sets our climate strategy—and investment philosophy—apart is our focus on integrity, which is why the forest climate strategy also aligns with the principles of the [GHG Protocol](#), [International Carbon Reduction and Offset Alliance](#), the [Oxford Principles for Net Zero Aligned Carbon Offsetting](#), and our proprietary [IC-VCM](#) Core Carbon Principles-aligned carbon principles.



Case study—encouraging policy action on methane emissions

Issue: The International Energy Agency estimates that methane is responsible for approximately 30% of the current rise in global temperature. Methane has a significant short-term impact as it can trap over 100 times the heat of carbon dioxide. Because it also breaks down over a decade on average, however, reduction in the near term rapidly reduces overall effective GHG emissions and associated warming while we work to reduce other longer-lived emissions (e.g., carbon dioxide) over the longer term. Some of the highest levels of methane emissions are a by-product of oil and gas production, where methane enters the atmosphere through flaring, venting, and leaks.

Action: Understanding that reducing methane emissions is a vital component of addressing and mitigating climate change, we joined several asset manager peers and asset owners in September 2022 in signing a letter to the Canadian ministry of environment and climate change encouraging action on methane in the oil and gas industry. The letter encouraged increased ambition to reduce and eliminate methane from flaring, venting, and fugitive emissions.

Outcome: In December 2023, at the world’s largest annual climate conference—COP 28—the Canadian ministry of environment and climate change announced new draft regulations to cut methane emissions. The release estimates that “from 2027 to 2040, the draft methane regulations will reduce cumulative emissions by 217 megatons (carbon dioxide equivalent). They’ll also have positive social and economic benefits of \$12.4 billion from avoided global damages.” This is a significant development in global policy on climate that we support, and we’ll monitor the draft regulation as it moves toward its final state.

Case study—fostering the adoption of the TCFD framework in Japan

Issue: Soon after the release of the climate-reporting framework from the TCFD in 2017, we saw the potential for the framework to foster a better understanding of climate risk as both a global and a local issue. We believed that broadly communicating the importance of this dual significance, both for physical and transition (or policy-related) risks, could be a useful facet to emphasize—and that it could be especially beneficial to foreign investors who are less familiar with the local context in Japan. We also believed it might help speed adoption of the disclosure framework by Japanese companies, which we’ve come to see as paramount for those companies issuing or planning to issue green and transition bonds.

Action: The Japan [TCFD Consortium](#), backed by Japan’s Ministry of Economy, Trade and Industry, was convened in 2019 to help Japanese companies incorporate the analysis of climate risks into their business strategies. Manulife Investment Management’s Japan credit research team, together with our sustainability professionals in public markets, has been a participant in the consortium since its inception; we’re one of the few asset managers that have been a continuous participant from the start.

Our team has viewed the TCFD as a critical tool for better understanding climate risks and opportunities faced by bond issuers, their track records for addressing the same, and enhancing the credibility of various types of sustainability-labeled bonds. Through our participation in the consortium, we also saw the opportunity to help make a broad market impact: Given that nearly a third of all Japanese bond issuers are in GHG-intensive sectors, we believe the proliferation of TCFD reporting among Japanese companies is a potentially powerful lever for improving the overall risk profile of the market and our clients’ portfolios.

Case study—fostering the adoption of the TCFD framework in Japan (continued)

Outcome: In the four years since the consortium was convened, participation in its activities has grown more than fivefold, to more than 800 member companies, which is a meaningful share of the approximately 3,900 publicly listed companies in Japan.¹⁴ In addition, we’ve seen an increasing number of companies announcing their alignments with the SBTi. As of October 2023, among the 6,389 companies that had so far taken action by adopting specific targets or making net zero commitments, Japan-domiciled companies constituted 11% of the total.¹⁵

Investors have come to expect issuers to be able to articulate how they structure climate governance, the level of ambition in their climate-related targets, and how they develop their sustainability strategy in relation to climate goals at the national level. In our view, many issuers are better able to meet these demands of the marketplace as a result of their participation in the TCFD Consortium, and we see many already preparing to release new disclosures under newer sustainability frameworks, such as that which was finalized in late 2023 by the TNFD. Getting ahead of future regulatory requirements is one of the main benefits of participation in the consortium, and we expect an increasing number of Japanese issuers to realize this benefit by joining this sustainability-focused forum over time.

14 TCFD Consortium and Japan Exchange Group. **15** SBTi.

Targets

By seeking to address climate change across our asset management activities, we move closer to fulfilling our ambition of giving our customers and broader stakeholders the confidence to plan for the future.

We're actively incorporating climate change considerations into our decision-making, including how we manage our operations, how we make investment decisions, and how we develop and offer financial products and services. As a business deeply rooted in long-term thinking, we're made stronger when our people and our planet thrive.

Sustainability targets and milestones

We've integrated ESG analysis into our investment process across our investment teams, and we continue to strengthen this year over year, recognizing that sustainable investing is a journey of ongoing improvements as our understanding of the underlying issues affecting our planet evolves.

In addition to ESG integration, we'll continue to expand our range of sustainable investing products and services, including building out our offerings for clients looking for net zero investment solutions.

Real estate

We use a variety of metrics and targets to manage and monitor progress in our real estate portfolio. These are also used to identify and monitor the potential financial effects associated with climate change on our business. Some of the metrics we use include:

- **GHG reduction**—Our ambition to manage our carbon impact has never been more imperative, so we've set a long-term GHG reduction target of 80% for our real estate assets by 2050. This carbon reduction goal will help keep us accountable and help measure our GHG emissions reduction in line with our global targets.
- **Energy, water, and waste reduction**—We monitor property and portfolio energy, water, and waste performance through our proprietary Sustainable Building Standards twice each year. Properties we operationally control aim to conduct an energy audit to identify improvements every three years.
- **Physical risk data**—We track property resilience scores, which combine third-party physical risk data with property resilience survey results. We also track the number of properties located in 100-year flood zones and report in alignment with SASB through our insurance program.

Timberland and agriculture

In 2021, we set short-term targets for both our agriculture and timberland businesses. The following provides brief updates on our progress against these targets in the reporting year. Our medium-term climate goals, documented in Manulife’s [1t.org](#) commitment, are designed to help us take the next steps toward reaching our climate ambitions.

Asset class	Short-term target	2023 progress	Status (year-end 2023)
Agriculture	Improve GHG quantification methods	We refined our calculation of fertilizer emissions, improved the tracking of crop types and their acreages, and increased the quality of estimate values.	Complete
Agriculture	Launch our decarbonization strategy	We’ve developed two working groups for decarbonization in agriculture, focused on row crop and permanent crops. We have identified our top five priority solutions.	Strategy is complete, implementation is ongoing
Agriculture	Scale regenerative agriculture	We’ve engaged with external experts to help us scale regenerative practices on both our row crop and permanent crop operations. As of 2023, 100% of our properties are using at least one regenerative practice.	Ongoing
Agriculture	Systematically understand climate risk	Analysis of our agriculture properties using third-party climate risk data is ongoing for both current and future acquisitions.	Ongoing
Timberland	Decarbonization strategy launch	We established the timberland decarbonization working group. This group is global in scope and focused on identifying and implementing practical solutions to reduce our timberland portfolio’s emissions.	Strategy is complete, implementation is ongoing
Timberland	Launch of forest climate strategy focused on carbon sequestration	Completed in 2022	Complete
Timberland	Net zero commitment partnerships	Partially completed in 2022 and we continue working with partners to support these commitments.	Ongoing

Listed equity and fixed income

We understand the crucial importance of reducing GHG emissions and in line with our fiduciary duty, recognize our responsibility for the emissions associated with the portfolios we manage on behalf of our clients. However, we believe it's important not to oversimplify matters by measuring emissions with a single metric—or by targeting a single metric such as WACI—as that process may not move the dial toward real emissions reduction. Instead, we adopt an approach of reviewing a range of metrics pertaining to our portfolio emissions exposure and using this data to optimize our engagement with investee companies to make strides toward—and ultimately achieve—meaningful change over time.

Lack of company-disclosed data in the fixed-income asset class as well as credibility of estimated data points is a reality we're challenged with while striving to improve it through engagement. Investment managers, asset owners, and investee companies are on similar journeys toward overcoming these data and disclosure challenges. As a global investor, we're committed to publishing our GHG emissions analysis, capturing a greater proportion of our AUM, and increasing the usefulness of the metrics we provide. At the same time, we're also committed to expanding our offering of sustainable and thematic products and solutions to make more meaningful contributions to reducing global GHG emissions for investors with climate-aligned objectives.

Looking ahead

In this report, we've built on our previous TCFD report and the responses to the recommendations related to the four core elements and five supplemental recommendations for asset managers. We outline our approach to climate-related risks and opportunities, as well as where we strive to show leadership and demonstrate innovation.

In recognition of how climate overlaps with other natural systems, we've also touched on some of our efforts to positively affect nature and biodiversity through our business and investment activities. In the near future, we look forward to developing more robust disclosures that specifically address our impact on nature and biodiversity in line with recommendations from the TNFD.

Sustainable investing is an evolving field, so we'll continue this journey with our clients as we navigate the changing regulatory and global environment. We look forward to continuing to enhance our efforts, disclosures, and impact.



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Manulife Investment Management conducts hundreds of ESG engagements each year but does not engage on all issues or with all issuers in our portfolios. We also frequently conduct collaborative engagements in which we do not set the terms of engagement but lend our support in order to achieve a desired outcome. Where we manage and operate physical assets, we seek to weave sustainability into our operational strategies and execution. The case studies shown are illustrative of different types of engagements across our in-house investment teams, asset classes and geographies in which we operate. While we conduct outcome-based engagements to enhance long term-financial value for our clients, we recognize that our engagements may not necessarily result in outcomes which are significant or quantifiable. In addition, we acknowledge that any observed outcomes may be attributable to factors and influences independent of our engagement activities. Our approach to ESG investing and incorporation of ESG principles into the investment process differs by investment strategy and investment team. It should not be assumed that an investment in the company discussed herein was or will be profitable. Actual investments will vary and there is no guarantee that a particular fund or client account will hold the investments or reflect the characteristics identified herein. Please see our [ESG policies](#) for details. We consider that the integration of sustainability risks in the decision-making process is an important element in determining long-term performance outcomes and is an effective risk mitigation technique. Our approach to sustainability provides a flexible framework that supports implementation across different asset classes and investment teams. While we believe that sustainable investing will lead to better long-term investment outcomes, there is no guarantee that sustainable investing will ensure better returns in the longer term. In particular, by limiting the range of investable assets through the exclusionary framework, positive screening and thematic investment, we may forego the opportunity to invest in an investment which we otherwise believe likely to outperform over time.

Investing involves risks, including the potential loss of principal. Financial markets are volatile and can fluctuate significantly in response to company, industry, political, regulatory, market, or economic developments. These risks are magnified for investments made in emerging markets. Currency risk is the risk that fluctuations in exchange rates may adversely affect the value of a portfolio's investments.

The information provided does not take into account the suitability, investment objectives, financial situation, or particular needs of any specific person. You should consider the suitability of any type of investment for your circumstances and, if necessary, seek professional advice.

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