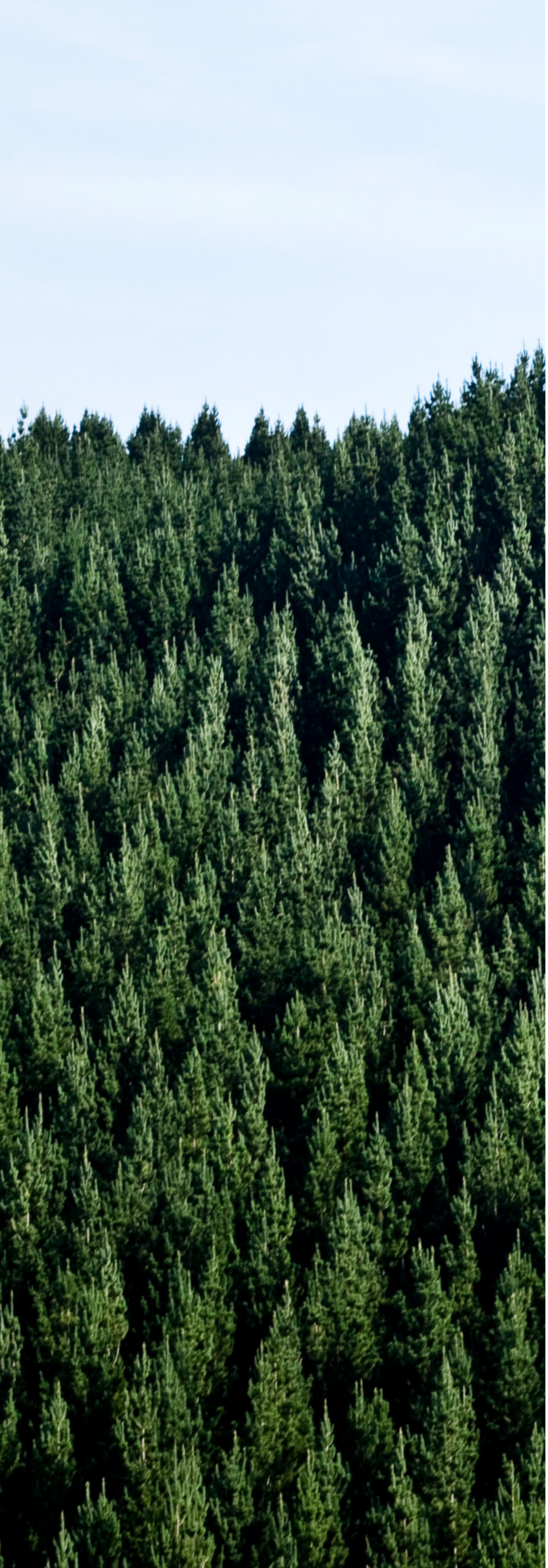
Manulife Investment Management

Sustainable and responsible investing report

2019



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A *message* from Steve Blewitt and Chris Conkey

Stephen J. Blewitt

Head of Private Markets

Christopher P. Conkey, CFA

Head of Public Markets

We're pleased to share our 2019 Sustainable and responsible investing report (SRI report). Our report covers both our public and private markets activities in sustainable asset management and showcases a more holistic view of our sustainability-focused research capabilities, engagement activities, and asset ownership practices. We hope it reflects our commitment to sustainable investing at Manulife Investment Management.

Our investment teams and environmental, social, and governance (ESG) specialists have contributed to and proposed a variety of new sustainability frameworks in 2019—initiatives that deepen our effectiveness for clients while also mapping a path to meet urgent global challenges such as climate change. We were pleased to play a role in bringing Leading Harvest, a new sustainable agriculture standard, to bear in the United States, while continuously advancing the operational sustainability of our global real estate portfolio. In public markets, we've helped to drive positive change through advanced ESG integration and active engagement across our equity and fixed-income capabilities. Today, ESG investing at Manulife Investment Management spans our global footprint and includes the deployment of a sovereign ESG model for public markets that we believe enhances our debt-related investment decision-making in a global context.

We're committed to continuous evolution in a quickly changing space. As more sustainability data and best practices continue to emerge—whether in connection with climate science, biodiversity, the quantification of social risks, or other factors—we remain keenly interested in analyzing these new data sets, exploring the benefits of new analytics, and providing ongoing training and development to our investment professionals. We've made early advances to integrate climate science into financial modeling, and we believe we're well positioned to take advantage of rapidly evolving carbon markets, understand the efficacy of technological innovations before the market may fully appreciate their likely impact, and advocate for better disclosure and greater transparency in corporate governance practices.

The world is running up against the limits of natural resources, which exacerbates social and economic risks in virtually all capital markets. The COVID-19 pandemic, moreover, has underscored our shared economic fragility in a way that calls out for greater resilience and rigor in portfolio construction and monitoring. We believe that being sustainable investors and operators of real assets helps us provide that renewed focus on material risks and opportunities while allocating capital more efficiently and pursuing better risk-adjusted returns. Ultimately, we know that sustainability is central to our clients' objectives, to the broader set of stakeholders with whom we work, and to the communities whose lives are touched by our capital allocation decisions.

About this report

This report outlines the sustainable investing activities of our investment management business under Manulife Investment Management. Unless otherwise noted, the report covers activity through year-end 2019 and excludes investments managed by third parties.

While our inaugural SRI report for 2018 covered our public markets activities only, this edition includes our public and private markets activities, differentiators, affiliations, and sustainability goals. Offering a more comprehensive review of our responsible investing efforts, it showcases the unique character of our perspective as an asset manager/operator and an investor in certain assets on behalf of our clients.

Listed equity

Fixed income

Timber

Agriculture

Real estate

Infrastructure

Private equity and credit

Across the diverse asset mix of our institutional business, we're committed to principles of sustainability. As we outline in the report's section on our sustainability governance, our commitment to stakeholders goes beyond financial performance.

We leverage the sustainable investing principles articulated by the Sustainability Accounting Standards Board (SASB), whose materiality matrix we take to be a core lens for identifying areas of focus for assessing ESG risks as well as opportunities to achieve returns from the transition to a more sustainable economy. We also support the provisions outlined by the Task Force on Climate-related Financial Disclosures (TCFD), pursuant to which we include our inaugural disclosure aligned with the recommendations of the TCFD. In addition, in our global collaboration section, we outline a broad range of sustainability frameworks, initiatives, and industrywide organizations that inform our ESG integration and engagement practices—described in great detail in their own separate report sections.

This report is part of an ecosystem of disclosures outlining our sustainable investing and asset management efforts. The following reports provide more details on our sustainability programs and those of our parent company, Manulife, in specific business segments and reflect our overall commitment to transparency.

- 2020 report on sustainability for real estate
- 2019 report on sustainability and responsible investing for timber and agriculture
- Manulife's 2019 sustainability report and public accountability statement

We welcome your feedback

Please feel free to reach out with comments or questions about this report or any aspect of our sustainable investing efforts. Please direct your communications to our institutional distribution leadership in:

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About Manulife Investment Management

Manulife Investment Management is the global wealth and asset management segment of Manulife Financial Corporation (Manulife). We draw on more than a century of financial stewardship and the full resources of our parent company to serve individuals, institutions, and retirement plan members worldwide. Headquartered in Toronto, our leading capabilities in public and private markets are strengthened by an investment footprint that spans 17 geographies. We complement these capabilities by providing access to a network of unaffiliated asset managers from around the world. We're committed to investing responsibly across our businesses. We develop innovative global frameworks for sustainable investing, collaboratively engage with companies in our securities portfolios, and maintain a high standard of stewardship where we own and operate assets, and we believe in supporting financial well-being through our workplace retirement plans. Today, plan sponsors around the world rely on our retirement plan administration and investment expertise to help their employees plan for, save for, and live a better retirement.

Manulife Financial Corporation

35,000

employees serving 30 million customers worldwide

$1.2T

in assets under management and administration

- Global wealth and asset management
- Financial advice
- Insurance

Manulife Investment Management[1,2,3]

$900B

in AUMA

13M

retirement plan participants and investor accounts

1,000+

institutional accounts

230,787

retirement plans served globally

- Institutional asset management
- Retirement
- Retail investments

1 MFC statistical information package, as of June 2019. **2** Global wealth and asset management assets under management and administration (AUMA) as of June 2020, and includes $203.2 billion of assets managed on behalf of other segments and $149.5B of assets under administration. Assets are shown in $CAD. **3** This report does not include information related to the retirement or retail investments business.

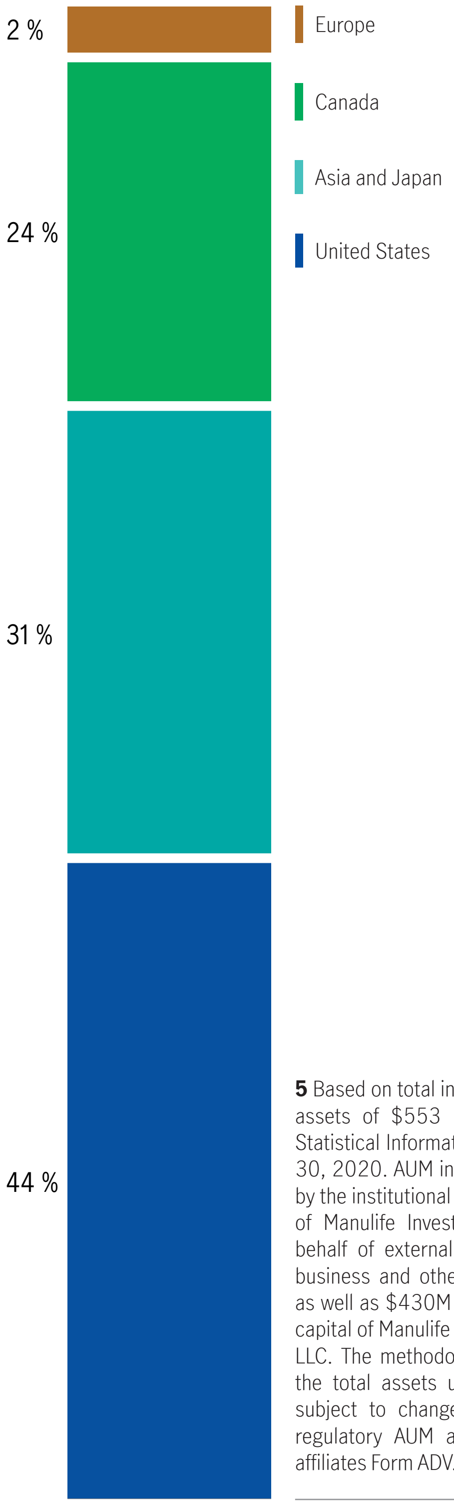
Our global footprint

Combining local insight with global reach

More than 525 investment professionals in 17 geographies

Source: Manulife Investment Management, as of June 2020. The total includes investment professionals in private market asset classes of agriculture/timberland, infrastructure, and real estate. As of June 2020, agriculture/timber classified additional personnel as investment professionals. **4** The total comprises investment professionals of Manulife Investment Management, Manulife-TEDA Fund Management Co. Ltd., a 49% joint venture between Manulife Financial and Northern International Trust, part of the Tianjin TEDA Investment Holding Co. Ltd. (TEDA), and Mahindra Manulife Investment Management Private Ltd., a 49% joint venture of Manulife and Mahindra AMC.

Client AUM by market[5]

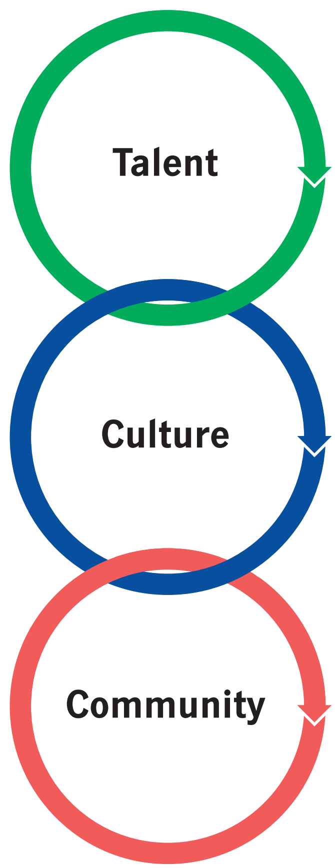


5 Based on total institutional management assets of $553 billion worldwide. MFC Statistical Information Package as of June 30, 2020. AUM includes assets managed by the institutional asset management arm of Manulife Investment Management on behalf of external clients, the Insurance business and other affiliated businesses, as well as $430M of unfunded committed capital of Manulife IM Private Markets (US) LLC. The methodologies used to compile the total assets under management are subject to change and may not reflect regulatory AUM as reported on certain affiliates Form ADV. Assets shown in $CAD.

Diversity, equity, and inclusion (DEI)

We aspire to cultivate a diverse and inclusive workplace in which all employees feel empowered and inspired to bring their authentic and whole selves to work.

We believe that a diverse and inclusive workplace enables our people to thrive personally and professionally, helping them best serve our customers, business partners, and communities.



Our DEI strategy forges connections

We strive to build diversity at all levels of our organization so that it's reflective of the communities we serve. And we seek to stay connected to those communities through partnerships and DEI support.

For illustrative purposes only.

We set the tone at the top

The Manulife board operates under a diversity policy, covering age, ethnicity, disability, sexual orientation, and geographic representation. In addition, members of the executive leadership team have performance goals related to diversity, employee engagement, and leadership accountability. Manulife supports businesses owned by women, members of minorities, and persons who identify as LGBTQ. Furthermore, Manulife is a member of the Financial Services Roundtable for Supplier Diversity and we are a founding member of the Pacesetters initiative, which creates opportunities at scale for local businesses owned by members of ethnic minorities in the Boston area.

Our strategy, which we share with our parent company, Manulife, is spearheaded by the Manulife chief diversity officer, and Manulife's global diversity and inclusion council guides, supports, and facilitates its implementation. Chaired by Manulife's CEO, the council is made up of executive leaders who are passionate about diversity, equity, and inclusion. Council members meet as a group quarterly and act as advocates in their respective divisions. Manulife tracks a variety of diversity metrics in different markets depending on the regional legislative requirements and frameworks.

We know we have ground to cover

At Manulife Investment Management, we see the same key challenges and opportunities that many other organizations face in this area—for example, a lower proportion of women at senior levels. To address the challenges we face, we've strengthened leadership and business accountability for diversity with the introduction of customized leader diversity and inclusion dashboards, which are reviewed quarterly by Manulife's CEO and executive leadership team, and we've included diversity and inclusion in all people leadership goals.

Gender statistics for Manulife Investment Management*
December 31, 2019

	Female %	Male %	Female	Male
By region				
Asia	45.4	54.6	98	118
Canada	35.6	64.2	197	355
United States	29.1	70.9	286	698
Europe	23.8	76.2	10	32
Other	30.2	69.8	45	104
All	32.7	67.2	636	1,307
By organization level				
VP and above	14.1	85.9	11	67
AVP, director, manager	25.4	74.6	228	669

* Data represents investments, distribution, product and dedicated marketing personnel. Source: Manulife Investment Management, as of December 2019.

Manulife's recent DEI commitments (2020 announcements)

- Manulife makes $3.5 million investment in diversity, equity, and inclusion
- Manulife Sets Goals to Increase BIPOC Recruitment and Leadership Representation as Part of Five-Year Diversity, Equity & Inclusion Plan
- Manulife also signed on to the BlackNorth Initiative Pledge in Canada

Manulife Investment Management's approach to DEI in our investment and engagement strategies

Manulife Investment Management views the goal of advancing equality as a core component of global resilience and therefore it is a key part of our mission to be a global leader in sustainable asset management.

Within our ESG analysis in our public markets capabilities, led by our ESG research and integration team, we look at our portfolios through many risk-adjusted lenses, including gender-based analyses for our portfolio holdings. These analyses may include an assessment of factors such as board and companywide DEI programs, as well as any negative effects that are gender-related or carry a negative impact on vulnerable populations. This enables us to ensure we fully understand the risks and opportunities in the companies in which we're invested.

This analysis then feeds into our active ownership activities, such as engagement and proxy voting. For example, we look at diversity goals tied to executive pay and we monitor gender-related controversies for our investments.

We collaborate with our peers to create positive change in the market. Manulife Investment Management is a member of the 30% Club Canadian Investor Group, a group of Canadian institutional investors whose objective, through engagement, is to achieve a minimum of 30% women on the boards and at the executive management level of the S&P/TSX Composite Index companies by 2022.

This is in keeping with Manulife's overall corporate ethos of advancing diversity and inclusion across the organization. Our President and CEO Roy Gori is a vocal champion of gender diversity and a firm advocate of representation of women at all levels. In October 2017, he signed the Catalyst Accord, a commitment to increase the percentage of women on our board and in executive positions in our corporate headquarters in Canada to 30% or greater by 2022. As of May 7, 2020, 50% of our independent board of directors are women and 23% of our executive leadership team is made up of women.

Creating new frameworks for measuring and enhancing workforce diversity

Manulife Investment Management served as an advisor to the Edison Electric Institute (EEI), an association that represents investor-owned electric utilities in the United States. In 2018, the EEI launched a sustainability template to help investors track companies' ESG initiatives, including workforce diversity, sustainability governance and strategy, greenhouse gas (GHG) emissions, and power generation portfolio. Our private markets infrastructure team was an active participant in the development of this framework, which enables analysts to assess quantitative data and qualitative information, and to compare progress and priorities among peer companies, and the team is still involved in tracking progress. So far, more than 35 companies have voluntarily reported in line with this template, which translates into standardized, periodic data that's generally comparable across electric utility companies and shows trends over time.

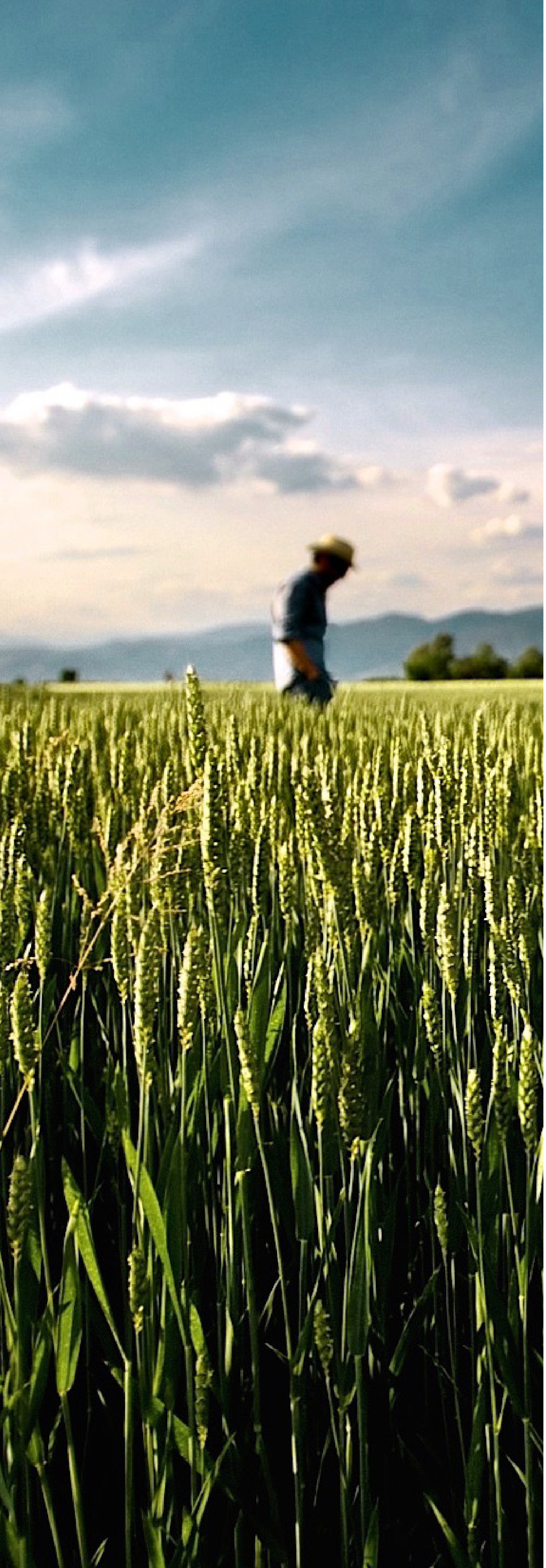
Manulife Investment Management was one of the founding members of the Board Diversity Hong Kong Investor Initiative, the aim of which is to encourage diversity at all levels of listed companies in Hong Kong, starting with the board of directors. We believe diversity on boards encourages better leadership and better corporate governance, and it ultimately increases corporate performance and global competitiveness for both companies and their shareholders.

Supporting the UN's Sustainable Development Goals—goal 5: gender equality

In 2019, we sponsored the Community Foundations of Canada All In conference, which brought together community leaders from across Canada to discuss how to make progress on the UN's Sustainable Development Goals (SDGs). In addition, Manulife Investment Management's SDG assessment methodology was featured in Global Compact Network Canada's "SDGs Emerging Practice Guide." Our proprietary SDG assessment methodology encompasses 10 themes—including gender diversity—mapping to various SDGs and provides a transparent and scalable process for assessing companies' relative commitments to and contributions toward achieving the SDGs. The methodology is designed to enable investors to contribute to the achievement of the SDGs through their company selection and portfolio construction.

The SDGs are a collection of 17 global goals designed to be a "blueprint to achieve a better and more sustainable future for all." The SDGs were set in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030.

Source: United Nations.



How we help our clients

We seek to support our clients' needs through our **sustainability and investment expertise** across a broad range of public and private asset classes, as well as multi-asset solutions.

We continuously seek to **enhance our product offerings and our reporting** in line with industry standards and best practices.

We take a **consultative approach** to meeting our clients' sustainability objectives.

We host **sustainability education and training** for industry participants.

Our sustainable investing capabilities are broad, ranging from ESG integration to thematic investing. In some cases, we can tailor these capabilities to our clients' needs. Where our clients include socially responsible investing considerations or screening requirements in their investment guidelines or mandate, we'll evaluate their parameters and determine if we're able to offer a version of the strategy customized to those guidelines.

The spectrum of our sustainability offering

ESG integration (including active ownership)

Consideration and analysis of ESG factors as part of investment decision-making

Negative screening (and norms based)

Industry sectors or companies excluded/ divested from to avoid risk or better align with values

Positive or best-in-class screening (and norms based)

Investments that target companies or industries with better ESG performance

Thematic/sustainability-themed investments

Investments that specifically target sustainability themes (e.g., clean energy, green property, SDG-aligned solutions)

For illustrative purposes only.

Robust communications

On an annual basis, we publicly report high-level summary data on Manulife Investment Management's active ownership activities in addition to the annual public reporting required as a PRI signatory. On request by a client, we will provide more detailed information of the engagement activities undertaken in relation to holdings in that client's portfolio. We may share specific engagement outcomes with clients through responses to client due diligence questionnaires, requests for proposal, direct communication, or through other means.

2019 highlights and recognitions

Recognitions

As a result of the assessment submitted to the Principles for Responsible Investment (PRI) for the 2019 reporting year, we received:

A+

for strategy and governance;

for equity integration;

for SSA fixed-income integration (sovereign, supranational, and agency debt)

A

for real estate;

for listed equity active ownership;

for fixed income (corporate financial, corporate non-financial, and securitized)

B

for infrastructure; for private equity (in our first filing for both modules)

- Winner of 2019 SDG Canadian leadership awards from the Global Compact Canadian Network
- Public markets ESG team won “Best ESG Team: North America” award from Capital Finance International
- Improved real estate GRESB scores, earning a Green Star ranking in six submissions and three submissions with a top quintile, five-star, rating.

Advancements in ESG integration

- Rolled out methodology to incorporate ESG factors into sovereign credit model
- Formalized a robust governance structure for the sustainable investing program in private markets
- Developed a proprietary framework for evaluating and monitoring the investing practices of the general partners (GPs) in our private equity business

Active ownership

- 940 engagement interactions globally, up from 276 the year before (across public markets)
- Establishment in 2019 of a proxy voting working group, comprising senior managers from across Manulife Investment Management's public markets capabilities
- Evolution of the proxy voting policy

Global collaboration

- Joined the SASB's Investor Advisory Group
- Helped pioneer the Leading Harvest Sustainable Farmland Management Standard
- Joined the 30% Club Canadian Investor Group
- Joined the Real Estate Roundtable Sustainable Property Action Committee
- Joined the Responsible Investment Association
- Joined the World Business Council for Sustainable Development (WBCSD)

Climate action[6]

- We manage 5.4 million acres of timberland, of which 100% is third-party certified, and have protected over 470,000 acres of sensitive lands
- Our infrastructure investment team manages CAD$2.5 billion in renewable energy private equity investments*
- Nearly 50 million square feet—81% of our real estate equity portfolio—is certified to a green building standard
- Invited by the Japanese government to join the TCFD consortium—the world's first-ever summit on the implementation of the TCFD
- We participated in the UN Environment Programme Finance Initiative (UNEP FI) TCFD pilot

***** As of December 31, 2019; The infrastructure team manages renewable energy private equity investments on behalf of external clients and the insurance business of Manulife, and renewable energy infrastructure debt investments on behalf of the insurance business of Manulife. **6** All data as of December 31, 2019.

Our beliefs

Our commitment to sustainable investing is driven by our beliefs.

Sustainability is not a given

Achieving sustainable outcomes requires asset managers and investors to display leadership around and commitment to principles of sustainability.

Sustainability helps drive financial value

The ability to create financial value is affected by the health of our natural environment and the strength of the social infrastructure in our communities. As such, we believe that ESG analysis is integral to understanding the true value of an investment.

The future of sustainability and active investment management is interlinked

As financial data and investment processes become increasingly automated, active investment management is necessary to deeply understand and harvest the value implicit in ESG factors.

Our commitment to stakeholders goes beyond financial performance

While our commitment to our clients is paramount, as a leading global financial institution, we have a role in making a positive contribution to society in addition to our financial performance.

We share sustainability goals with our clients

We strive to provide transparency about our asset management process, including our approach to sustainable investing, in order to support our clients in responding to their own stakeholders.

We hold ourselves to a high standard of stewardship

Where we own and operate our assets, we believe it's our responsibility to pursue the best sustainability processes and standards for ourselves and our employees. We also take seriously our potential influence over the sustainability trajectory of companies we invest in.

Our sustainability governance

A+

for strategy and governance

Manulife PRI assessment report 2019.

As a manager of client capital, we believe that the analysis of ESG risks and the consideration of opportunities arising from a move to a more sustainable economy are key aspects of protecting capital over the long term. This belief informs our governance structure, which also reflects our commitments as a signatory to the PRI, as well as to various stewardship codes that apply in different jurisdictions.

Our governance structure is composed of committees 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 and technology, to be crucial to supporting our sustainable investing activities across the organization and ensuring the buy-in and commitment required for success.

The leadership team of Manulife Investment Management meets on a regular basis and ensures the firm's sustainable investing agenda and its overall strategy and business priorities are aligned. This team is composed of senior interdepartmental members and is chaired by the the president and CEO of Manulife Investment Management.

The public markets and private markets sustainable investing committees are each convened to enable decision-making oversight and implementation of the sustainable investing program that's appropriate to specific asset classes. Each committee is chaired by the relevant business head and includes the heads of all asset classes as well as representatives from across different business support functions.

"As investors who are focused on long-term performance and the preservation of capital, our commitment to investing sustainably is a core aspect of our investment process."

—Christopher P. Conkey
Head of Public Markets

"It's important for us to think about sustainability because private markets is an illiquid asset class—and we're generally long-term asset holders. For us, sustainability is one of the keys to creating long-term value."

—Stephen J. Blewitt
Head of Private Markets

The sustainable investing committees are supported by a team of sustainable investing professionals that facilitates the implementation of the sustainable investing agenda through a variety of activities and projects. These include preparing annual business plans, identifying and developing sustainable investing best practices, supporting investment teams to develop tools and methodologies to adopt sustainable investing best practices across the investment lifecycle, and leading the participation in external initiatives or collaborative industry engagements as appropriate.

The sustainability governance structure of Manulife Investment Management is part of the larger sustainability governance at Manulife

Corporate governance and nominating committee
Receives Sustainability updates on a quarterly basis

Audit committee

Management resources and compensation committee

Risk committee

Executive Sustainability Council members
Meeting occurrence—monthly

- General counsel—chair
- Chief analytics officer
- Chief marketing officer
- Chief human resources officer
- President and CEO, Manulife Investment Management
- Chief financial officer
- Chief operations officer
- Chief investment officer
- Chief risk officer

Sustainability center of expertise members
Meeting occurrence—monthly

- Corporate finance
- Manulife Investment Management—public markets
- Corporate sustainability
- Manulife Investment Management—private markets
- Group risk management
- General account
- John Hancock—United States

Sustainability issues discussed in 2019

- Climate change
- ESG disclosure
- Health and well-being
- Sustainable finance

Two committees are convened to enable regular decision-making oversight

Committees include representatives from across different business functions

Public markets sustainable investing committee

Private markets sustainable investing committee

Dedicated ESG professionals

Activities include identifying and developing best practices, supporting investment teams to develop tools and methodologies to adopt sustainable and responsible investing best practices across the investment lifecycle, and leading the firm's participation in external initiatives or collaboration engagements

Source: Manulife Investment Management, September 2020. ● Manulife ● Manulife Investment Management

Manulife Investment Management has made a series of strategic hires across our teams, including four seasoned ESG specialists hired in 2019. This, plus more recent hiring activity, brings our numbers to 16 dedicated sustainability professionals across Manulife Investment Management as of September 15, 2020.

Source: Manulife, Manulife Investment Management, September 2020.

ESG integration: enhancing value, improving risk/return

"The cornerstone of our offering: improving financial outcomes for our clients while seeking to advance their sustainability objectives."

—Paul R. Lorentz

President and CEO, Manulife Investment Management

Our approach to ESG integration spans our public and private markets capabilities across our global footprint. The central objective of our approach is to strengthen the potential risk/reward profile of our clients' portfolios. In public markets, we seek to create a positive impact by engaging with investee companies to mitigate ESG-related challenges and enhance ESG-related opportunities. In private markets, our approach varies by asset class and includes an assessment of material ESG issues that helps us protect and enhance the value of the assets we own or operate.

Our investment teams are staffed with highly experienced portfolio managers and analysts who share a deep commitment to fundamental research. In collaboration with our dedicated ESG professionals, our investment teams look to integrate ESG analysis into the investment processes—which we consider a natural extension of our fundamental, bottom-up approach. This is a crucial part of protecting and enhancing the value of our clients' capital since ESG risks can materialize as tail risks that have the potential to permanently impair wealth. Finally, we believe that material ESG risks and opportunities need to be part of the portfolio construction process, as they're the key to pursuing alpha-generation opportunities as well as managing downside risks.

To offer a consistent financial benefit, we believe the consideration of material ESG factors must be practiced systematically across all stages of the investment process. While different investment processes don't need to integrate ESG factors in the same way, investment teams need to find a way to embed ESG analysis throughout their investment approach.

Best practices of ESG integration and sustainable asset ownership

We look to incorporate material ESG 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. In our operating activities, we hold ourselves to a high standard of sustainability. We do this to both protect and grow the value of the assets as we create long-term value for our stakeholders.

The systematic integration of ESG factors as we practice it has certain key characteristics

- **Good governance—**We implement good governance as a necessary foundation for strong environmental and social risk and impact management, as well as to long-term financial performance.
- **Global commitment, local definition—**Our sustainability efforts with respect to ESG research, integration, and engagement are shaped both by our global knowledge and by our local market expertise. Our on-the-ground presence in these local markets informs our application of ESG analysis regionally.
- **Active ownership—**Our long history of active, bottom-up company research and analysis coupled with the experience of our investment teams in working with management and investment partners gives us a knowledge- and relationship-based edge for practicing ESG engagement.
- **Sustainable operations—**In our private markets business, we believe we can create value through the sustainable operation of our timber, agriculture, and real estate assets.
- **Tailored approach—**Our philosophy provides a flexible framework that supports implementation across different asset classes and investment teams. The core elements and applicability are the same, but they're applied within a tailored framework suitable to each asset class.
- **Embedding into processes—**We strive to consider ESG research at every stage of the investment, asset ownership, and operation processes—from ideation and due diligence to portfolio construction and ongoing monitoring and optimization.
- **Ongoing monitoring—**In our capacity as stewards of capital, our investment approaches go beyond conventional financial statement analysis; our investment strategies that have fully integrated ESG analysis will monitor a company's strategy, capital structure, and management of ESG risks and opportunities on an ongoing basis.
- **Continuous evolution—**We recognize that the sustainability space is constantly evolving, with increased disclosure and scientific development. We have an ongoing commitment to training, research, and development to incorporate that new understanding into our processes.
- **Collaboration enhances integration—**We work closely with an array of international working groups, nongovernmental organizations, and sustainability standards-setting bodies. These partnerships inform our ESG integration efforts and amplify our impact.

We recognize that ESG factors can be material to companies and assets in both the short and long term and that they can become material across the ESG factor taxonomy. Supply chain oversight and management, for example, could equally be considered under its E, S, and G dimensions of risk and opportunity. Consequently, we focus on understanding how companies and investments may be able to take advantage of opportunities that arise as the world solves ESG-related challenges and assessing business opportunities associated with a company's or fund's operations, reputation, market access, innovation, or ability to navigate regulatory changes.

Our aim is to protect and enhance our portfolio returns for our clients and to encourage the leadership of the entities in which we invest, or plan to invest, to improve their ESG practices.

Some ESG factors that we believe are most relevant to our investments

ESG factors can materialize in different ways, but the major distinction is between sudden shocks and gradual trends. In either case, they can be highly disruptive to a company's operations.

Cross-ESG factor concerns

- Supply chain oversight and management
- Technological innovation and disruption
- Cybersecurity and privacy
- Population demographic shifts
- Resiliency of infrastructure
- Significant ESG-related controversies
- Quality of ESG disclosure and transparency

Environmental

- Climate change
- Pollution
- Natural resource utilization
- Biodiversity
- Water scarcity
- Waste management
- Other environmental issues

Social

- Health and safety
- Labor relations
- Diversity
- Human rights
- Respect for the community
- Other stakeholder expectations

Governance

- Board composition and oversight
- Executive compensation: structure, performance metrics, and oversight
- Minority shareholder rights protection
- Capital management, dividend payouts, and dilution
- Corporate actions (e.g., M&A) and corporate strategy

Companies need an ESG strategy and high-quality management to execute it

Company's ESG strategy

ESG shocks

- Labor stoppages
- Product recalls
- Supply chain disruption
- Pollution incidents
- Accounting fraud
- Executive corruption

Company's ESG management quality

ESG trends

- Climate change
- Water scarcity
- Tech disruption
- Healthier lifestyle/longevity
- Labor scarcity
- Diversity

Company impacts

- Cost/liabilities
- Operational stoppages
- Litigation
- Regulator intervention
- Executive rotation
- Reputational loss
- R&D, compliance costs
- Gain/loss access to markets

For illustrative purposes only.

Sustainability implementation

Our global ESG and investment teams across regions share a belief in the power of fundamental research and an active approach to investing and risk management. This puts our ESG integration efforts on the path of promoting change for greater resilience at investee companies, as well as among our owned and operated assets, even as we pursue investment objectives on behalf of our clients.

The investment processes of our teams rely on a sustainability-informed assessment of investment opportunities and business partners, responsible active ownership practices, and collaboration with like-minded investors and industry associations to encourage sustainable markets and financial systems.

Public markets

When investing in publicly traded markets, we view sustainability as a pillar of our fiduciary duty and a critical driver of our success. We recognize our ability and the opportunity to be at the forefront of the evolution toward sustainable investing, which further defines our value proposition to our clients.

Our efforts in sustainable investing have been recognized externally. For example, we were the winner of 2019 SDG Canadian Leadership Awards for large enterprise—Canada's premier awarding event for organizations and businesses that are doing exceptional work to integrate and advance actions toward the 17 SDGs of the of the United Nations Global Compact.

We recognized early in our ESG evolution the importance of a strong governance framework around ESG integration. This led us to create integration progression levels, which measure investment teams' progress. The top tier of that internal evaluation reflects a level that we believe represents a true leadership position in the sector, including fully integrating ESG factors into investment evaluation, active ownership, and an ongoing commitment to training and best-in-class practices.

To support our investment teams in the achievement of this significant goal, we've provided support and resources, available to all teams

ESG education

- Education and training program for internal and external audiences
- Specialists host seminars and online training
- Hosted forum on climate change, September 2019

Public markets ESG team

- Advance ESG research and thought leadership
- Develop proprietary views on macro-sustainability trends
- Act as the primary base of support for investment teams and distribution

ESG info hub

- ESG milestones
- Thought leadership
- Engagement recaps
- Media and industry events

For illustrative purposes only.

Equity

Our equity teams use internal and external ESG data to assess the potential impact of material ESG factors on the valuation and risk/return profile of investee companies. In addition to using data to identify higher- and lower-risk stocks, our teams actively engage with company management to assess their exposure—and potentially help enhance their resiliency—to different types of ESG risks. This insight can help shape the teams' modeling and define sensitivities around their estimates of fair value.

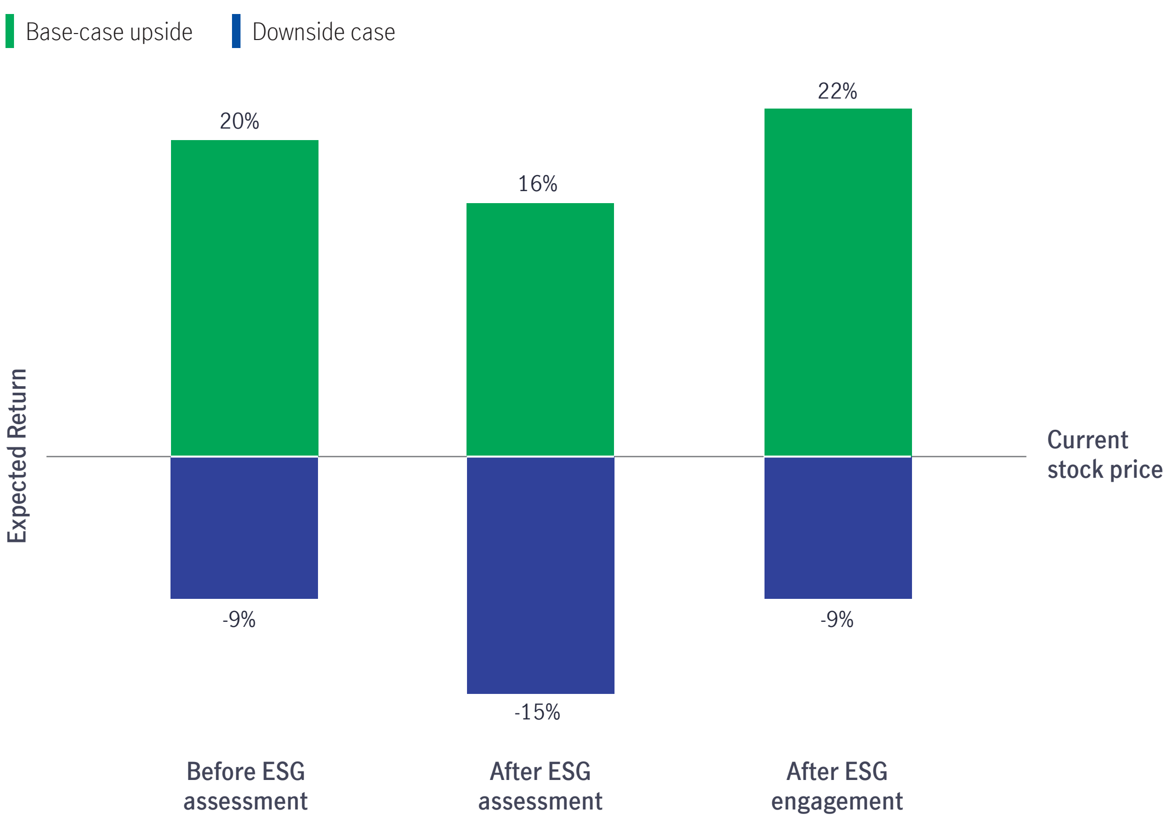
An increasingly common practice of our ESG engagement strategy involves thinking across the complex dynamics of value chains, such as plastics, palm oil, or cybersecurity. By thinking through the interdependencies that bind producers, traders, banks, and consumer companies, for example, we believe a more holistic method of seeing and acting on the systemic nature of sustainability can allow us greater leverage in our engagements with individual companies. In our view, this can help us better frame the most relevant issues and define and discuss more effective targets for ESG risk mitigation and opportunity development with investee companies.

A+	A
for listed equity integration	for listed equity active ownership

Manulife PRI assessment report 2019.

The combination of ESG analysis and engagement can create a clearer view of a company's potential

Equity valuation example



For illustrative purposes only.

"ESG integration strengthens our ability to offer solutions with more attractive risk/reward profiles, along with an ability to positively affect the companies we invest in, with the potential to improve outcomes for clients."

—Steven E. Medina
Global Equity CIO

Our investment teams have the flexibility to determine which methods of ESG integration work best for their investments. The following examples are illustrative of some methods the investment teams might apply to integrate ESG analysis into their particular investment strategy.

Generally, investment teams have modeled costs associated with changing or new regulations, required rehabilitation of physical sites used in operations (e.g., tailings dams), or implementation of an emissions trading scheme. In each of these instances, compliance increases costs, reduces cash flow, and results in a lower intrinsic value.

This past year, some investment teams adjusted their expected return models to account for direct costs (carbon pricing) and indirect costs (reduced demand) for oil and gas companies. Their work significantly increased the potential downside of an investment in oil and gas firms.

Other teams used known, or perceived, ESG risks to identify potential investment opportunities in which those risks may be overstated by the market. This work can involve significant research into company filings and policies, review of third-party research and certifications, and engagement with company management to assess the risk that's potentially causing a firm to trade at a discount.

How we apply sensitivity and/or scenario analysis to security valuations

At a high level, our investment teams are using carbon risk data to flag the level of climate risk exposure an individual issuer may have. Our analysts may also consider a range of potential risk outcomes when developing their investment theses. In 2019, for example, several teams built carbon pricing into their models for carbon-intensive firms. This included an estimate of the cost of carbon per barrel of oil in oil and gas firm models. In another instance, an investment team modeled the worst-case cost scenario for a European cement manufacturer should the European Union move forward with the most stringent regulation of carbon emissions proposed.

Fixed income

Preserving capital plus income generation is a key priority of fixed-income clients. Our understanding of ESG factors, coupled with our fundamental research strength, enables us to reduce tail risks and provide a more stable foundation for our fixed-income portfolios.

A+ for SSA fixed-income integration[7]

A for fixed-income (corporate financial, corporate nonfinancial and securitized)

Manulife PRI assessment report 2019.

Across our fixed-income strategies, our global fixed-income organization has access to a proprietary sovereign ESG risk model—a unique product of collaborative work between our global ESG research and integration team and veteran sovereign debt and multi-sector fixed-income professionals. This provides our portfolio teams with a dynamic top-down perspective on sovereign strengths and weaknesses and complements our ESG credit risk analysis template, which helps our teams assess the potential impact of ESG factors on spreads and default risk.

7 Sovereign, supranational, and agency debt.

Our approach to ESG integration is adapted to identify the material key issues within an industry. The integration occurs through the fundamental research of financial issuers, where we seek to identify corporate behavior and objective ESG risk exposures that we believe raise financially material risks. Risks could include executing transactions where sanctions have been applied, the violation of local laws governing the industry, allegations of involvement in money laundering, or the inappropriate selling or mis-selling of financial products. A common theme in these examples is the potential harm to brand image or reputation along with fines, penalties, and loan losses. In addition to the materiality of ESG risks, our investment professionals seek to assess the timing of likely impact.

> “ESG factors are central to fixed-income analysis. They function as a hedge against tail risks and can form the basis of a framework for capturing upside potential.”
>
> **—John Addeo, CFA**
> **Global Fixed Income CIO**

All credit teams have access to a proprietary ESG credit risk analysis template that draws on various sources of ESG data and research. This tool enables credit teams to better discern and analyze areas of risk, and, in turn, potential valuation impacts on investments. Our investment teams also have access to ESG industry handbooks that we've developed to identify industry-specific ESG key performance indicators (KPIs) and their potential impact on financial drivers.

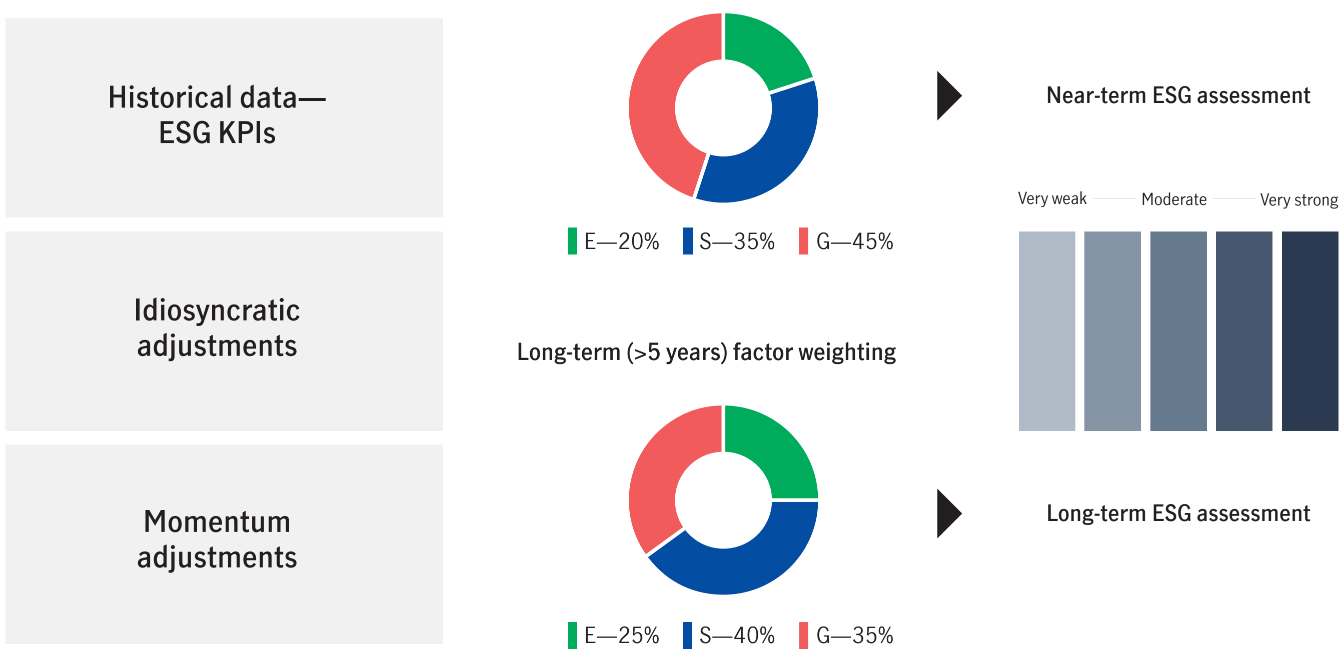
ESG integration for sovereign fixed income

Manulife Investment Management provides all investment teams with access to specialized ESG research on sovereigns. Given that we operate as a community of specialist investment teams, each team incorporates ESG factors into the investment process in a manner that aligns best within its individual investment decision-making approach. To further the integration efforts with respect to sovereigns, Manulife Investment Management was a member of the PRI's Working Group on ESG Integration and Sovereigns.

In 2019, we launched a proprietary sovereign ESG model, which the credit investment teams use as an input into their credit assessment models. One of the real weaknesses we identified with external models on sovereigns is that due to the timeliness of data sources, many models appeared to lag rather than lead the market. While our sovereign ESG model uses statistical, reported, and demographic data to produce a baseline view on environmental, social, and political (governance) issues for countries, they are then adjusted using a momentum factor based on our views on country reforms and long-term climate change risk exposures. The environmental, social, and political (governance) pillars in the model include inputs that capture key risk exposures at a country level and represent our real-time view on ESG performance as influenced by our engagement efforts. The proprietary model assesses each sovereign according to a five-tier category system, ranging from very weak to very strong and provides near-term/long-term assessments that account for the increasing relevance of environmental factors to sovereign debt as time passes.

Sovereign credit analysis

- Standardized proprietary approach to assessing sovereign ESG factors for 199 countries, developed in collaboration with global sovereign credit analysts/ portfolio managers
- Builds on historical country ESG data with real-time insight and assessment of country ESG momentum



For illustrative purposes only. Our dynamic sovereign ESG model provides group-relative rankings for 200 countries based on a multidimensional scoring method focused on distinct E, S, and G factors. The model incorporates historical data, real-time assessments of sovereign idiosyncrasies, and forward-looking momentum adjustment factors. The combination of these perspectives reflects the careful calibration of active investment insight with fundamental ESG data.

Private markets

In our private markets portfolios, we're frequently investors in and simultaneously operators of assets, which we believe gives us a unique perspective on sustainable business practices and concerns. For example, we invest and operate assets in our real estate, timber, and agriculture portfolios, where we seek to raise the bar of sustainable investing and stewardship while enhancing the value of our assets and having a positive impact on all our stakeholders. In our infrastructure and private equity and credit investments, we focus on building strong relationships with companies and co-investors, which enables a meaningful approach to sustainability and enhances our influence over key assets and portfolio companies.

Moreover, as long-term investors and as a steward of our clients' capital, we're able to use our broad experience with sustainability implementation, research, governance, and collaboration to manage ESG-related risks and opportunities over extended time horizons in all our asset classes.

Timber and agriculture[8]

In our approach to investing in and maintaining stewardship of timber and agriculture assets, five material ESG factors inform our strategy and management:

1. Climate stability
2. Ecosystem resiliency
3. Watershed protection
4. People empowerment
5. Community prosperity

These five priorities form the basis for our approach to sustainability and responsible investing (SRI) and guide every aspect of our business, including our governance, our investment processes, and our property management practices.

We've mapped ESG issues related to each of these five priorities at different stages of the investment process, from target identification through preliminary due diligence and valuation, feasibility, and confirmatory diligence, and then to final valuation. In addition to our five ESG priorities, we also consider economic performance and ethics and governance. Our investment teams assess, evaluate, and document ESG risks and opportunities for consideration by the investment committee alongside traditional financial factors.

Finally, while our SRI strategy is deliberately organic and focused on issues material to our business, we believe that it's the responsibility of every business—including ours—to demonstrate how this approach positively contributes to global goals. In that spirit, we present our performance metrics in line with third-party sustainability standards governing forestry and agriculture, the SDGs, and the Impact Reporting and Investment Standards (IRIS+) maintained by the Global Impact Investing Network (GIIN).

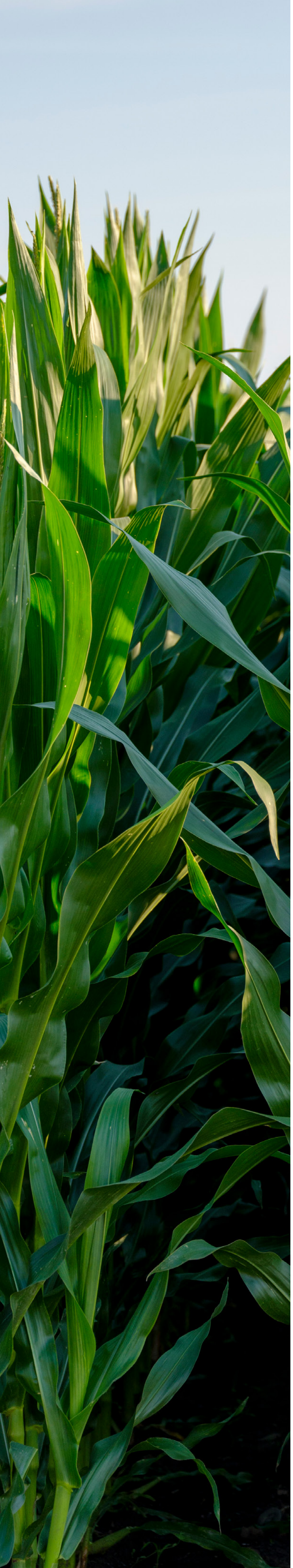
Highlights

- Managing 5.4 million acres of timberland, of which 100% is third-party certified, and grew our cumulative sensitive lands protected to over 470,000 acres
- Helping develop the Leading Harvest Farmland Management Standard
- Committing to a strict zero deforestation policy
- Removing an average of 3.1 million $MtCO_2$ annually over the past five years through our forests and farms
- Planting over 1.1 billion trees since the founding of our timber business in 1985

8 The PRI does not have a timber and agriculture assessment module.

1.1B trees

We’ve planted over 1.1 billion trees since the founding of our timber business in 1985



Case study: Leading Harvest Farmland Management Standard

In 2014, we began to mirror, adapt, and extend the sustainability protocols internalized in our timberland properties to our farmlands by establishing a set of stewardship principles. Our years of experience with these principles guided our contributions to the working group that would come to develop sustainable standards for agriculture. Similar to forest certification programs, the new Leading Harvest Farmland Management Standard is designed to meet the sustainability priorities of investors, consumers, and the supply chain.

In 2017, we helped convene the Sustainable Agriculture Working Group, which consisted of two leading environmental nonprofit organizations—the Conservation Fund and Manomet—and eight professional owner and management entities representing roughly 1.5 million farmland acres across 22 U.S. states and an additional 2.0 million acres in seven other countries.

At the time, the agriculture sector lacked a sustainability standard that could work across different crop types, production systems, scales, and geographies. However, we were confident that the working group's collective scale could lead the agriculture sector toward greater adoption of sustainable farming by developing and launching a new standard.

Using the Sustainable Forestry Initiative blueprint to create a similar standard for farmland, the working group collected input from a broad representation of interested parties—some four-dozen sources, including farmers, environmental leaders, academics, government agencies, and investment managers.

The resulting standard is performance based and designed to help land managers achieve sustainability through continuous improvement on 13 specific operational objectives, collectively rigorous and complete, yet practical and obtainable.

"In our practice of sustainable agriculture, we invest in the land to produce food sustainably while enhancing the long-term resilience of the asset."

—William E. Peressini
President and CEO, Hancock Natural Resource Group,
a Manulife Investment Management company

Real estate

Buildings consume substantial amounts of energy and water and generate approximately 40% of GHG emissions globally. As building owners and operators, we have five sustainable real estate commitments:

1. Minimize our environmental impact
2. Support health and wellness
3. Engage our stakeholders on sustainability
4. Promote responsible business practices
5. Be accountable for our performance

A

for real estate

Manulife PRI assessment report 2019.

Our approach to sustainability in real estate is based on responsible property investment and aligns with global standards, including GRESB. We incorporate ESG considerations into all our investment management and operational practices across the entire real estate value chain, from construction and acquisition of an asset through all aspects of property management. In addition, we've formalized sustainability initiatives for investments, operations, asset management, and leasing. These practices are supported by resources such as our Sustainability in Investment and Due Diligence tool, sustainability clauses in our standard lease, and our Sustainable Building Standards. In cases where third-party managers are responsible for managing properties on our behalf, we require them to adhere to our standard practices.

Across our global portfolio, we set energy reduction targets, as well as targets for water use, waste diversion and generation, and GHG emissions reduction, which we report on annually in our publicly available real estate sustainability report.

Our real estate debt group requires environmental assessments conducted by a third party and environmental questionnaires to be completed by the borrower as a condition of funding all loans.

To ensure that Manulife Investment Management doesn't knowingly finance a property with potential for significant environmental risk, thorough due diligence and analysis, including a Phase I environmental site assessment (ESA), are conducted for every loan we make. A Phase II ESA must be performed if a Phase I ESA reveals suspected contamination. Examples of due diligence assessments include: flood risk assessment, seismic risk assessment, zoning reports for compliance with all applicable laws, borrower and sponsor credit reports, as well as Bridger and Lexis Nexis searches for criminal activity, unethical behavior, bankruptcy, or fraud.

Highlights

- Over 80% of our global real estate equity portfolio carries a green building certification
- Certified 15 new buildings to a LEED standard, including the first-ever Canadian certification awarded for LEED v4.15
- Launched our internal recognition program celebrating excellence in sustainable leadership by our property teams
- Participated in climate scenario analysis in the UNEP FI climate risk pilot
- Our global real estate portfolio received five Green Stars—the highest possible rating—from GRESB

Case study: One Bay East, Hong Kong

Manulife Tower at One Bay East is a Class A office building located in the emerging Kowloon East business district of Hong Kong. Housing Manulife's Hong Kong corporate offices, the tower is certified LEED Gold and the office space fit out is LEED Platinum certified.

One Bay East has also won the Royal Institution of Chartered Surveyors Award for Sustainability Achievement of the Year twice, first in 2016 and most recently in 2018. This award recognizes buildings that use innovative technology and teamwork to deliver measurable environmental benefits.

Initiatives at One Bay East

- Promoting healthy occupant working, living, and eating through behavioral change campaigns
- Achieving energy and cost savings of up to 16% with our Central Chiller Plant Optimization system
- Educating employees and other stakeholders through information sessions and guided tours that demonstrate innovative technologies and strong building performance

"Over 80% of our global portfolio carries a green building certification and we're actively working to maintain momentum in this area. Sustainability is a never-ending journey requiring our continuous commitment and dedication."

—William G. McPadden, CPA
Global Head of Real Estate

Infrastructure

ESG analysis is an extension of our infrastructure team's traditional risk assessment and fundamental investment approach. Depending on the degree of materiality, the analysis of ESG factors may influence valuation recommendations, portfolio construction decisions, and transaction underwriting.

B

for infrastructure

Manulife PRI assessment report 2019.

For our infrastructure investments, the team conducts a multilayered due diligence process, including ESG considerations, to ensure the investment is fully aligned with the overarching investment thesis and our sustainability views. ESG factors such as, but not limited to, community relations, biodiversity, labor, anticorruption, carbon emission levels, local environment impact, and health and safety are all kept in mind.

Our approach is to build meaningful partnerships with leading operators and sponsors. Once an investment is made, our team maintains a close relationship with the management of companies to continue monitoring material aspects of the investment, including ESG factors. In some cases, this comes in the form of board seats and in other cases it comes in the form of protective governance rights and controls. This helps ensure frequent dialogue to discuss any material concerns, including those related to ESG matters.

Highlights

- Our infrastructure investment team manages CAD$2.5 billion in renewable energy private equity investments*
- For the first time, we submitted to GRESB for the 2019 reporting year
- For the first time, we completed the PRI infrastructure module for the 2019 reporting year and received a score of B

* As of December 31, 2019; The infrastructure team manages renewable energy private equity investments on behalf of external clients and the insurance business of Manulife, and renewable energy infrastructure debt investments on behalf of the insurance business of Manulife.

Case study: partnering with a leader in renewable energy

Duke Energy is a leading owner and operator in the renewable energy industry. Our team's strong relationship with Duke yielded a compelling opportunity to invest in a high-quality portfolio of wind and solar projects, illustrative of the secular shift toward sustainable, renewable energy production. The team's detailed investment due diligence confirmed this as a differentiated opportunity to invest in core infrastructure assets featuring strong, long-term contracts, stable cash yield, a streamlined financing structure, and partnership with a best-in-class operator.

Our infrastructure team was also attracted to Duke's commitment to a sustainable energy future. Duke is at the forefront of investing in renewable energy and modernizing the energy grid to create cleaner energy and protect the communities in which it operates.

Modernizing the energy grid is essential to improving the integration of renewable energy generation, reducing GHG, and making the global transition to clean energy possible. To that end, Duke continues to invest in transmission system upgrades as well as deploy battery storage systems that better enable renewables to consistently meet demand despite the natural variability of these resources.

Responsible stewardship of wildlife is a key priority for Duke. The company is the first wind operator to commercially deploy an artificial intelligence-driven system—IdentiFlight—to ensure the successful co-existence of endangered birds, such as bald and golden eagles, and wind energy. Each IdentiFlight system uses eight cameras offering a 360-degree view of a wind farm. In just seconds, it can identify an eagle flying too close to a rotating turbine and automatically shut the turbine down to prevent a collision.

Supported by technological improvements, cost competitiveness, and heightened environmental awareness, the demand for clean renewable energy is poised to continue to grow over the next decade. Partnering with an industry leader and investor in the renewable energy space allows Manulife Investment Management to actively support the industry's sustainable growth trajectory and broader adoption of clean energy.

"For infrastructure to demonstrate a greater degree of insulation against macro risks, such as economic recession or unexpected inflation, investment in this hybrid asset class has to be conducted with an eye toward sustainability."

—John Anderson
Global Head of Corporate Finance and Infrastructure

Private equity and credit

Manulife Investment Management's private equity teams have adopted an approach based on industry standards for the consideration of ESG factors during the investment underwriting and due diligence process.

B

for private equity and credit

Manulife PRI assessment report 2019.

Accordingly, our teams are taking a structured approach to due diligence, underwriting, and monitoring with respect to ESG considerations across their investment activities. This approach has three main features:

1. The consideration of ESG factors during the investment underwriting and due diligence process, using an approach that draws from both the PRI and SASB
2. The inclusion of a section in final investment memos highlighting the summary of each team's ESG analysis
3. Monitoring of our investments through our proprietary framework

To inform their assessments, the teams use proprietary ESG data and research from our dedicated ESG professionals. Our teams also consider the responses of investee company management and financial sponsors to inquiries regarding their ability and willingness to manage ESG issues. We leverage this knowledge to refine our investment process in private credit to identify and manage ESG-related risks and opportunities as we adopt industry best practices.

Highlights

- For the first time, we completed the PRI private equity module for the 2019 reporting year and received a score of B
- Our investment process is now aligned with industry best practices such as SASB and PRI
- 100% of the GPs in our fund of funds recognize ESG risks and opportunities in their due diligence process

"Active integration of ESG factors provides another lens with which to view risks and opportunities for both new and existing private equity and credit investments. It provides us with more information to make investment decisions, enhancing the decision-making process."

—Vipon Ghai
Global Head of Private Equity and Credit

Case study: assessment of GP sustainability commitment

Our private equity team developed a proprietary framework for evaluating and monitoring the investing practices of the GPs in our private equity fund of funds, incorporating industry best practices and resources provided by the PRI.

Each GP was assessed on its ESG-related policies and processes, including identification and management of ESG risks and opportunities, engagement with portfolio companies, and disclosure and transparency.

Among the areas of excellence identified across the portfolio, a large proportion of GPs integrate ESG factors into their due diligence processes to identify risks and opportunities and consider them in their investment decision-making. GPs have also developed formal monitoring processes to assess a company's management of ESG factors. This new framework enables us to monitor individual and aggregated performance of the underlying investments and is used to monitor GP improvement on an annual basis.

We evaluate our GPs for their ESG experience and rigor

	Advanced (% of GPs)	**Intermediate (% of GPs)**	**Beginner (% of GPs)**	**Laggard (% of GPs)**
ESG policies and factors' influence on investment beliefs	42	47	11	0
Identify and manage material ESG risks and use ESG factors to create value	42	53	5	0
Contribute to portfolio companies' management of ESG-related risks and opportunities	5	89	5	0
Monitor and ensure fund operates consistently with ESG policies, including disclosure of ESG-related incidents	16	53	21	11

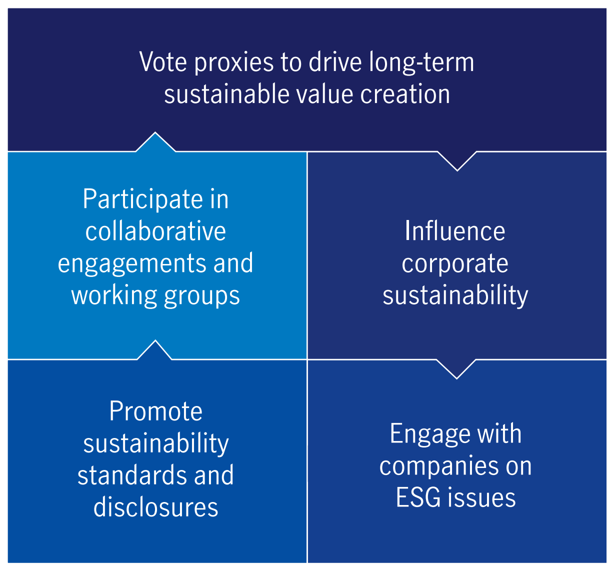
Source: Manulife Investment Management, as of December 2019. A total of 19 GPs were assessed.

Active ownership

Our philosophy

We believe that engaging with companies in which we invest and voting thoughtfully is the linchpin of an actively managed approach to sustainable investing. These forms of active ownership can contribute to the long-term sustainability of our investee companies while improving the sustainability of their business models and reducing risk.

Proxy voting and engagement can advance sustainability objectives and operating strength



In our private markets capabilities, our asset operational practices are inseparable from our high standards for sustainability. In our management of timber, agriculture, and real estate, our sustainability priorities are woven into our operations. Throughout the investment lifecycle of these asset classes, as well as in our infrastructure and private equity and credit portfolios, we continuously engage with our co-investors, investees, and business partners to encourage best practices, and we seek to monitor ESG-related data available to help ensure the efficacy of our approach.

In our public market portfolios, we seek to exercise the rights and responsibilities associated with equity ownership, on behalf of our clients, with a focus on maximizing long-term shareholder returns as well as enhancing and improving the operating strength of our partner companies to create sustainable value for shareholders.

As bondholders, as well, we speak with issuers on various ESG topics, which gives us insight into their business models and strategy. Through our engagements with companies, governments, and regulators, we leverage our insight in a diverse array of local markets, languages, and cultures, and we share our views on industry best practices around sustainability issues based on our research and experience. Our engagement as bondholders carries with it the ability to protect and grow invested capital while also helping to shape key issues and support the resiliency of the capital markets.

“Active ownership protects and enhances investment value over the long term by aligning research, engagement, and ownership rights to encourage issuers to adopt robust frameworks intended to mitigate risk and maximize opportunity.”

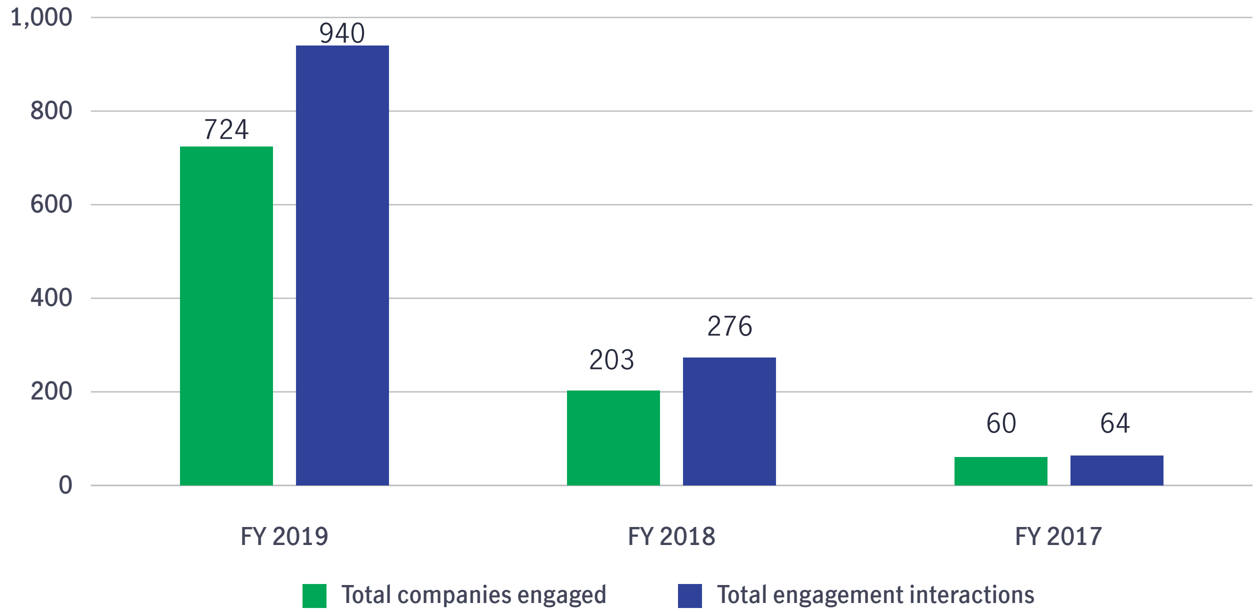
—Peter Mennie
Global Head of ESG Integration and Research (Public Markets)

Our engagement practices

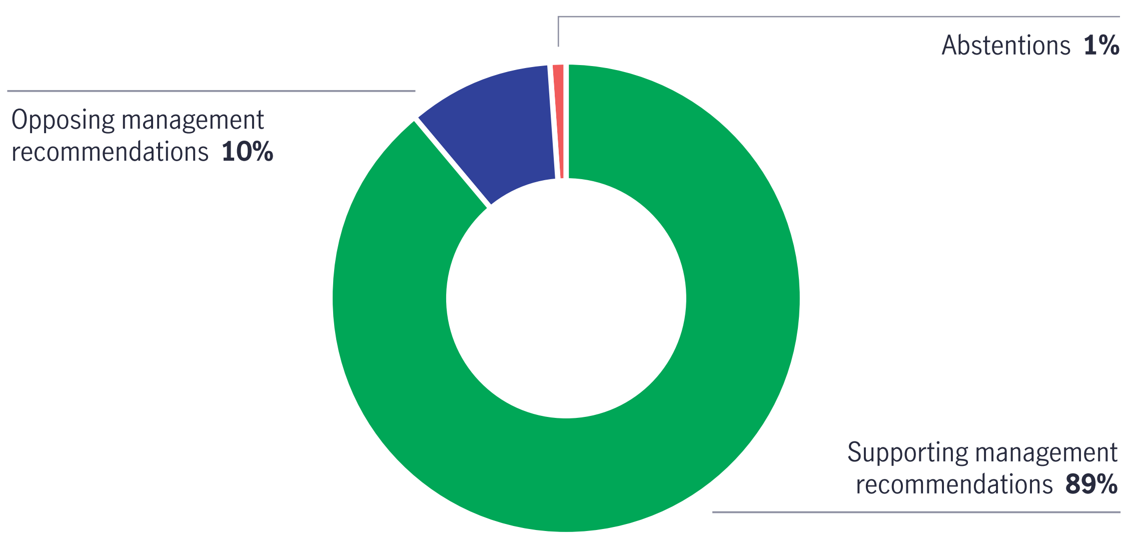
Our public markets investment teams and ESG integration and research team also regularly engage with boards and management on ESG issues consistent with the principles stipulated in our sustainable investing statement, our ESG engagement policy, and our global proxy voting policy. We may, through these engagements, request certain changes of the company to mitigate risks or maximize opportunities.

Depending on a company’s progress on an issue, we may choose to escalate the matter by requesting to speak to certain board members, joining a collaborative engagement, or adjusting a valuation model. In the context of preparing for a shareholder meeting, we review progress on requested changes for those companies engaged. In a situation in which we determine that the issuer hasn’t made sufficient improvements on an issue, we may take voting action to demonstrate our concerns.

Overall engagement statistics*



Aggregate voting instructions relative to management recommendations



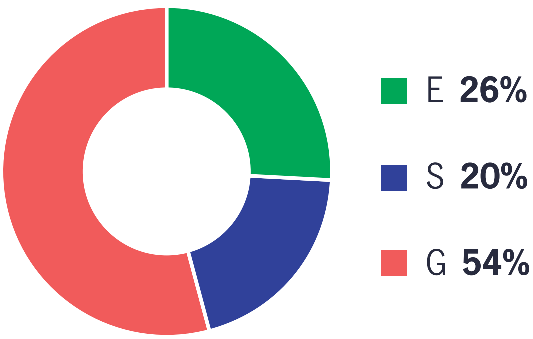
* Engagement statistics for 2019 reflect expanded engagement tracking.

Source: Manulife Investment Management as of December 31, 2019.

A range of ESG issues in our engagements

We often engage with a company on more than one ESG issue in a given engagement interaction. These engagements can be purely to learn about firm management of sustainability risks or to encourage them to address a material issue we've identified that may affect value over the long term.

Engagement factor focus, FY 2019



Top 10 engagement topics*	E, S, G	Number of engagements
Board structure and practices	G	248
Shareholder rights	G	196
Market opportunity: environmental business/sust finance	E	115
Market opportunities	G	92
Customer pref and shift	S	86
Other governance topics	G	79
Other social topics	S	62
Climate change vulnerability	E	55
Other environment topics	E	47
GHGs	E	41

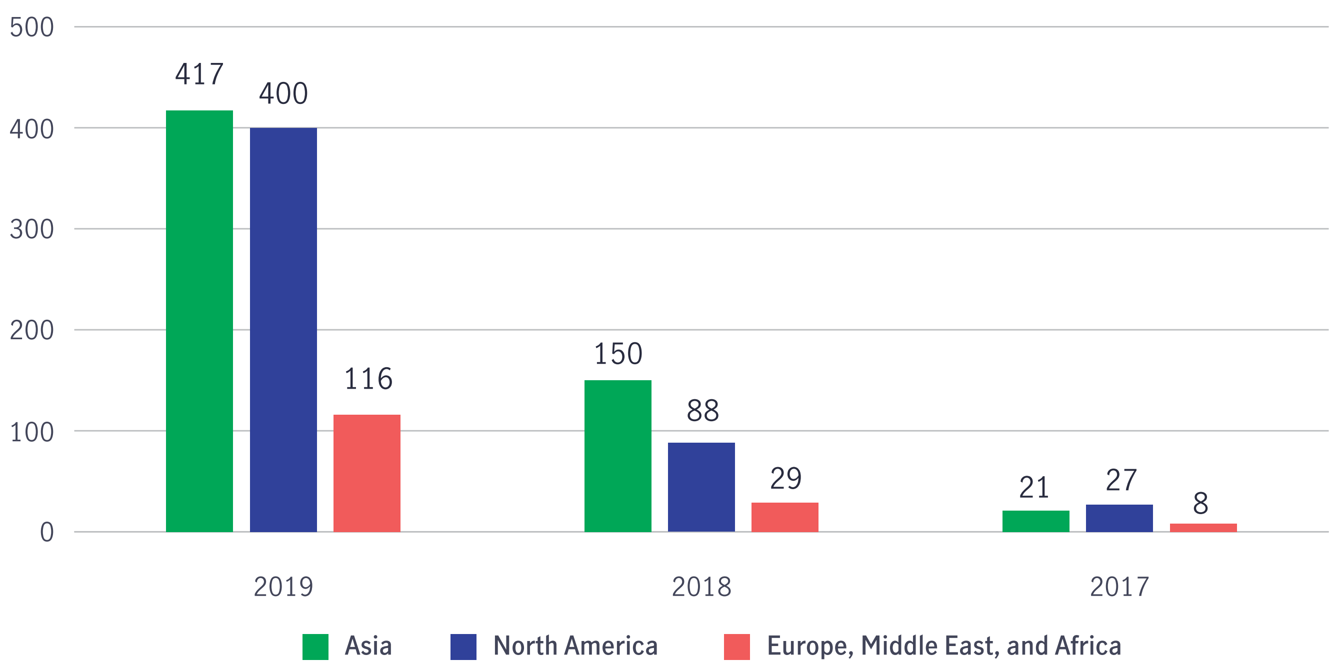
* Table reflects the largest single-factor topics. ESG due diligence and disclosure, which crosses all factor categories, was the most common engagement topic, numbering 275 engagements.

Source: Manulife Investment Management as of December 31, 2019.

Engagement by region

Our engagements span the globe, with the largest portion of 2019 engagements occurring with companies domiciled in Asia and North America.

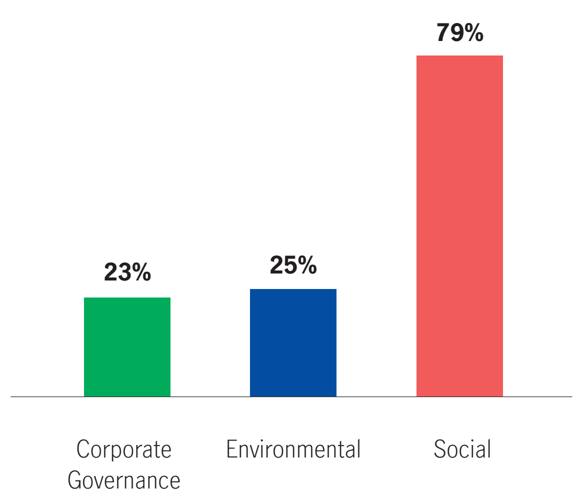
Engagement across the top three most active regions



Shareholder proposals

We frequently support shareholder proposals that address material ESG risks pertaining to a given issuer, and we evaluate each proposal on its merits. Some of the factors we consider are the magnitude of the opportunity or risk identified, current practices and disclosure at the firm, legislative or regulatory action on the matter, and the cost of implementation on the business. In 2019, our support for such proposals was wide ranging and particularly evident in socially focused proposals touching on human rights, lobbying payments and policy, and employment diversity.

Shareholder proposals supported



Source: Manulife Investment Management, as of December 31, 2019.

Examples of governance proposals supported

- Requests for an independent board chair
- Adoption of bonus clawback mechanisms
- Incorporation of ESG factors in executive compensation

Examples of environmental proposals supported

- Report on sustainable packaging
- Report on deforestation risk in the supply chain
- Adoption of quantitative GHG emissions goals

Examples of social proposals supported

- Report on human rights risks in the supply chain
- Adoption of a human rights policy
- Report on the gender pay gap
- Report on lobbying payments and political contributions
- Setting a gender diversity target for the board of directors

Global remuneration proposals

	Voted against (%)
Approve severance	53
Equity plan	25
Pay frequency	21
Approve bonus	15
Executive compensation plan	15
Approve non-executive director pay	2

Developments in our stewardship practices

Portfolio managers actively review voting options and make voting decisions for their holdings in accordance with our proxy voting policy, and they frequently consult with our ESG team on proxy matters, as when seeking advice on specific proxy votes for individual issuers. Manulife Investment Management also employs a proxy voting services provider to ensure the timely casting of votes and to provide relevant and timely proxy voting research to inform our voting decisions.

In 2019, we established a proxy voting working group composed of senior managers from across the firm, including the equity investment team, legal, compliance, and the ESG team. The working group operates under the auspices of the public markets sustainable investing committee, described in our sustainability governance section of this report.

The activities of the working group have contributed to the evolution of our proxy voting policy and have led to enhanced efforts to scrutinize proxy voting decisions and processes across our investment organization.

Reviewing our stewardship practices

Early in 2020, we conducted a third-party review of our active ownership practices in an effort to identify opportunities to enhance our approach. Pursuant to this effort, we intend to file a statement in 2021 that outlines our active ownership practices to the Financial Reporting Council, which oversees the U.K. Stewardship Code.

Source: Manulife Investment Management, 31 December, 2019. Details of our proxy voting records can be accessed here.

Engagement and proxy voting case studies

Case study 1: collaborative engagement on emissions reduction

Manulife Investment Management is a member of the Climate Action 100+ initiative, which seeks commitments from the boards and senior management of target companies to take three actions:

1. Implement a strong governance framework that clearly articulates the board's accountability and oversight of climate change risks and opportunities
2. Reduce GHG emissions across the value chain, consistent with the Paris Agreement's goal of limiting the global average temperature increase to well below 2°C above preindustrial levels
3. Enhance corporate disclosure in line with the final recommendations of the TCFD

Under the Climate Action 100+ umbrella, Manulife Investment Management co-led engagement efforts since 2018 with an oil and gas company to work toward the three goals above. Multiple discussions included senior management and members of the board. Over the course of 2019, the company took the noteworthy step of adopting a net zero aspirational target in relation to certain operations. The company subsequently updated short-term emission reduction targets that helped provide some insight into how the company could work toward achieving its target. Discussions are ongoing, and we continue to collaborate with other investors to support the company to increase its commitment to GHG emissions reduction, improved disclosure, and strengthened targets.

Case study 2: excessive stock pledges

Our investment team was concerned about risk associated with the board's allowance of excessive pledging of stock by executives. The investment team conducted a thorough analysis and determined that a significant liquidity risk existed at the issuer as, at the time of the release of the proxy statement, a total value of 5% of shares outstanding was pledged as collateral by executives. The investment team voiced concern through a vote against the audit committee.

Case study 3: GHG emissions, gender diversity, and systemic market risk

In 2019, we engaged with a Japanese steel company across several ESG topics in an effort to learn more about its risk mitigation techniques, encourage better disclosure, and seek other behavioral changes.

The steel industry is one of the highest GHG-emitting industries, and so we focused on environmental topics in our conversation with the issuer. The company completed a TCFD report, and for its scenario analysis, used both a 2°C and 4°C scenario. The company also identified significant potential to reduce carbon emissions in the future by using hydrogen in the ferro-coke process.

We also discussed human capital development efforts with specific attention to diversity. The firm noted that it's working on improving gender diversity in the workplace and had already achieved three times its 2014 baseline.

Finally, we raised the issue of crossholdings—a governance risk systemic to the Japanese market. We encouraged the company to ensure any crossholdings were relevant to the business and to avoid an inefficient lockup of capital.

> "In 2019, Manulife Investment Management generally supported the disclosure of diversity information, including information on the gender pay gap."
>
> **—Peter Mennie**
>
> **Global Head of ESG Integration and Research (Public Markets)**

Case study 4: executive compensation plan rigor

A U.S.-based equities team was concerned with the rigor of executive compensation metrics and engaged with the target company to discuss those concerns, to learn more, and to persuade the company to better align executive pay with shareholder interests.

Our team was disappointed that the executives at the target firm received a maximum award under the short-term incentive plan. In our team's view, this payout occurred not because of factors under the control of management, but due to a one-time tax windfall. In our team's analysis, it was determined that the target firm actually underperformed on fundamental measures.

The target company's board refused to adjust the executive compensation metrics to improve the rigor of the compensation plan. The team believed this misalignment of shareholder and executive interests was significant enough to warrant a vote against the directors and on the advisory vote on compensation at the firm's annual meeting. This misalignment was also a significant factor in the ultimate decision to exit the position.

Case study 5: climate change risk management

We engaged with a Chinese insurance company on its ESG disclosure, TCFD alignment, and climate change strategy. We shared our view that climate change was a key risk for the company and outlined the additional information that it could provide to help our investment analysis. We also highlighted best practices from other global insurance companies in an effort to encourage changed behavior at the firm.

The company subsequently joined PRI and Climate Action 100+. It further developed a low-carbon strategy and began preparing its first TCFD report. This became the first TCFD report in China, and the company aims to be a leader in ESG standards in the country. We believe our engagement was a contributing factor to these changes. The actions taken by the company also bolstered our investment thesis by demonstrating that climate risks are being addressed. Our teams have since shared this firm's TCFD report as a model for other companies in China.

Case study 6: ESG policy improvements

Through our internal research process, we determined that significant ESG risks existed at a U.S. company related to human capital management, carbon footprint, and water stress, among others. Our investment and ESG teams set out to determine through engagement whether the firm lacked robust disclosure regarding the management of those risks and whether the risks were indeed as substantial as they appeared.

We conducted an initial engagement with the company to discuss the significant risks we identified across each ESG factor. Company representatives declined to provide satisfactory responses to those questions, but then we were proactively contacted to discuss ESG risk with the CEO. The conversation revealed that the company was taking actions to address its carbon footprint and water stress levels but hadn't documented those actions through formal policies. The CEO agreed to reconvene the discussion six months from the initial meeting to provide an update on the firm's sustainability reporting strategy, risk mitigation activities, and general strategy to improve sustainable practices.

Private markets: operational excellence

Where we operate assets, the incorporation of sustainability considerations includes high standards of stewardship and governance. Sustainability considerations are fundamental to our property management practices across our timber, agriculture, and real estate businesses.

As the world's largest timberland investment manager and one of the largest farmland investment managers, our operations can contribute directly to solutions for a variety of global challenges. Both of these businesses are significant carbon sinks, focus on protecting and enhancing biodiversity, and bring rewarding employment opportunities to rural communities.

Our approach to real estate asset and property management is philosophically similar. Tenants in our buildings want healthy and efficient workspaces. Their employees care about their personal wellness and are increasingly interested in tackling the pressing issues facing humanity today. Forward-thinking investors seek to own buildings that are built to last and align themselves with a manager that stays ahead of risks and opportunities. For these reasons, we make focusing on sustainability a cornerstone of our approach to real asset operations.

Timber and agriculture

As a steward of major timberland and farmland holdings throughout the world, Manulife Investment Management's timber and agriculture businesses maintain a well-defined set of forest and farm management policies and guidelines. These ensure alignment with investor interests, seek to protect and secure investor assets to minimize risk, and enhance the value of our investors' timberland and farmland through the appropriate application of silvicultural and agricultural technologies (e.g., genetics, site preparation, fertilization, stocking control, integrated pest management, and remote sensing).

Sustainability is fundamental to our timber and agriculture operations and property management. Our forest and farmland managers integrate sustainability priorities into our operations by implementing stewardship principles that are aligned with third-party sustainability certification standards. Examples of the comprehensive suite of operational policies followed by our managers include health and safety, biodiversity, forest chemical use, riparian management zones, and threatened and endangered species.

One particular focus is biodiversity. Our staff biologists identify forests with exceptional conservation value (FECVs) and threatened and endangered (T&E) species. We develop plans to preserve FECVs and protect habitat for T&E species, and we hold training sessions so field staff know how to identify them.

Sustainability actions in our timber and agriculture portfolios

773M

Forests—$MtCO_2$ stored at year end

1.16B

Forests—trees planted (cumulative)

6.1M

Forests—carbon credits sold (cumulative, $MtCO_2$)

–3.1M

total GHG removals ($MtCO_2$, 5-year trailing average)

12K

miles of stream frontage protected

100%

permanent crop farms using water conservation practices

Source: Manulife Investment Management, as of December 31, 2019.

Real estate

The Manulife Investment Management real estate team has building operation sustainability procedures and asset management sustainability procedures that help guide ESG management in postinvestment activities. Procedures include, but aren't limited to, energy, water and waste management, occupier engagement, community engagement, renewable energy, and indoor environmental quality.

Property managers, which may include the Manulife Investment Management real estate team and third-party managers, are responsible for sustainability management on an ongoing basis.

Our real estate team monitors sustainability practices at our properties through our engineering and technical services department. Sustainability data is used for performance management, public disclosure, and participation in benchmarking initiatives (e.g., GRESB).

Third-party managers are expected to manage certain ESG aspects such as safety, environmental risks, and energy and water performance. Third-party management companies have continuous contact with the real estate team's asset and portfolio managers and discuss ESG management considerations such as energy management and green building certifications.

Annually, we monitor both our own property managers' and third-party managers' sustainability performance in several areas, including energy, water and waste performance, renewable energy, certifications, and tenant engagement, through GRESB. Manulife Investment Management's real estate team has set five-year targets for energy, water, and waste that managers are assessed against annually. Managers' performance is also benchmarked against other portfolio performance and benchmarks, such as GRESB.

Our real estate team's Sustainable Building Standards provide guidance to our property managers on material ESG initiatives such as energy, water and waste management, and tenant and community engagement. Property managers are expected to achieve minimum levels for all properties in each asset class.

Sustainability actions in our global real estate portfolio

Diversion rate ▶ 45%—7,900 million tons of waste diverted from landfills; achieved an average portfolio waste diversion rate of 45%

Water ▼ 6.8%—Decreased normalized water use intensity by 6.8%, equivalent to the water needed to fill 164,000 bathtubs

Energy ▼ 2%—Decreased normalized energy use intensity by 2%, equivalent to the energy consumed by 540 Canadian homes

Carbon emissions ▼ 5.7%—Decreased GHG intensity by 5.7%, equivalent to removing 3,700 cars from the road

Source: Manulife Investment Management, as of December 2019.

Our Sustainable Building Standards apply to third-party and internal managers. Our expectation is that all properties in all asset classes achieve at least level 1 and report on performance semiannually.

Our Sustainable Building Standards—level definitions

Level 1: Sustainability essentials, achievable for all property types

Level 2: Basic initiatives which require some operational control to implement.

Level 3: Strong sustainability practices, achievable for all office properties

Level 4: Advanced sustainability initiatives requiring increased investment and tenant/market demand

Level 5: Sustainability leadership applicable to Class A offices

Global collaboration

We understand that the sustainability challenges our world faces are too vast for any single government or corporate entity to make all the difference. It takes work from many different actors, from sovereigns and asset managers to nongovernmental organizations and international working groups of corporate, academic, and government leaders, to move the dial on the challenges before us.

For this reason, we're an active participant in a variety of regional and international organizations, sustainability standards-setting bodies, and collaborative engagement projects that focus on systemic ESG issues. Through this activity, we amplify our impact in addressing sustainability concerns among the companies, industries, and markets in our collective orbit of influence.

Amplifying our impact through collaboration

Market education

We engage with a wide range of industry participants and seek to be a leading voice.

Regulator/policy focus

We support regulators' efforts to formalize the SRI industry.

Issuer focus

Our collaborative leadership helps us steer markets and the economy.

For illustrative purposes only.

Current sustainability/ESG-related industry groups and initiatives with which we're engaged

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
30% Club Canadian Investor Group	Canada	2019	17 institutional investors across Canada (asset managers and pension plans)	Through engagement, the objective is to achieve a minimum of 30% women on the boards and at the executive management level of S&P/TSX Composite Index companies by 2022	SDG 5: gender equality
Asian Corporate Governance Association (ACGA)	Asia	2016	111 organizations operating or investing in Asia; 1,200 professional members from 19 markets across the globe; investor members—pension and asset managers—manage more than US$30 trillion globally	Promotes implementation of effective governance practices in Asian companies on behalf of institutional investors and regulators	SDG 16: peace, justice, and strong institutions SDG 17: partnerships for the goals
Asia Investor Group on Climate Change (AIGCC)	Asia	2016	42 members managing more than US$3.5 trillion	Works with Asian asset owners and financial institutions to create awareness about the risks and opportunities associated with climate change and low carbon investing	SDG 13: climate action
Building Owners and Resilience Association (BOMA)	Canada	2018	Represents owners and managers of all commercial property types, 11 regional associations across Canada	Implements timely, responsible, and consistent policy positions on important issues to the Canadian real estate industry; acts as the voice representing the industry by advocating on members' behalf on a national or provincial platform	SDG 11: sustainable cities and communities

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
Canada Green Building Council (CGBC)	Canada	2018	Over 1,200 industry organizations and more than 2,500 individual chapter members involved in designing, building, and operating buildings, homes, and communities	A nonprofit, national organization working since 2002 to advance green building and sustainable community development practices in Canada	SDG 9: industry, innovation, and infrastructure SDG 11: sustainable cities and communities
Canadian Coalition for Good Governance (CCGG)	Canada	2012	Institutional investors managing US$4.5 trillion	Promotes good governance practices in Canadian public companies on behalf of institutional investors	SDG 16: peace, justice, and strong institutions
Carbon Disclosure Project (CDP)	Global	2018	Over 515 investors with US$106 trillion in assets, 150+ major buyers with combined purchasing power of US$4 trillion, 8,400+ companies, 800+ cities, 120+ states, and regions	Advocates for disclosure of company data to measure and manage the environmental impact (carbon, water, forestry). One of the first ESG disclosure initiatives in the financial industry	SDG 6: clean water and sanitation SDG 7: affordable and clean energy SDG 11: sustainable cities and communities SDG 12: responsible consumption and production SDG 13: climate action SDG 15: life on land
Ceres Investor Network on Climate Risk (INCR)	North America	2016	More than 175 institutional investors representing more than US$29 trillion in assets	Promotes discussion and collaboration on how to address climate risk and other sustainability challenges among institutional investors	SDG 13: climate action SDG 17: partnerships for the goals

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
Climate Action 100+	Global	2018	Over 450 investors managing US$40 trillion	Collaborative investor initiative to engage with the 100+ largest systemic emitters, encouraging them to improve their performance from a climate perspective, reduce emissions over time, and abide by TCFD disclosures	SDG 7: affordable and clean energy SDG 13: climate action SDG 17: partnerships for the goals
Climate Smart Land Network (CSLN)	North America	2015	Forestland owners and managers with 33.3 million acres across North America	Provides forest landowners and managers with direct access to forest and climate experts and the opportunity to benefit from other forest landowners in the network	SDG 13: climate action SDG 14: life below water SDG 15: life on land SDG 17: partnerships for the goals
Emerging Markets Investors Association (EMIA)	Global	2015	Approximately 36 global members, funds, advisory firms, and consultancies	A central hub for information, education, and networking for investors in emerging markets Member of the extractive industries working group	SDG 8: decent work and economic growth SDG 10: reduced inequalities SDG 16: peace, justice, and strong institutions SDG 17: partnerships for the goals
Singapore Standards Council (SCC), Enterprise Singapore	Singapore	2019	Industry, academic, and governmental organizations	Facilitates the development, promotion, and review of standards and technical references in Singapore	SDG 16: peace, justice, and strong institutions

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
Global Impact Investing Network (GIIN)	Global	2018	A broad network of investors and leaders with over 20,000 members	A nonprofit organization dedicated to increasing the scale and effectiveness of impact investing; builds critical infrastructure and supports activities, education, and research that help accelerate the development of a coherent impact investing industry	All 17 SDGs addressed by their operations
Global Real Estate Sustainability Benchmark (GRESB)	Global	2015	More than 100 institutional investors, with over US$22 trillion in AUM; use GRESB data to monitor their investments, engage with their managers, and make decisions that lead to a more sustainable real asset industry	Validates, scores, and benchmarks ESG performance data for real assets, providing business intelligence and engagement tools to investors and managers	SDG 9: industry, innovation and infrastructure SDG 11: sustainable cities and communities SDG 17: partnerships for the goals
Hong Kong Board Diversity Initiative	Asia	2018	12 institutional investors	Founding signatory to the Hong Kong Board Diversity Investor Initiative, along with BlackRock and managers commit to ongoing engagement with investee companies in Hong Kong on matters of diversity	SDG 5: gender equality
Hong Kong Financial Services Development Council ESG Working Group	Asia	2018	Around 10 ESG professionals	Fosters engagement between the Hong Kong government and the financial services industry; commissioned a one-year ESG working group to identify recommendations for the Hong Kong government to accelerate ESG adoption	SDG 16: peace, justice and strong institutions SDG 17: partnerships for the goals

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
Hong Kong Green Finance Association (HKGFA)	Hong Kong	2018	100+ members from across a range of sectors, from banking and insurance to technology and utilities	Promotes adoption of green finance and responsible investment principles by institutional investors and the Hong Kong government; we participate in the HKGFA's ESG investor subcommittee	SDG 13: climate action SDG 17: partnerships for the goals
International Corporate Governance Network (ICGN)	Global	2019	Investor members across 45 countries managing over US$54 trillion	Promotes effective standards of corporate governance and investor stewardship to advance efficient markets and sustainable economies worldwide	SDG 16: peace, justice, and strong institutions SDG 17: partnerships for the goals
Investment Company Institute (ICI)	Global	2015	Broad network of members managing total assets of US$25.2 trillion in the United States, serving more than 100 million U.S. shareholders, and US$6.5 trillion in assets in other jurisdictions	Encouraging adherence to high ethical standards by all industry participants; advancing the interests of funds, their shareholders, directors, and investment professionals; and promoting public understanding of mutual funds and other investment companies	SDG 17: partnerships for the goals
Japan TCFD Consortium	Japan	2019	271 investors and corporates	Aims to further discussion on effective and efficient corporate disclosure of climate-related information and its use by financial institutions; we were invited to participate based on Manulife's official support for TCFD	SDG 13: climate action SDG 16: peace, justice, and strong institutions SDG 17: partnerships for the goals

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
Long-term Infrastructure Investors Association (LTIIA)	Global	2017	50+ members, including infrastructure investors, policymakers, and academic institutions, US$12 trillion in assets, US$350 billion of infrastructure assets	Works with a wide range of stakeholders—infrastructure investors, policymakers, and academics, among others—to enable the long-term, responsible deployment of private capital in public infrastructure projects around the world	SDG 8: decent work and economic growth SDG 9: industry, innovation and infrastructure SDG 11: sustainable cities and communities SDG 17: partnerships for the goals
Massachusetts Institute of Technology (MIT) Joint Program on the Science and Policy of Global Change	Global	2016	International consortium of government, industry, and foundation sponsors	Focuses on advancing a sustainable, prosperous world through scientific analysis of the complex interactions among co-evolving, interconnected global systems	SDG 17: partnerships for the goals
Principles for Responsible Investment (PRI)	Global	2015	Over 2,300 signatories managing more than US$90 trillion	A signatory and an active member of various working groups, including the fixed-income advisory group, sovereign bond working group, and the listed equity integration subcommittee	SDG 17: partnerships for the goals

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
Real Estate Roundtable Sustainability Policy Advisory Committee (SPAC)	United States	2019	Real estate ownership, development, lending, and management firms; 12 billion square feet of office, retail, and industrial properties valued at more than US$3 trillion; over 2 million apartment units and 3 million+ hotel rooms	Seeks to educate policymakers and the public about real estate and its significance to the economy	SDG 9: industry, innovation and infrastructure SDG 11: sustainable cities and communities
Responsible Investment Association (RIA)	Canada	2019	100+ members, including asset managers, asset owners, and service providers; also includes 250+ individuals, mainly advisors	Promotes responsible investing and ESG integration into the investment process in Canada	SDG 17: partnerships for the goals
Securities Industry and Financial Markets Association (SIFMA)	United States	2015	Hundreds of broker-dealers, investment banks, and asset managers	Industry trade group representing securities firms, banks, and asset management companies advocate on legislation, regulation and business policy affecting retail and institutional investors, equity and fixed-income markets, and related products and services	SDG 16: peace, justice, and strong institution SDG 17: partnerships for the goals

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
Sustainability Accounting Standards Board (SASB) Investor Advisory Group	Global	2019	Leading asset owners and managers representing US$40 trillion in AUM	Engages with leading companies to encourage a market standard for ESG disclosure and to foster adoption of SASB disclosure metrics	SDG 16: peace, justice and strong institutions SDG 17: partnerships for the goals
Toronto Responsible Investment Working Group	Canada	2014	About 30 members	Comprises Toronto-based investors, consultants, and nongovernmental organizations that meet at least quarterly to discuss the advancement of sustainable investing	SDG 17: partnerships for the goals
UNEP FI Property Working Group (PWG)	Global	2019	Global network of asset managers and real estate institutions	Drives innovation in responsible property investment by facilitating access to relevant information and best practices for systematically applying and integrating ESG criteria into investment and lending decisions	SDG 10: reduced inequalities SDG 17: partnerships for the goals
UNEP Guidance for Implementing TCFD Recommendations (ended 2019)	Global	2018	20 institutional investors from 11 countries	Delivered a state-of-the-art overview of approaches, tools, and providers available to investors today, detailing the methodologies piloted by the participating members	SDG 13: climate action SDG 17: partnerships for the goals

Associations and initiatives	Regional scope	Year joined	Entities involved	Focus	SDGs supported
World Benchmarking Alliance (WBA)	Global	2018	Members from civil society and business networks, financial institutions, and multilateral organizations	Seeks to increase the private sector's sustainability impact; creates benchmarks to incentivize and accelerate companies' efforts toward achieving the UN's SDGs; Manulife Investment Management has joined the climate and gender working groups	SDG 13: climate action SDG 17: partnerships for the goals
World Business Council on Sustainable Development (WBCSD)	Global	2019	Cross-sector industry members, 200 member companies, US$8.5 trillion in combined revenues, 19 million employees, 70 global partner networks	Global, CEO-led organization of over 200 leading businesses working together to accelerate the transition to a sustainable world	SDG 17: partnerships for the goals

Climate-related financial disclosure (TCFD report)

The stated mission of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) is "to develop voluntary consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders." This disclosure is aligned with the recommendations of the TCFD. In it, we offer details on our approach to climate-related sustainability governance, describe our strategy for managing climate-related risks and opportunities, and outline the metrics we use to manage and monitor our alignment with climate-related goals.

Core elements of recommended climate-related disclosures

Governance—The organization's governance and climate-related risks and opportunities

Strategy—The actual and potential impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk management—The processes used by the organization to identify, assess, and manage climate-related risks

Metrics and targets—The metrics and targets used to assess and manage relevant climate-related risks and opportunities

Source: TCFD. For illustrative purposes only.

Our climate-related financial disclosure

Manulife Investment Management is the unified global organization for Manulife Financial Corporation's (Manulife's) Global Wealth and Asset Management segment. As Manulife Investment Management is an integral part of Manulife, some of this report makes reference to processes at a wider corporate level and other sections relate only to Manulife Investment Management. Although some responses apply to the overall firm, this document doesn't purport to reflect Manulife's overall climate initiatives. This report covers Manulife Investment Management's public and private market capabilities.

Our parent, Manulife, has been a supporter of the TCFD since November 2017, publishing its first disclosure aligned with the TCFD in 2019, and is committed to adopting and aligning its disclosures to the TCFD recommendations. This disclosure reflects our first disclosure on the TCFD and sets out how we incorporate climate-related risks and opportunities into governance, strategy, risk management, metrics, and targets.

In our role as fiduciaries, we recognize and prioritize the importance of risk-adjusted returns. We recognize that our clients, as owners of the underlying assets, bear the major portion of the potential climate-related transition and physical risks to which their investments are exposed. Conversely, our clients also stand to benefit from the potential returns on the investment opportunities associated with the transition to a lower-carbon economy. The relevance of climate-related risks and opportunities to our clients will depend on several variables, including the investment styles and objectives they pursue, the asset classes in which a strategy invests, and the investment's mandate.

Governance

Board oversight—Matters related to climate change are a component of Manulife's ESG framework, overseen by the corporate governance and nominating committee of the Manulife Board of Directors. Climate-related risks and opportunities are considered by the board's risk committee through the ongoing monitoring and reporting of emerging risks. In 2019, the executive sustainability committee (ESC) initiated a review of Manulife's ESG framework, which included assessing the definitions of climate-related metrics and targets. Progress on climate-related matters is reported to the corporate governance and nominating committee at least quarterly. The chief risk officer, a member of the ESC, chairs the climate change working group and is responsible for overseeing the approach and risk management activities on climate-related matters. Manulife Investment Management's president and CEO sits on the ESC, which links Manulife and Manulife Investment Management's oversight of climate-related issues.

Management's role in assessing and managing climate-related risks and opportunities—Manulife Investment Management has established a governance structure to oversee our teams' sustainable investing activities and support the implementation of our sustainable investing statement. This governance structure also applies to the oversight of climate-related issues, and comprises a committee for each of our public and private markets capabilities, allowing for oversight and decision-making of the sustainable investing agenda 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 sustainable investing agenda.

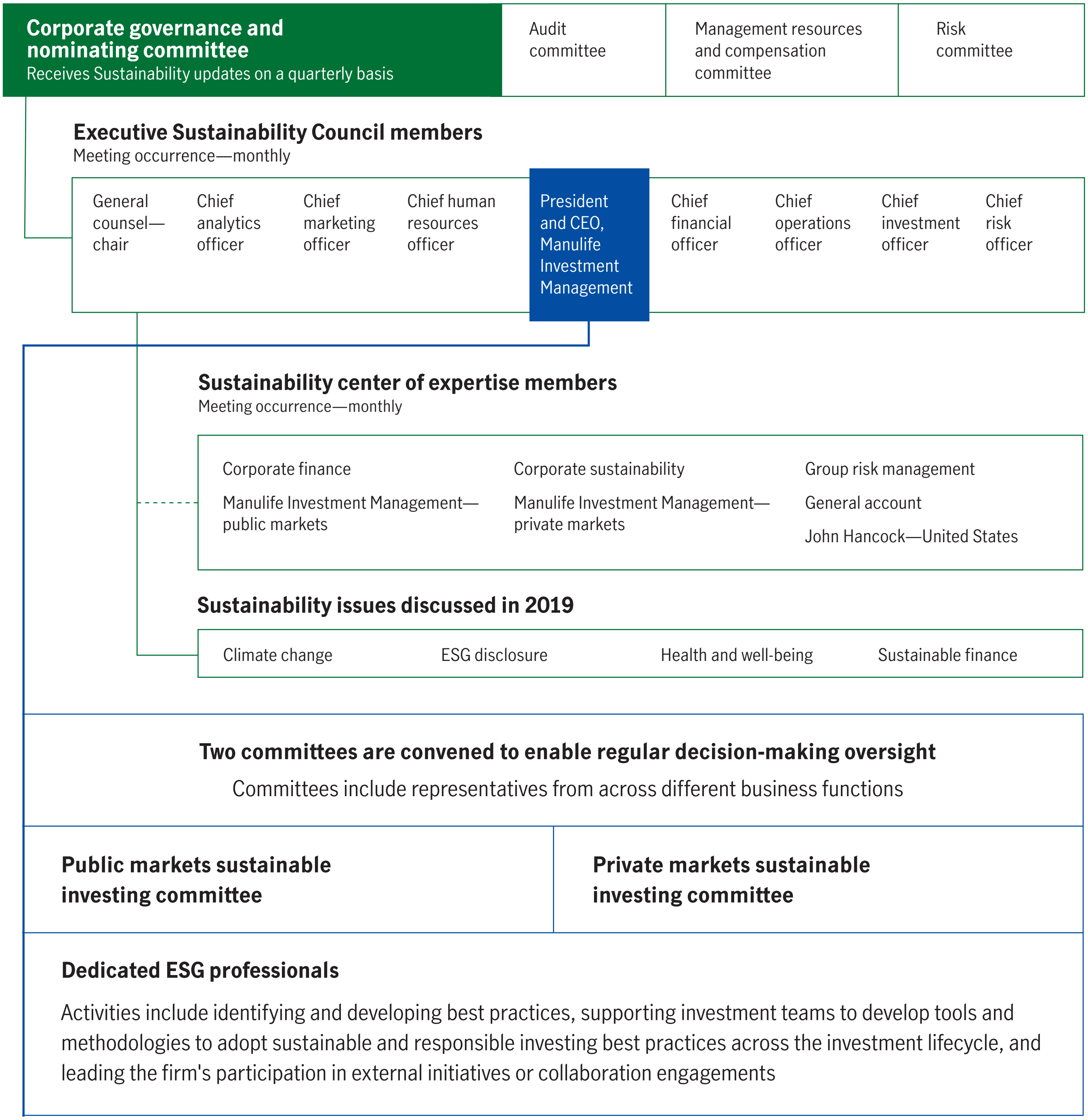
The committees are supported by staff that specializes in sustainable investing. These individuals support the implementation of the sustainable investing statement through a variety of activities and projects. Their efforts include preparing annual business plans, identifying and developing sustainable investing best practices, supporting investment teams to develop tools and methodologies to adopt sustainable investing best practices across the investment lifecycle, and leading the firm's participation in external initiatives or collaborative engagements.

The sustainable investing specialists work closely with portfolio managers and investment analysts around the globe, helping lead the process of ESG integration and offering their expertise to perform climate risk assessments. Through this coordinated approach, the sustainable investing business plans and goals are disseminated throughout the firm, and the firm's approach to ESG is further developed by the investment teams.

Our ESG teams work closely with our investment professionals to assist them in considering climate-related risks and opportunities within their research and portfolio construction and risk assessment process. Tools are made available to teams to enable them to assess these risks at the strategy level.

To enhance our governance of climate-related risks and opportunities, Manulife Investment Management provides ongoing training for management and investment professionals, which equips management to give appropriate direction to the investment teams and enables investment teams to identify, measure, manage, and monitor these risks and opportunities.

The sustainability governance structure of Manulife Investment Management is part of the larger sustainability governance at Manulife



Source: Manulife Investment Management, September 2020. ● Manulife ● Manulife Investment Management

Strategy

We believe that unmitigated climate-related risks present a systemic threat to societal and financial stability, and therefore to our business and our clients' financial objectives, over the coming decades. To understand the impact of climate change on investment decisions, we believe asset managers should assess the transition risk, physical risk, and opportunities posed by climate change to the companies in which they are invested. We recognize that climate change could have an economic impact that will vary from company to company. The varying degree will depend on the exposure level of each sector, industry, and geography. We believe that the understanding of climate change across the capital markets remains uneven, leading to potential mispricing of assets, and that many companies may be inadequately prepared to respond to the risks and opportunities of this transition. We may take a variety of actions toward managing climate-related risks and opportunities across our businesses and investments to appropriately price climate risk.

Between 2017 and 2019, Manulife Investment Management participated in the UNEP FI pilot project, which brought together 20 of the world's leading investors to advance the TCFD recommendations. The participants in the pilot developed scenarios, models, and metrics to enable a scenario-based, forward-looking assessment and disclosure of climate-related risks and opportunities. With UNEP FI and expert support, the investors trialed their portfolios against a range of climate scenarios and co-developed a metric for determining the climate value at risk (climate VaR) for equity, bond, and real estate portfolios. The outputs and conclusions of this group are intended to stimulate and ease the adoption of the TCFD recommendations by the wider industry.

Over the course of 2019, we rolled out the use of the scenario analysis model for select asset classes to evaluate climate change risk, which includes an assessment of climate VaR associated with physical risks, transition (or policy) risks, and associated opportunities. The model creates a numerical output that measures the risk of loss for investments. At a portfolio level, this helps identify the underlying companies with the greatest climate change exposure risk and whether the portfolio is more exposed to transition or physical risks. The model also helps identify companies that may be well positioned to benefit from the low-carbon transition.

Identification of climate-related risks and opportunities: public markets case study

In 2019, we conducted a comparison of public equity portfolios in different regions to evaluate the impact of climate risk by region and the implication of these risks on asset allocation. We analyzed the climate VaR impact on companies in two existing investment portfolios from different geographic regions, under three climate scenarios. The analysis also identified the physical hazards of climate change that carry the highest potential negative impact at the portfolio level and the industries in each portfolio that are potentially most exposed to these risks. The climate risk tool employed in our scenario analysis used a 15-year timeframe to assess risks and opportunities. The output allowed for an analysis at the company level to help determine those organizations that may have greater exposures to climate risk.

We believe that scenario analysis will continue to improve over time and become a meaningful tool to understand the impact of climate change. Our current analysis is limited to scope 1 emissions of the underlying companies, which measures direct GHG emissions from operations. Scope 2, which includes indirect emissions from the consumption of energy, such as electricity, isn't included in the analysis. Future analyses may be developed to incorporate scope 2 and scope 3 emissions.

Unweighted aggregate climate VaR among holdings for two portfolios

Change in average global temperatures above preindustrial levels	Canadian equity portfolio		Asian equity portfolio	
	Climate VaR from transition risk	Climate VaR from tech opportunity	Climate VaR from transition risk	Climate VaR from tech opportunity
3.0˚C	-12.65%	0.77%	-16.74%	4.99%
2.0˚C	-48.78%	2.87%	-135.70%	17.20%
1.5˚C	-99.77%	6.91%	-177.60%	40.40%

Source: Manulife Investment Management, Carbon Delta, August 2018. Climate VaR is a measure of the risk of loss for investments. It estimates how much a set of investments might lose (or gain, if expressed as a positive percentage), given normal market conditions, and based on a terminal period of approximately 30 years with a declining carbon avoidance cost that eventually reaches zero. The Canadian portfolio invests primarily in large-cap Canadian equities, benchmarked against the S&P/TSX Composite Index, while the Asian portfolio invests in equities with primary interest in China, benchmarked against an aggregated MSCI China/Hong Kong Index. The methodology used for scenario analysis is only focused on scope 1 (direct) emissions and does not consider the impact of climate change risks on scope 2 and scope 3 (indirect) emissions. Our unweighted aggregate climate VaR calculations rely on several assumptions, including nationally determined contributions to GHG emissions by country and a range of global carbon prices under varying temperature scenarios. The analysis does not make any assumptions regarding individual companies' ability to reduce their carbon emissions or pass transition risk-related costs to customers or suppliers; nor does it offer a confidence interval for transition-related risks or opportunities.

Magnitudes of risk and opportunity

Climate transition risk—or the general cost associated with moving from a current business-as-usual scenario in the direction of a more carbon-neutral future—represents the greatest portfolio risk.

This is followed in magnitude by 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.

Both climate transition and physical hazard risks may be partially offset by low-carbon technology innovation such as carbon extraction or sequestration, particularly for those companies that have invested in sustainability-related research and development.

Coal-fired power plants: private markets case study

In our private markets' capabilities, the lifecycle of our investments requires the consideration of a broad range of material ESG risks, including climate change, that could materialize in the short, medium, and long term.

Given the climate-related risks associated with coal power, in 2017 the infrastructure team decided to no longer evaluate new investments in individual coal-fired power plants. For example, in the United States, the team declined to evaluate a coal-fired power plant in the Northeast that was scheduled to operate for five more years under current power sales agreements. The team believes that support for coal-fired power generation in the United States will continue to decline as concerns grow over carbon emissions and climate change. In addition, the team is concerned there's a risk that coal-fired power plants currently in operation could suddenly become uneconomical and stranded, facing complete loss of investment.

The team continues to invest in utilities in which part of their generation derives from coal-fired power plants and for which there's adequate protection from stranded cost, with most of the cost recovery coming from preapproved future electricity rates.

Timber and agriculture

Forests and farms offer natural climate solutions by removing carbon from the atmosphere naturally. The carbon removals generated by our managed agriculture and timberlands of 3.1 million metric tons of carbon dioxide ($MtCO_2$) based on a five-year trailing average exceed all our scope 1 and 2 emissions of 1.0 million $MtCO_2$ in 2019.

Our risk management process considers climate-related risks and effects for both investment and property management. Our teams identify in internal risk registries not only the nature of the issue but the mitigation strategies that we have in place. Some examples include severe or large-scale wildfires, damage from a hurricane, flood, or tornado, and the impact of climate change—whether due to warmer or colder temperatures, precipitation, or changes in growing season—on productivity. These risk registries are used to inform our investment theses and acquisition due diligence, as well as our operational property management plans.

For our timber and agriculture capabilities, we're planning to release a public report in 2020 that demonstrates alignment with recommendations from the TCFD. This initiative is in line with our commitment to manage and disclose climate-related risks and opportunities and respond to investor demands.

Real estate

In 2019, Manulife Investment Management's real estate team initiated the use of scenario analysis under the strategy pillar of the TCFD framework. Scenario analysis provides an assessment of how a business might perform under future conditions and in response to specific sets of climate-related risks.

As an owner and operator of property, our business is exposed to both risk and opportunity from climate change. The nature and level of risk are dependent on government, business, and society's response in the short and long term, and our business will be affected in both positive and negative ways by the transition.

Real estate assets in the long term will be exposed to increasing levels of physical climate risks. Particularly at risk are those properties with locations in climate-sensitive regions. Our preliminary physical risk assessments demonstrate a range of risks due to temperature rise, sea level rise, and changes to the frequency and severity of specific extreme weather events. The physical risks from these hazards are translated into potential costs for each property. To advance our climate-related initiatives, we responded to the GRESB resilience module for the 2019 reporting year. The resilience module aims to address climate risk and resilience of the TCFD recommendations. Furthermore, our preliminary asset-level analysis has shown transition risk due to regulatory requirements.

Output from the climate VaR analysis for our real estate portfolios, our physical climate risk assessments, and the GRESB resilience module results will inform our real estate sustainability strategy, as well as our operational, asset management, and investment practices.

Risk management

Manulife Investment Management has a rigorous risk management approach and framework, which lays out how we identify and manage the climate-related risks and opportunities to which we're exposed. We integrate the consideration of ESG factors, including climate-related issues, into the investment process 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. Manulife Investment Management is developing strategies that support sustainability goals, including strategies oriented toward investors who wish to have structurally lower carbon emissions and intensity, and that look to invest in companies that are making strong progress on climate change goals.

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 understand the impacts on our investments. The UN's Intergovernmental Panel on Climate Change (IPCC) urges action to limit global warming to 1.5°C in order to prevent the destabilization of the climate system, reduce the risk of impending extreme weather events, changes to global food systems, biodiversity loss, and poverty. According to the IPCC, "limiting global warming to 1.5°C would require 'rapid and far-reaching' transitions in land, energy, industry, buildings, transport, and cities."[9] Additionally, as noted by the World Resources Institute, "if the 1.5˚C goal is to be met, investments in low-carbon energy technology and energy efficiency will need to increase by roughly a factor of five by 2050 compared to 2015 levels."[10] Such profound changes present both significant risks and opportunities for all institutions, including the private sector.

Steps we've taken to encourage climate risk mitigation and adaptation

Education	We provide education opportunities on climate change science and policy risks to our management and investment teams. Some of the education sessions may tackle a specific area in depth such as scenario analysis.
Investments	We integrate climate change issues into our investment analysis, and we aim to develop specific climate-related investment solutions aligned to our clients' needs.
Manulife corporate office operations	We've committed to minimizing GHG emissions from the office buildings that Manulife employees occupy.
Active ownership and operations	We use our influence to help tackle climate change by working with companies, peers, nonprofit organizations, and industry bodies to promote an understanding of climate change and strategies for mitigating it.
Innovation	We work with our peers, data providers, and academics to develop better approaches to the assessment of climate risk and opportunities.

For illustrative purposes only.

9 https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments, October 2018.
10 https://www.wri.org/blog/2018/10/8-things-you-need-know-about-ipcc-15-c-report, October 2018

Education—Throughout the course of 2019, our public markets ESG team led educational sessions for our investment staff on transition and physical risks related to climate change as well as opportunities related to a transition to a low-carbon economy. We also provided education to the broader market. For example, in September 2019, Manulife Investment Management's ESG team collaborated with UNEP FI, Carbon Delta, and Ceres to host an extended forum on scenario analysis and its uses in assessing climate-related risks and opportunities. The event was targeted at organizations looking to use climate-related scenario analysis in their investment analysis or to support the development of disclosures consistent with the recommendations of the TCFD. The event was hosted at Manulife's headquarters in Toronto, Canada, and a wide range of companies, asset owners, investment managers, and other stakeholders participated. Participants sought to understand collectively the benefits and limitations of scenario analysis and climate stress testing. Manulife's CFO provided insight into the responsibility that financial services companies have on various ESG topics, including supporting the transition to a lower-carbon economy.

Investments—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 best-in-class sustainability management practices for operated assets, and participating in collaborative industry climate initiatives. In general, our preferred position is to engage directly with companies to encourage effective implementation of climate risk mitigation and adaptation strategies, reserving the right to divest of any investment.

Given its materiality and proximity, we're acting now to mitigate and manage the effects of climate change both today and in the future. Manulife Investment Management has developed models and tools to assess the potential impact on our business of the four IPCC scenarios. These climate-related risks identified in the climate VaR metric are integrated into our investment decision-making and risk management processes. ESG information is included in our public markets daily risk reporting and portfolio analysis reports. These are complemented by regular discussions on the risk team of emerging risks and regular risk reviews with the investment teams.

Manulife corporate office operations—Manulife recognizes the threats posed by climate change to our business, to public health, and to the livelihoods of the communities in which we operate. As a long-term investor and asset manager, we closely monitor and manage these risks and help facilitate the transition to a lower-carbon economy.

Manulife Investment Management has a global real estate portfolio of more than 61.9 million square feet, which includes properties we own as well as those we invest in or manage on behalf of clients. Recognizing that nearly 40% of global GHG emissions are attributed to the design, construction, and operation of buildings, we've committed to minimizing the GHG emissions from our buildings, including the buildings occupied by our employees. We're targeting a 10% energy consumption reduction between 2017 and 2022 associated with carbon emission per square foot in our real estate portfolio. Across our global portfolio, we decreased normalized energy use intensity by 2% to 24.1 equivalent kilowatt hours per square foot, meeting our annual energy reduction target of 2%. Since 2017, we decreased energy use by 2%, progressing toward our five-year, 10% reduction target. With most of our emissions derived from the electricity we use to power buildings and the fuels used to heat spaces and water, we focus on improving energy efficiency, which is currently the most cost-effective way to reduce our GHG footprint. We also purchase renewable energy and pilot clean technologies to further reduce emissions.

Active ownership and operations—As an asset owner, operator, and investor, we use our influence to encourage our assets and companies we invest in to reduce their GHG emissions and align their business models with the realities of a changing climate. 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 impact on reducing systemic climate change risks and realizing the economic benefits of the low-carbon transition.

In 2017, Manulife Investment Management was a founding member of Climate Action 100+, a five-year initiative that now includes more than 450 investors from around the globe representing US$40 trillion in investor capital. It's the largest investor-led collaborative engagement initiative of its kind ever assembled.[11]

One of the chief objectives of Climate Action 100+ is to set new norms for engaging with the world's largest GHG emitters. A consistent message from such a large and influential group of investors helps ensure that companies take more ambitious action to curb emissions, strengthen climate-related financial disclosures, and improve their governance of climate change issues. By late 2019, Climate Action 100+ had logged notable successes among major mining and oil and gas companies.

In our private markets portfolios, we're frequently investors in and simultaneously operators of assets, which we believe gives us a unique perspective on sustainable business practices and concerns. For example, we invest and operate assets in our real estate, timber, and agriculture portfolios, where we seek to raise the bar of sustainable investing and stewardship while enhancing the value of our assets and having a positive impact on all our stakeholders. Moreover, as long-term investors and as a steward of our clients' capital, we're able to use our broad experience with sustainability implementation, research, governance, and collaboration to manage ESG-related risks and opportunities over extended time horizons in all our asset classes.

Manulife Investment Management's real estate team incorporates the evaluation of ESG risks and opportunities in the investment and due diligence process. ESG considerations in the investment process include, but aren't limited to:

- Transportation and walkability
- Green building certifications
- Contamination
- Flooding
- Natural hazards
- Climate change risks
- Energy efficiency and supply
- Water efficiency and supply

As part of our 2019/2020 sustainability program initiatives, we developed a GHG reduction model to identify GHG reduction pathways, project emissions reduction scenarios, identify financial implications, and evaluate GHG target ambitions. We intend to use this model on an ongoing basis to support strategic, capital, and operational planning while managing our real estate GHG reduction strategy. The model assesses GHG reduction scenarios with their associated capital cost, incremental lifecycle cost, and GHG abatement cost (i.e., $/t$CO_2$e, or tons of carbon dioxide equivalent) for each scenario. Capital projects at select properties, such as the installation of battery storage and electric vehicle charging stations, support our emission reductions.

In 2019, we also updated tools for our real estate team to provide better guidance on analyzing and quantifying climate-related and social risks and opportunities in new acquisitions. Furthermore, we're integrating climate mitigation and adaptation into our property management Sustainable Building Standards.

As part of our strategies for physical risk management and value creation on acquiring a property and on a rolling cycle for existing properties, our portfolio insurer conducts risk and probable loss assessments for flooding and earthquakes. Assessments are based on historical occurrence data for the location of the properties. Properties identified to be in

11 https://climateaction100.wordpress.com

100-year and 500-year flood zones are given a site-level assessment by the insurer, who then provides us with a list of risks to the property and recommended actions to improve resilience. Risks and recommendations are reviewed and considered for implementation.

Our timber and agriculture team systematically considers climate risks and opportunities in investment decision-making and operations. For example, we consider wildfire, drought, and flood risks in our acquisition due diligence. We also consider opportunities—for example, growing crops in different regions based on changing climate conditions. Forests and farms both offer considerable opportunities for investing in natural climate solutions through biological carbon removal in trees and soils.

The team factors costs for achieving third-party sustainability certifications into its budgets, systematically considers climate-related risks and opportunities in acquisitions and divestments, and considers the potential valuation impact of risks such as access to water or potential for wildfire.

Our core business—responsibly managing forests and farms—opens up natural carbon sequestration opportunities. And we further enhance these climate change mitigation efforts by investing in renewable energy and energy efficiency. Through our engagement in partnerships and research we're funding, we also seek to understand how we can best adapt our investment decision-making and property management practices to climate change.

Innovation—We continue to innovate to support and enhance the resiliency of our climate strategy. In 2019, we completed our participation in the UNEP FI pilot to develop scenario analysis tools for investors. Over the remainder of 2019, we integrated the climate VaR modeling into our public markets and real estate asset classes. These scenarios evaluate the impacts of 1.5°C, 2°C, 3°C, and 4°C scenarios. We see scenario analysis as a valuable tool through which we can assess climate risk and opportunities at the portfolio level; this, in turn, helps to inform our approach and strategy to climate change. Our real estate professionals have also participated in the UNEP FI scenario analysis pilot, which included a climate stress test covering both physical and transition risk. Furthermore, we were invited by the Japanese government to join the TCFD Consortium—the world's first-ever summit on the implementation of the TCFD.

Through our partnerships with the WBCSD's Forest Solutions Group and Scaling Positive Agriculture, as well as with both the MIT Joint Program on the Science and Policy of Global Change and the Climate Smart Land Network, we're preparing to better understand and respond to the risks climate change poses to forestry and agriculture.

Metrics and targets

In addition to climate VaR, we use a variety of metrics to manage and monitor our alignment and that of our investee companies with the Paris Agreement's goal of limiting the global average temperature rise to well below 2°C by the end of the 21st century. 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 green real estate and certified timber and agriculture assets and low-carbon infrastructure.
- **Carbon footprinting:** For some public markets portfolios, we may use carbon footprinting and weighted average carbon intensity data (tCO_2e/$M sales) to assess exposure to a potential increase in carbon pricing.
- **Portfolio warming potential:** We use climate science specialist Carbon Delta's portfolio warming potential metric to assess our public equity and fixed-income portfolio alignment with the Paris Agreement. This warming potential methodology captures scope 1 emissions as well as revenues from low-carbon technology to provide a forward-looking perspective.
- **Sovereign ESG model:** Our proprietary sovereign ESG model allows us to track climate-related risks—including the momentum of these risks—for 200 countries and territories.
- **Strategy-level emissions monitoring:** We measure emissions at a strategy level to better understand and incorporate risks related to physical asset damage, 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 UNEP FI Investor Pilot and the Investor Leaders Group. We also have a close partnership with the MIT Joint Program on the Science and Policy of Global Change. The Joint Program provides sponsors access to historical information, analysis, projections, and modeling capabilities focused on climate change and its impacts using state-of-the-art economic and earth system models.

Managing climate-related risks and opportunities

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 this goal. We have a variety of internal initiatives to help us pursue this objective:

- Training for investment staff on topics such as climate science, analysis, and available tools
- Engagement with companies on the topics of their climate disclosure, business strategies, governance, and emissions reduction plans and progress
- Development of strategies that support sustainability goals
- Education and reporting for our clients on climate risks and opportunities
- Operations and emission reductions of our own real assets

Public markets: expanding our climate reporting capabilities

Our ESG team works with our investment teams to provide a range of climate-related decision-useful metrics. For example, at the investment strategy level, we're able to report on the weighted average carbon intensity, including estimated data. In addition, we provide our investment teams with scenario analysis and warming potential information at the strategy level. We also consider other climate-related metrics, such as energy, waste, and water use, which we believe are useful for fundamental research-driven decision-making.

Sample strategy-level report provided to our investment teams

High-level aggregate indicator of a portfolio's position relative to warming scenarios

Portfolio warming potential
3.18° C

Climate VaR—Forward-looking, return-based valuation assessments measure the potential impact of climate change on an aggregate portfolio

Scenario	Climate VaR contribution
Low-carbon transition risk scenarios	-0.46%
Physical climate scenarios	-7.15%
Aggregated climate VaR	-7.61%

Transition risk/opportunities

Data helps identify assets that may be at risk from the worst regulatory effects resulting from climate change.

Company name	Est scope 1 ($MtCO_2e$/year)	Total emissions reduction requirement in 15 yrs ($MtCO_2e$)	Total discontinued emissions reduction cost (US$M)	Main policy risk country	Policy risk climate VaR
Company A	35.4	16.32	-4,715.44	Brazil	-11.25%
Company B	115.76	56.31	-16,224.79	United States	-4.87%
Company C	40	27.22	-8,671.94	France	-4.49%

Report offers a quantified view on innovative low-carbon investment opportunities.

Company name	Total # of all patents	Total score of all patents	# of low-carbon patents	Score of low-carbon patents	Green % of low-carbon score in total score	Technology opportunities climate VaR
Company C	1,388	953.77	162	115.73	12.13%	4.04%
Company D	1,718	997.06	64	46.34	4.65%	3.29%
Company E	4,960	4,123.64	1,569	1,248.29	30.27%	1.75%

Physical risk

Helps identify assets that may be at risk from the worst physical effects resulting from climate change.

Company name	Main/highest risk type	Most vulnerable location	Total discounted cost in mUSD	Physical risk climate VaR contribution
Company F	Coastal flooding	Redwood City, United States	-132,182.43	2
Company G	Coastal flooding	Zaanstad, Netherlands	24,896.32	1.98
Company A	Coastal flooding	Netherlands	5,752.53	0.51

Source: Manulife Investment Management, 2019. For illustrative purposes only.

In addition to the climate-related risk and opportunity analysis provided to our investment teams, we're also working on client reporting that provides useful metrics such as carbon footprinting, as well as portfolio-level, benchmark-relative analysis of waste and water usage. In 2020, we've been working on a pilot program for rolling out this portfolio analysis to our institutional clients.

Private markets: sustainability targets and milestones

Timber and agriculture

In timber and agriculture, our sustainability strategy is deliberately organic and focused on issues material to our business, but which also positively contribute to global goals. In that spirit, we present our performance metrics in line with third-party sustainability standards governing forestry and agriculture, the UUN's SDG, and the Impact Reporting and Investment Standards maintained by the GIIN. At year-end 2019, key data points related to our strategy include the following:

- We manage 5.4 million acres of timberland, of which 100% is third-party certified, and have protected over 470,000 acres of sensitive lands
- We manage 474,000 acres of farmland, of which almost 101,000 acres are third-party certified to sustainable farmland management standards, and we've committed to third-party certify the remaining acres by 2021
- In 2019, we sold over 1.2 million carbon credits from our New Zealand forests; since inception, we've sold over 6.1 million metric tons of carbon credits
- 3.1 million $MtCO_2$ of total GHG removals (five-year trailing average)
- 3.2 million $MtCO_2$ stored in wood products harvested from our forests in 2019
- 1.16 billion trees planted (cumulative since inception of our timber business in 1985)

Our infrastructure investment team manages **CAD$2.5 billion** in renewable energy private equity investments*

Real estate

Our real estate team has a five-year reduction target for energy consumption based on a 2017 baseline. Each year, we measure our performance against this target. The results of our 2019 review informed our 2020 sustainability strategy and initiatives for continuing and enhancing our energy reduction and managing climate transition risks. Some key facts about our global real estate portfolio as of December 31, 2019:

- Nearly 50 million square feet—81% of our real estate equity portfolio—is certified to a green building standard.
- In 2019, we improved our real estate GRESB scores, earning a Green Star ranking in six submissions and a five-star, top-quintile rating in three submissions.

Energy

	2019	2018	2017
Absolute energy use (eMWh)[1]	**795,931,784**	834,492,962	795,894,698
Normalized energy use intensity (ekWh/ square foot)[2]	**24.1**	24.6	24.7

Buildings consume substantial amounts of energy and water and generate approximately 40% of GHG, globally. As building owners and managers, we seek to minimize our environmental impact by investing in resource efficiency and look to embed conservation practices into our operations.

Our total energy consumption in 2019 was 796,000 eMWh. Comparing our normalized portfolio, this is a reduction in energy consumption of 1.9%, which is equivalent to the energy required to power 540 Canadian homes.

Across our global portfolio, we decreased normalized energy use intensity by 2% to 24.1 ekWh per square foot, meeting our annual energy target of 2%. Since 2017, we decreased energy use by 2%, progressing toward our five-year, 10% reduction target.

* As of December 31, 2019; The infrastructure team manages renewable energy private equity investments on behalf of external clients and the insurance business of Manulife, and renewable energy infrastructure debt investments on behalf of the insurance business of Manulife.

Water

	2019	2018	2017
Absolute water use (m3)	**2,432,761**	2,573,773	2,556,907
Normalized water use intensity (L/square foot)[3]	**63.3**	67.9	70.9

In 2019, we continued to reduce our water consumption, decreasing our like-for-like water use by 1.2%. This is equivalent to nearly 7.4 million gallons, which is enough water to fill 164,000 bathtubs.

Our normalized water use intensity decreased by 6.8% between 2018 and 2019 to 63.3 liters per square foot. With this reduction, we surpassed our annual 1.5% water reduction target and have already reduced our water intensity by 10.7%, exceeding our five-year 7.5% reduction target.

GHG

	2019	2018	2017
Scope 1 emissions (tCO_2e)[1]	**33,551**	31,403	28,492
Scope 2 emissions (tCO_2e)[2]	**116,993**	148,519	146,904
GHG intensity ($kgCO_2e$/square foot)	**5.0**	5.3	5.4

In 2019, our GHG emission was 150,550 tCO_2e. Comparing our like-for-like portfolio, we reduced our footprint by 17,400 tCO_2e in 2019, the equivalent of taking 3,700 cars off the road.

The decrease in GHG emissions is a result of our reduction in energy consumption as well as the electricity grids in select regions having a lesser carbon intensity compared with 2018.

Conclusion

Unlike other sources of material risk for companies, economies, and social and political stability, climate change has the potential to exert exponentially more damaging effects on a global scale over time. However, with coordinated work—including mitigation efforts described through the disclosure framework of the TCFD—a unique opportunity is within our collective grasp: to better manage the risks associated with climate change. By encouraging enhanced disclosure in line with the TCFD recommendations and educating investee companies as well as our clients in sustainability best practices, we believe it's possible to steer client capital to more resilient solutions while doing our part to derisk the global financial system.

That said, we understand that collaboration across an entire ecosystem of actors, from governments, regulators, and asset managers to nongovernmental organizations, academic institutions, and asset owners, is required to cause a real difference in the climate change trajectory. But better disclosure in line with well-thought-out frameworks for encouraging sustainable corporate behaviors can have a transformative effect—at first with one company and industry at a time, but potentially building to a momentum that can help us reach globally meaningful targets, ultimately helping safeguard our world's natural capital for generations to come.

We're committed to the same level of transparency on sustainability as we encourage among the companies and assets in which we invest. This commitment encompasses our annual reporting to the PRI on our work in support of implementing its principles and—beginning with this, our inaugural TCFD report—annual disclosures that continue to respond to the recommendations of the TCFD. Going forward, we expect to build on this disclosure effort and intend to show progress in the depth of our risk management tools, the extent of our climate reporting to clients, and the variety of our initiatives for managing climate-related risks and opportunities across our public and private markets capabilities.

Looking ahead

With rapid changes in disclosures, data availability, and sustainability metrics, being an effective practitioner of sustainable investing means staying abreast of the leading edge of research, continuing diligent practices of active ownership, and collaborating with coalitions beyond our four walls that are mapping paths of shared action. In our view, this work is inseparable from thinking about how to be most effective in the pursuit of the risk/return objectives of our clients, whether the emphasis falls on exposing capital to sustainable growth or on preserving capital from the risks of permanent loss.

Moving forward, we know we've accomplished much, but we also know there's always more we can do. Select areas of our focus into 2021 include:

- **Building on our momentum in sustainable agriculture—**In reference to our work with the Leading Harvest Farmland Management Standard, our regional success in 2019 is prelude to global aspirations. The group's efforts have so far been dedicated to the agriculture sector in the United States, but food security is a global issue. To that end, we're supportive of engaging in parallel discussion in other countries in which we operate, such as Australia and Canada. We are confident that such a conversation will yield comparable advances in sustainable agriculture. Ultimately, we'd like to see certification systems such as these be adopted globally, much as they have in the forest sector.
- **Moving toward full ESG integration in public markets—**Since adopting our inaugural ESG policy in November 2015, we've rapidly embedded ESG factors into investment processes and operations and demonstrated innovation and leadership in what continues to be an emerging field. Moving into 2021, we're targeting 75% full integration across our global equity and fixed-income capabilities by the summer.
- **Leadership in sustainable Asian markets—**We have one of the world's largest Asian fixed-income organizations, including credit research and ESG team members based in Greater China and across the Association of Southeast Asian Nations region. This unique capability has enabled us to hone our practices of ESG integration and engagement within our fundamental credit research process model while ensuring that our practices remain sensitive to local contexts. In 2020, we've built on this sustainable Asian fixed-income strength and launched a new sustainable Asian fixed-income strategy to help our clients around the globe pursue their risk/return objectives.
- **Continuous commitment in global real estate portfolios—**In 2019, we worked to minimize our environmental footprint by certifying 15 new buildings to a LEED standard, which includes the first-ever certification awarded for LEED v4.1. To date, over 80% of our global portfolio carries a green building certification, and we're actively working to maintain momentum in this area.
- **Evolving our sustainable assessment model in infrastructure, private equity and credit—**Infrastructure and private equity and credit are about pairing talented investors with exceptional management teams and using their collective wisdom to get the job done together. Building from our framework for evaluating and monitoring the investment practices of our GPs, we aim to expand our monitoring process to cover all our infrastructure and private equity funds. As we continue to monitor our portfolios, we expect to enhance our model, which will enable us to learn more from our partners and set a higher bar for sustainability across our investments.

Speaking with one voice

We're committed to the same level of transparency on sustainability as we encourage in the companies in which we invest. Moving forward, we aim to provide annual disclosures that respond to the recommendations of the TCFD, and we'll provide ESG metrics in our client reporting. This is in line with the practices of our parent company, Manulife, with which we speak as a single voice in the financial markets on our shared journey toward a more sustainable future.

Manulife Investment Management

Important disclosures

A widespread health crisis such as a global pandemic could cause substantial market volatility, exchange trading suspensions and closures, and affect portfolio performance. For example, the novel coronavirus disease (COVID-19) has resulted in significant disruptions to global business activity. The impact of a health crisis and other epidemics and pandemics that may arise in the future, could affect the global economy in ways that cannot necessarily be foreseen at the present time. A health crisis may exacerbate other pre-existing political, social and economic risks. Any such impact could adversely affect the portfolio's performance, resulting in losses to your investment

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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Manulife Investment Management

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October 2020 PPM 522948 AODA