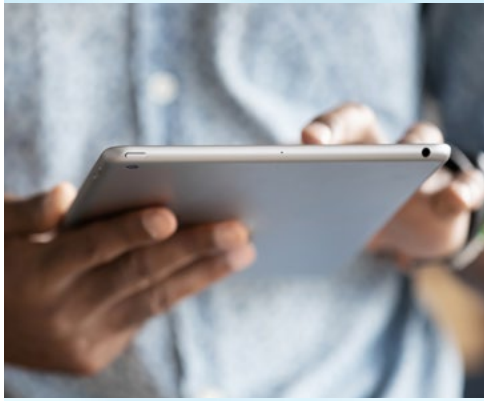
BMO Financial Group

2022 Climate Report

BMO

BMO's Climate Ambition: To be our clients' lead partner in the transition to a net-zero world.

Our 2022 Climate Report sets out our approach to realizing this ambition, in alignment with the guidelines of the Task Force on Climate-related Financial Disclosures (TCFD).[1] Information about our efforts to help build a sustainable world can be found in our 2022 Sustainability Report.



In this report

We, *us*, *our*, *bank* and *BMO* mean Bank of Montreal and its subsidiaries.

Reporting period

Covers the fiscal year ended October 31, 2022.

We published our last report in March 2022. Past reports are available on our website.

Reporting framework

Task Force on Climate-related Financial Disclosures (TCFD).

Data

Unless otherwise noted:

as of October 31, 2022

enterprise-wide

may be rounded

dollar amounts are in Canadian dollars, unless otherwise noted.

◆ KPMG has provided limited assurance of this figure. KPMG's Independent Limited Assurance Report is on page 56.

BMO's approach to sustainability is integrated into our business strategy and corporate governance.

Sustainability reporting suite

- Sustainability Report and Public Accountability Statement
- GRI Content Index
- SASB Disclosure
- Data Pack and Glossary
- Climate Report
- Sustainable Bonds Impact Report
- Principles for Responsible Banking Reporting and Self-Assessment

Learn more here

- Annual Report to Shareholders
- Management Proxy Circular

[1] This report includes voluntary disclosures on climate-related opportunities and risks, governance, strategy, risk management and metrics and targets that may not be, and are not required to be, incorporated into our mandatory disclosures, where we use a definition of materiality established under applicable securities laws for the purpose of complying with the disclosure rules and regulations promulgated by applicable securities regulators and applicable stock exchange listing standards.

Message from the Chief Sustainability Officer

2022 was an important year for BMO's Climate Ambition – to be our clients' lead partner in the transition to a net-zero world. We delivered strong progress and positioned the bank for further acceleration in 2023 and beyond.

Key outcomes included activities to help accelerate climate solutions, commercial strategy advancement to finance these solutions, development of our climate-related digital strategy, enhancement of our climate-related risk management capabilities and further development of our approach to carbon neutrality, as well as enhancements to our climate disclosure. These efforts involve building the infrastructure to advance BMO's climate commitments and to support real economy decarbonization and resilience. **Our 2022 Climate Report demonstrates this progress over the past year and highlights our future path in pursuit of our Climate Ambition.**

BMO Climate Institute – Demonstrating Leadership

The BMO Climate Institute, established in 2021, advanced important work across three foundational pillars: (1) decarbonization, (2) resilience and (3) climate justice. The Institute is convening important public-private dialogue, including serving as the secretariat coordinator to the Net-Zero Capital Allocation Working Group of the Government of Canada's Sustainable Finance Action Council. To help advance decarbonization of sectors supplying the critical feedstock materials required for the net-zero transition, the BMO Climate Institute analyzed the technical and economic viability of decarbonization roadmaps for North America's heavy industry sectors against science-based net-zero pathways. It also leveraged its industry-leading geospatial analytics on physical climate hazards to help our Risk team enhance our climate-related scenario analysis capabilities and to support BMO Equity Research in producing what we believe was the most sophisticated climate risk analysis ever conducted on the U.S. REITs industry. The Institute also published an inaugural climate change survey of North American small- and medium-sized (SME) businesses – underscoring the need for engagement of SMEs to create the right incentives for climate action.

Advancing Climate Commercialization Strategy

In 2022, we formalized the integration of BMO's Climate Ambition into our strategic priorities. The climate commercialization opportunity is substantial – with hundreds of billions of dollars of investment required to achieve net-zero goals. One of the most exciting developments on this front was BMO's announcement to acquire Radicle Group Inc., a leader in greenhouse gas measurement, advisory, carbon credit origination and environmental commodity trading. With Radicle, BMO is well positioned to drive better client engagement on decarbonization opportunities, improve data quality and further integrate climate considerations into our business strategy.

Diversifying Our Carbon Neutrality Program

From an operational sustainability perspective, our carbon neutrality program continued to diversify, with the purchase of carbon credits equalling 5,750 metric tonnes of CO_2 removal and reductions through an agreement with CarbonCure Technologies, a Canadian climate tech company supporting the decarbonization of the global concrete industry. This investment in innovation underscores our commitment to developing the ecosystem that will be needed to achieve net-zero.

Enhancing our Climate Risk Approach

In 2022, we built upon our internal capacity to conduct climate scenario analysis. Taking a holistic, multi-disciplinary approach, the Enterprise Risk climate scenario analysis group aims to promote consistency in design and implement a repeatable climate scenario analysis program, leveraging existing stress-testing capabilities, augmented with climate-specific expertise. In 2022, we conducted scenario analysis projects to evaluate transition risks related to our portfolio of wholesale loans to metals and mining sector, the potential impact of physical risks on our portfolio of Canadian residential mortgages, and exposure to market risk in our trading and underwriting portfolio under a delayed, disorderly transition.

Expanding Disclosure and Tracking Against Commitments

Our work on metrics and targets continues to progress. We are in the second year of a three-year journey to quantify financed emissions and evaluate targets for carbon-intensive sectors, applying PCAF and NZBA methodologies. We have expanded our financed emissions quantification and net-zero target-setting analysis this year to include heavy industry (cement, aluminum, iron and steel) and agriculture, as well as an analysis of financed emissions for our business and government lending portfolio.[1] These sectors are critical to the transition and the BMO Climate Institute undertook substantive analysis of decarbonization pathways for each (see Financed emissions). We have also updated analyses of previous disclosures for oil and gas, power generation, motor vehicle lending and residential real estate. In the coming year, we will focus on commercial real estate and commercial transportation, thus covering a substantial majority of the emissions related to our lending portfolio.

Concluding Thoughts

Global events over the past year have underscored the importance of an orderly transition that balances current needs while moving at pace toward the goal of net-zero, which rightly remains the key organizing principle for decarbonization efforts. As noted at COP27, the world is not currently on track to achieve net-zero emissions goals by 2050. Continuing to map our pathways to net-zero, finance decarbonization and grow and scale the innovative technologies that will be needed in a 1.5°C world, are part of the solutions.

The challenge will be to advance an orderly and timely transition to meet the ambitious goals of net-zero by 2050. It can be achieved, but the urgency for action is increasing. Energy security has also become a major strategic and economic issue, tied to inflation and the impacts of increased costs of living on society. Sustainability involves meeting the needs of today while not jeopardizing the ability of future generations to meet their own needs. To do both, we need to have access to affordable energy while simultaneously transitioning to a lower carbon economy. Transition finance is a key tool to decarbonize the economy on the path to a net-zero future. Investing in innovation and available technology like carbon capture and sequestration will allow for emissions reduction to be achieved while the green transition is scaled to meet societal needs.

As we stated in our 2021 Climate Report, we do not pursue divestment strategies in isolation that may decarbonize our portfolio on paper without facilitating decarbonization of the real economy. Instead, our focus is to be our clients' lead partner in the transition to a net-zero world, facilitating the investment needed to help achieve that goal. Government must play a leading role to implement policies that support economy wide decarbonization and set out clear policy objectives for how that will be achieved.

Achievement of the goal of net-zero by 2050, and BMO's Climate Ambition, will depend on the successful efforts of many actors across the economy, including government, consumers, industry and the financial sector. Neither BMO, nor any bank, will be able to achieve this goal in isolation.Our Climate Ambition is a key aspect of our strategy and drives new ways of doing business, serving our customers and meeting the expectations of our shareholders and other stakeholders. At BMO, we are making progress, in partnership with our clients, but much more work remains to be done.

Michael Torrance
Chief Sustainability Officer
BMO Financial Group

[1] This analysis focused on on-balance sheet business lending activities, in alignment with the PCAF Standard.

About BMO

Established in 1817, BMO Financial Group is the eighth largest bank in North America by assets, with total assets of $1.14 trillion. We are highly diversified, providing a broad range of personal and commercial banking, wealth management, global markets and investment banking products and services. We serve twelve million customers across Canada and the United States, and in select markets globally, through three integrated operating groups.

12 million
customers globally

$1.14 trillion
in total assets

8th largest
bank in North America by assets

1817
serving customers for 205 years and counting

Personal and Commercial (P&C) Banking

Provides financial products and services to customers across North America. Personal and Business Banking helps customers make real financial progress through a network of branches, contact centres, digital banking platforms and automated teller machines. Commercial Banking serves clients as a trusted advisor, offering industry expertise, a local presence and a comprehensive range of commercial products and services.

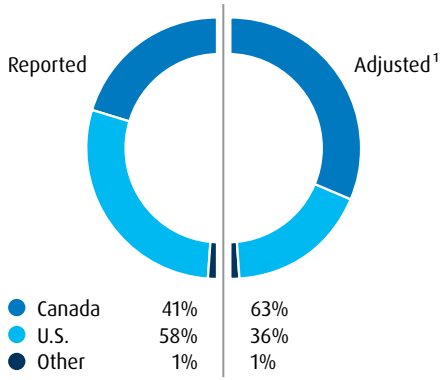
BMO Wealth Management (WM)

Serves a full range of clients, from individuals and families to business owners and institutions, offering a wide spectrum of wealth, asset management and insurance products and services aimed at helping clients plan, grow, protect and transition their wealth. Our asset management business is focused on delivering innovative client solutions and strategies.

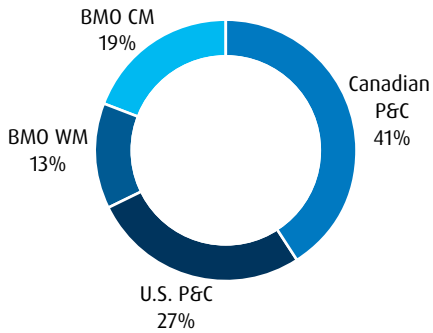
BMO Capital Markets (CM)

A North America-based financial services provider offering a complete range of products and services to corporate, institutional and government clients. BMO Capital Markets has approximately 2,800 professionals in 32 locations around the world, including 18 offices in North America.

Net Income by Geography – F2022



Reported Net Income by Operating Group[2] – F2022



[1] Adjusted results and measures are non-GAAP measures. For further information, see the Non-GAAP and Other Financial Measures section on page 58.

[2] Percentages determined excluding results in Corporate Services.

How our response to climate change aligns with our Purpose

BMO's Purpose to **Boldly Grow the Good *in business and life*** inspires us all to aim higher, to drive meaningful impact for our customers, employees and communities. Our Bold Commitments are measurable business-led goals to grow the good. They evolve as community needs, BMO priorities, and market realities change. Our Bold Commitments will continue to align with our commitment to progress for a thriving economy, a sustainable future and a more inclusive society with zero barriers.

BOLDLY GROW THE GOOD

IN BUSINESS AND LIFE

We're committed to making meaningful progress by supporting climate change solutions. Our **Climate Ambition: to be our clients' lead partner in the transition to a net-zero world** recognizes the critical role we, as a financial institution, play in catalyzing climate action, financing a just transition to a net-zero economy, and working with our clients to understand the risks and opportunities of this transformation. You can read about how we are integrating this ambition into our business starting on page 16.

BMO's Bold Commitments for a sustainable future

These commitments reflect our Climate Ambition.

Sustainable financing

$267 billion

Target: $300 billion
Increased by $150 billion in 2021

Mobilize $300 billion in capital to clients pursuing sustainable outcomes by 2025

(through green, social and sustainable lending, underwriting, advisory services, and investment)

Impact investing

$136 million

Target: $350 million
Increased by $100 million in 2022

Deploy our Impact Investment Fund, seeded with $350 million in capital by 2025

Climate Ambition

Target
Net-zero by 2050

Be our clients' lead partner in the transition to a net-zero world – targeting net-zero financed emissions in our lending by 2050

Our history of climate action

2007

First purchase of renewable energy

2008

Established operational greenhouse gas footprint and set first emissions reduction target

Became the first Canadian financial institution to achieve ISO 14001:2004 certification for a large office building

2009

Made a five-year, $10 million commitment to become lead investor in the Greening Canada Fund for carbon offset projects

Named to the CDP Global 500 Carbon Disclosure Leadership Index for the first time

2010

Achieved carbon neutrality in operations

Named to the CDP Global 500 Carbon Performance Leadership Index for the first time

2018

Began reporting in line with TCFD

Delivered climate change risk and disclosure training to BMO's Board of Directors

2019

Established first sustainable finance target and established Sustainable Finance team

Issued first sustainability bond

Conducted first climate-related scenario analysis pilot

Incorporated climate change into enterprise-wide risk taxonomy

2020

Achieved 100% renewable electricity across global operations

Included climate change in BMO's risk appetite statement and introduced climate-related key risk metric

BMO Global Asset Management became a founding member of Net Zero Asset Managers initiative (NZAM)

Restricted direct financing for any project or transaction that involves exploration or development in the Arctic National Wildlife Refuge

Developed digital climate risk analytics platform in collaboration with BMO's AI Labs

2021

Joined the Partnership for Carbon Accounting Financials (PCAF) and began to quantify financed emissions

Signed United Nations (UN) Principles for Responsible Banking

Launched the BMO Net-Zero Ambition, aligned with BMO's Purpose

Established the BMO Climate Institute to power the bank's ambition of being *our clients' lead partner in the transition to a net-zero world*

Established an Energy Transition Group within BMO Capital Markets

Joined the UN-convened Net-Zero Banking Alliance (NZBA)

Added climate-related physical and transition risk to enterprise-wide risk taxonomy

Established risk tolerance thresholds for climate-related key risk metric

2022

Rolled out enterprise-wide *"Climate Change Essentials"* training for all BMO employees, management and Board of Directors

Advanced climate commercialization strategy aligned with our Climate Ambition

Developed white papers outlining decarbonization roadmaps for hard-to-abate sectors

Announced acquisition of Radicle Group Inc., a leader in greenhouse gas measurement, advisory, carbon credit origination and environmental commodity trading

Further diversified carbon neutrality strategy with purchase of carbon credits for 5,750 metric tonnes of carbon dioxide over five years from CarbonCure

Introduced Board-approved Environmental and Social Risk Corporate Policy

Founding Member of Climate Engagement Canada (CEC), serving on its steering committee

Established and chaired the Government of Canada's Sustainable Finance Action Council (SFAC), and Net-Zero Capital Allocation Working Group

2022 Task Force on Climate-related Financial Disclosures (TCFD) – Summary

The table below summarizes our approach to capturing climate-related opportunities and managing risks, using the Task Force on Climate-related Financial Disclosures (TCFD) framework. In 2022, we made significant progress in our approach to climate-related governance, strategy, risk management, and metrics and targets.

Governance

Climate risk and opportunity are embedded in our governance structure

Supporting responsible business behaviour, performance and long-term sustainability

Board

The full Board of Directors is actively engaged in overseeing BMO's climate strategy.

Board members completed Climate Change Essentials for BMO training, in addition to reviewing regular sustainability newsletters and updates.

The Audit and Conduct Review Committee (ACRC) and the Risk Review Committee (RRC) have engaged on climate-related topics including:

- sustainability-related governance
- climate-related targets and transition action plans
- sustainability-related disclosure, including the Climate Report
- BMO's Climate Ambition and climate strategy
- approval of BMO's Environmental and Social Risk Corporate Policy

See page 11 for more on board oversight of climate change-related topics.

Management

Management of BMO's approach to climate involves various Executive Committee members and senior leaders including:

- Chief Executive Officer
- General Counsel & Executive Committee Sponsor for Sustainability
- Chief Risk Officer
- Chief Strategy and Operations Officer
- CEO BMO Capital Markets
- Chief Financial Officer
- Heads of Operating Groups
- Chief Sustainability Officer
- Sustainability team & BMO Climate Institute
- Head, Enterprise Risk
- Chief Technology & Operations Officer
- Special Advisor to the CEO on ESG
- Chief Investment Officer
- Head of Investor Relations
- Head of Sustainable Finance
- Head of Alternatives, ESG and Innovation at BMO Global Asset Management (GAM)

Management committees and forums

Management engages in several committees and forums including:

- ESG Executive Committee
- Sustainability Council
- Disclosure Committee
- Risk Management Committee
- Reputation Risk Management Committee
- Enterprise Regulatory Developments Committee
- Impact Investment Fund Investment Committee
- BMO GAM Investment Committee
- BMO Climate CoLab

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Strategy

We are integrating climate-related opportunities into our business, building on our existing strengths and capabilities

Net-zero outcomes as a key organizing principle for our business	• Continued implementation of PCAF and NZBA frameworks. • Developed decarbonization roadmaps for hard-to-abate sectors and identified opportunities for carbon emission reduction. • Established and Chaired Government of Canada's Sustainable Finance Action Council (SFAC), Net-Zero Capital Allocation Working Group. • Incorporated Climate Ambition as a key element of our corporate strategy.
Expanding climate-related capabilities across our operations	• Advanced the work of the BMO Climate Institute in three foundational pillars – decarbonization, resilience and climate justice. • Established an initiative to plan and develop an enterprise data and analytics solution that will provide timely data to inform ongoing, decision-useful analysis and to track our progress.
Supporting clients on their carbon transition journey	• Offered a range of carbon-related products, services and capabilities to clients across our businesses. • Announced acquisition of Radicle Group Inc., a leader in greenhouse gas measurement, advisory, carbon credit origination and environmental commodity trading, further advancing the bank's commercial strategy around climate.
Advancing our climate strategy	• Designing an environmental management system (EMS) across our enterprise that conforms to the requirements of ISO 14001. • Diversified carbon neutrality program with our purchase of carbon credits for 5,750 metric tonnes of carbon dioxide over five years from CarbonCure. • Advanced development of coordinated enterprise climate commercialization strategy as a horizontal, cross-enterprise initiative championed by the Executive Committee.
Convening for climate action	• Participated in numerous associations, initiatives, working groups and multi-stakeholder partnerships with a goal to advance climate action through collaboration.

Risk management

We consider climate change to be a transverse risk driver that manifests through our identified material risks

Incorporating climate change considerations into our enterprise risk management framework	• Established Board-approved Environmental and Social Risk Corporate Policy as part of Enterprise-wide Risk Management Framework (ERMF), applicable to all employees of BMO and its subsidiaries. • Developed an initial heatmap to aid in identifying physical and transition risk across our lending portfolio, and helping us prioritize our risk assessment efforts, including scenario analysis exercises. • Risk tolerance thresholds came into effect for climate-related key risk metric, carbon-related assets (see page 50), informed by financed emissions and decarbonization pathway modelling.
Expanding climate-related scenario analysis and capabilities	• Expanded Climate Scenario Analysis (CSA) team and, in conjunction with CSA Working Group, built out internal capacity to conduct climate scenario analysis. • Conducted scenario analysis projects to evaluate the transition risk on our portfolio of wholesale loans to the oil and gas sector, the potential impact of physical risks on our portfolio of Canadian residential mortgages, and market risk to our trading and underwriting portfolio under a delayed, disorderly transition.
Engaging with stakeholders on climate change	• Doubled the number of strategic suppliers engaged through the CDP Supply Chain program, accounting for approximately 70% of our supplier spend. • Monitored and responded to evolving international standards and regulations by conducting independent research, participating in global forums with our peers, and maintaining an open dialogue with our internal and external stakeholders.

Metrics and targets

We track and report on opportunities and risks associated with climate change

Measuring progress on our commitment to climate action	• Quantified and disclosed our emissions in Scope 1 and 2, and in specific categories of Scope 3 (categories 5, 6 – waste generation and business travel). • Pursued 30% emissions reduction target within our own operations by 2030 taking science-based approaches. • Achieved carbon neutrality each year since 2010 and achieved 100% renewable electricity supply each year since 2020. • Targeting net-zero financed emissions in our lending by 2050, and continued to track our financed emissions (BMO's Scope 3 emissions, category 15 – investments) performance for initial sectors: lending related to upstream oil and gas, lending related to power generation in Canada, lending for the purchase of personal vehicles in Canada, and residential mortgage lending in Canada. • Expanded our sector coverage for quantification and disclosure of our financed emissions to include the iron and steel, aluminum and cement manufacturing sectors, as well as agriculture.

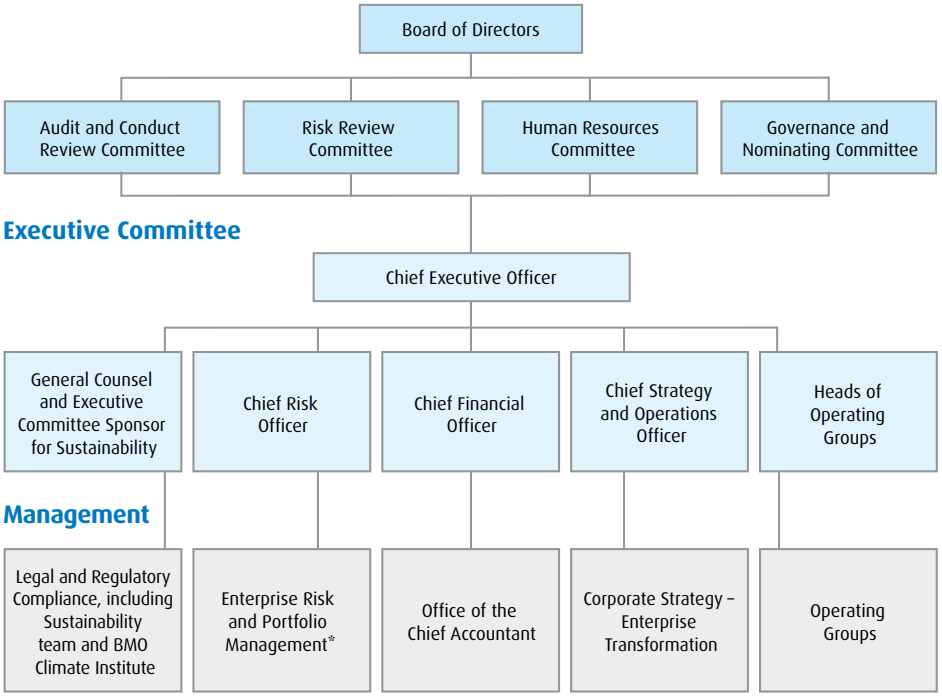
Governance

Climate risk and opportunity are embedded in our governance structure.

Climate risk and opportunity are managed, monitored and reported on, leveraging BMO's organizational structure, which has evolved and adapted to further integrate the topic of climate change. You'll find more information about our governance structure in the 2023 Management Proxy Circular. The chart below illustrates how climate-related governance and oversight functions at the Board, executive and management levels.

Figure 1: Climate-related governance structure

Board and Board committees



*Including Head of Enterprise Risk and centrally supported by Head of Risk Frameworks & Regulatory Capital Oversight

Management committees and forums

ESG Executive Committee
Sustainability Council
Disclosure Committee
Risk Management Committee
Reputation Risk Management Committee
Enterprise Regulatory Committee
Impact Investment Fund Investment Committee
BMO Global Asset Management (GAM) Investment Committee
BMO Climate CoLab

Board oversight

Each of the standing committees of BMO's Board has responsibility for the oversight of climate change risks and opportunities that fall within its purview.

BMO's directors are recruited and evaluated based on a skills matrix that includes understanding and experience with corporate responsibility and sustainable development practices. Nine of our twelve current independent directors have such experience. The board has members with demonstrated experience in climate change issues and these board members are represented on each of its standing committees. Directors receive ongoing training on sustainability topics, including climate risk and disclosure, and this training is available to all members of the board, as well as members of subsidiary boards. You'll find more information about the skills and experience of our directors and ongoing education in our 2023 Management Proxy Circular.

Board-level oversight of sustainability is embedded in the charter of the Audit and Conduct Review Committee. The chair of the Audit and Conduct Review Committee has a strong background in climate change and sustainability, and formerly led Ernst & Young's global Climate Change and Sustainable Services practice.

Figure 2: Board oversight of climate change-related topics

Governance body	Climate-related agenda frequency	Role in climate governance	Climate-related topics discussed and related training items in 2022
Board of Directors	Ad hoc Six times in 2022	Oversees BMO's strategic planning process and annually approves a strategic plan, including climate change. Upon the recommendation of the board's Human Resources Committee, approves the goals and objectives of the CEO, including our strategic priorities and sustainability principles. Upon the recommendation of the board's Governance and Nominating Committee, approves the Board of Directors' Objectives, including the evolution of ESG matters and the implementation by Management of the Sustainability Strategy. Upon recommendation of the Risk Review Committee, approves the Enterprise Risk Appetite Statement which includes the Environmental & Social Risk Appetite Statement.	The following climate-related matters were discussed at Board: • 2021 Climate Report • Shareholder proposals related to climate change • BMO Climate Institute • BMO's history of climate action and Climate Ambition • Enterprise strategies for climate and finance • Risk management on climate risk The following training opportunities were provided to the Board: • Climate Change Essentials for BMO • Sustainability Leaders podcasts
Audit and Conduct Review Committee (ACRC)	At least twice annually Three times in 2022	Approves BMO's Sustainability Report and Public Accountability Statement, as well as the Climate Report. Oversees internal controls on sustainability reporting of ESG matters and oversees any external assurances or attestations regarding reported sustainability metrics. Jointly with the Risk Review Committee, reviews BMO's climate-related targets and transition plan annually.	The following climate-related matters were discussed at meetings of the ACRC: • Approval of 2021 Climate Report • Internal audit spotlight on environmental and social (E&S) risk, including climate change • Climate-related commercialization strategy updates The following training opportunities were provided to ACRC: • BMO webinars on accelerating an Indigenous-led clean energy future; an Indigenous-led paradigm shift for economic reconciliation; and reaching the electric vehicle tipping point • EY webinars on what the audit committee needs to know: financial reporting and SEC developments including climate change

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Governance body	Climate-related agenda frequency	Role in climate governance	Climate-related topics discussed and related training items in 2022
Risk Review Committee (RRC)	Ad hoc Seven times in 2022	Oversees the identification, assessment and management of BMO's environmental and social risks, including climate change, our risk culture, adherence by operating groups to risk management corporate policies and procedures, and compliance with risk-related regulatory requirements. Reviews our risk management framework and provides guidance for the governance of our risk-taking activities. Reviews revisions to the Risk Appetite Framework, including the addition of a qualitative statement and key risk metric (KRM) referencing climate change in 2020 and updates to both in 2021 and 2022. Jointly with the ACRC, reviewing BMO's climate-related targets and transition plan annually. Collaborates, as needed, with the chairs of other committees of the board on subjects that span across committee responsibilities, including climate change and strategic risks.	The following climate-related matters were discussed at meetings of the RRC: • Approval of Environmental and Social Risk Corporate Policy • Onward approval of E&S Risk Appetite Statement and Carbon-related Assets Risk Appetite Key Risk Metric and related quarterly reporting • Update on environment and social risk, including climate change • Review of the enterprise risk report on emerging events and scenarios, including climate change • Climate change governance, strategy, risk management and metrics
Human Resources Committee (HRC)	At least once annually Three times in 2022	Aligns executive compensation with performance, including performance against environmental and social objectives.	The following climate-related matters were discussed at meetings of the HRC: • Review of executive incentive funding, which is impacted by our Purpose and strategic objectives, including ESG • Review of the Compensation Discussion & Analysis in our 2022 Proxy Circular, which includes a narrative on 2021 sustainability and ESG considerations and their impact on executive pay outcomes
Governance and Nominating Committee (GNC)	Ad hoc Five times in 2022	Oversees the alignment of reporting on environmental, social and governance (ESG) matters to the board and its committees.	The following climate-related matters were discussed at meetings of the GNC: • Shareholder proposals related to climate change • Updates on shareholder engagement discussions on climate • Updates on significant changes in governance rules and regulations related to proposed climate disclosures (OSFI, SEC, ISSB) • Corporate Audit update regarding climate-related financial risk The following training opportunities were provided to the GNC: • The evolving SEC landscape and the proposed climate change rules

Management's role

Led by BMO's Chief Executive Officer (CEO), our Executive Committee and their corresponding teams are responsible for strategically driving climate considerations within their lines of business, corporate function or geographic segment in pursuit of our Climate Ambition.

The ESG Executive Committee has responsibility for the oversight of climate strategy across the bank. This provides enterprise coordination that links our climate expertise, risk evaluations and commercialization strategy as we strive to have an agile and market-responsive approach. BMO's Chief Sustainability Officer (CSO) is Secretary of the ESG Executive Committee. The BMO Climate Institute plays a key role as an enterprise resource for BMO's climate efforts.

Figure 3: Management oversight of climate change

Function	Executive Committee member and team	Role in climate governance
Enterprise	CEO	Chairs the bank's Executive Committee and serves as a director of BMO Financial Group, as well as its U.S. subsidiary, BMO Financial Corp. The CEO reviews and approves climate-related targets.
Sustainability	General Counsel and Executive Committee Sponsor for Sustainability	Appointed by the CEO to be Executive Committee sponsor for sustainability. BMO's General Counsel reports directly to the CEO and is accountable for, among other things, legal and regulatory risk, reputation risk, business conduct, ethics and sustainability. Chairs the Environmental, Social and Governance (ESG) Executive Committee.
	Sustainability team and BMO Climate Institute	Led by the CSO, oversees sustainability strategy and leads bank-wide initiatives on E&S risk, climate change strategy, ESG-focused investor relations, sustainability-related disclosure, operational sustainability and the bank's own approach to sustainable finance with Treasury and our Sustainable Finance team. This mandate includes: • To champion and innovate climate strategy • External engagement on BMO's climate strategy • Enhance climate-related analytical capability and monitoring of evolving issues • Developing policies, governance mechanisms and strategies to manage climate-related risks and opportunities with Enterprise Risk and Portfolio Management (ERPM) • Providing advisory support to operating groups on identifying, assessing, managing, monitoring and reporting on climate risk associated with our clients and transactions • Producing and publishing climate-related disclosures. The BMO Climate Institute was established in 2021, as a key part of our Climate Ambition. The BMO Climate Institute is a centre of expertise, bridging policy, science and finance to help shape the market for climate change solutions. See page 20 for more information about the BMO Climate Institute. The Sustainability team, including the BMO Climate Institute, collaborates with partners across the bank to advance climate-related opportunities and risk management, including ERPM, Sustainable Finance, the lines of business, Corporate Strategy – Enterprise Transformation, Corporate Real Estate and Procurement.

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Function	Executive Committee member and team	Role in climate governance
Risk	Chief Risk Officer (CRO)	Provides leadership, independent review and oversight of enterprise-wide risks, develops and maintains the Enterprise Risk Management Framework (ERMF) and fosters a strong risk culture across the organization. Reports directly to the CEO, is head of ERPM, chairs the Risk Management Committee and its oversight of environmental and social (E&S) risk matters, is a member of the ESG Executive Committee and reports to the board's Risk Review Committee on E&S risk matters, including climate change.
	Enterprise Risk and Portfolio Management (ERPM)	Our Enterprise Risk and Portfolio Management (ERPM) group oversees the implementation and operation of the ERMF and provides independent review and oversight across the enterprise on risk-related issues, in order to enable prudent and measured risk-taking that is integrated with business strategy. The ERPM Leadership Team (ERPM LT) considers the transverse impacts of climate change on their respective risk areas, namely credit and counterparty risk, market risk, liquidity and funding risk, insurance risk and enterprise risk, including operational non-financial risk and model risk, and the overarching risk profile of our operating groups. The CRO and ERPM LT are supported by the Head of Risk Frameworks & Regulatory Capital Oversight, who leads the E&S Risk Framework team and the Climate Scenario Analysis team, which coordinate the efforts of ERPM to embed climate change considerations in the ERMF.
Finance	Chief Financial Officer (CFO)	Jointly responsible for the enterprise's disclosure controls and procedures and is chair of the Disclosure Committee. Reports directly to the CEO, provides the board's Audit and Conduct Review Committee with fiscal year-end evaluation of the disclosure controls and procedures for financial reporting. As chair of the Disclosure Committee reviews the Sustainability Reporting suite following the mandate. The CFO is a member of the ESG Executive Committee.
	Investor Relations	Oversees the bank's engagement with fixed income and equity investors, including discussions of climate-related topics.
Strategy	Chief Strategy and Operations Officer (CSOO)	Leads enterprise transformation and drives strategic direction, brand, Purpose and impact commitments, including climate strategy and is a member of the ESG Executive Committee.
	Corporate Strategy – Enterprise Transformation	Plays a coordinating and convening role on commercial strategy development, including BMO's climate commercialization strategy.
Business	Heads of Operating Groups	Heads of BMO Capital Markets, BMO Wealth Management and Personal and Commercial Banking lead strategies to capture business growth opportunities, including those associated with climate finance. Each operating group organizes itself differently to capture climate-related opportunities and manage climate-related risks. The head of BMO Capital Markets is a member of the ESG Executive Committee.
	Operating Groups	Management-level leads include (among others): • Chief Operating Officers (COOs) of lines of business – COOs from North American Personal and Business Banking, North American Commercial Banking, BMO Capital Markets and BMO Wealth Management support the development of strategies, initiatives, products and advisory capabilities to capture climate-related commercial opportunities and manage climate-related risks. • Head of Sustainable Finance – mobilizes sustainable finance opportunities with customers across all lines of business, and leads sustainable finance specialists who are responsible for building customer engagement and identifying market opportunities for products and services as the sustainable finance market grows. • Head of Alternatives, Commercial ESG and Innovation at BMO Global Asset Management (BMO GAM) – works with Head of Sustainable Finance across the lines of business and the Responsible Investing team to help investors understand and use their influence to drive climate action.

Management committees and working groups oversee and support a coordinated enterprise-wide approach to climate-related governance.

Figure 4: Management committees with a role in climate governance

Forums and committees	Chair	Composition	Climate-related agenda frequency	Role in climate governance
ESG Executive Committee	General Counsel	CRO, CFO, CSOO, CEO of BMO Capital Markets, Special Advisor to the CEO on ESG, CSO	At least quarterly	Oversees ESG matters including sustainability and climate change topics. Oversight includes BMO's climate strategy, Climate Ambition and Net-Zero Commitments.
Sustainability Council	Special Advisor to the CEO on ESG	Senior leaders from across BMO's lines of business and Corporate Services	Quarterly	A forum for dialogue on BMO's sustainability work efforts, including our Climate Ambition.
Disclosure Committee	CFO	Senior management	Annually	Ensures the accuracy and timeliness of the enterprise's public disclosures. Annually reviews BMO's sustainability disclosures, including the Climate Report.
Risk Management Committee	CRO	CEO, operating group heads, General Counsel, Chief Strategy & Operations Officer, Chief Technology & Operations Officer, CFO, Head of Enterprise Risk, and operating group CROs	Nine times annually	Reviews the enterprise risk appetite statement on E&S risk including climate change, as well as the supporting key risk metrics tied to lending to carbon-related assets on which it gets quarterly reporting. Receives presentations on the E&S risk program at least twice a year, including on the implementation of the E&S Risk Corporate Policy.
Reputation Risk Management Committee	General Counsel	CFO, CRO and operating group heads	As needed	Reviews instances of significant or heightened risk to our reputation, including climate risk.
Enterprise Regulatory Committee	General Counsel and CRO	Senior management	Quarterly, or as needed	Supports the effective management of regulatory matters relevant to BMO and provides a forum to inform senior leaders about key regulatory matters, including those related to climate change.
Impact Investment Fund Investment Committee	Head of Sustainable Finance and Head of U.S. Commercial Banking	Management with expertise relevant to the Fund's activities	As needed	Reviews and approves all investment decisions of the Fund based on economic and impact metrics.
BMO GAM Investment Committee	Chief Investment Officer	Head of BMO GAM and heads of each investment desk, alternative investments and product management	Quarterly, or as needed	Supports, approves, and oversees the adoption and application of BMO GAM's responsible investment activities in ESG matters and ensures they are aligned with its clients' best interests, through the Responsible Investing Working Group.

Working groups are set up as needed to advance our approach to managing climate-related opportunities and risks, and to promote consistency and alignment across the enterprise. They include representatives from various functional areas and levels of the bank. In 2022 climate-related topics advanced at the working group level included climate-related financial disclosure, climate justice, climate scenario analysis and climate finance.

BMO Climate CoLab

Convened by the BMO Climate Institute, the BMO Climate CoLab is a cross-functional forum to share and leverage climate-related information, research, analysis, resources and solutions across the bank. The CoLab aims to avoid duplication, while providing reliable information to support recommendations for BMO's leadership on climate change and transition topics. The CoLab is comprised of senior leaders across the bank with responsibilities that include climate change from a commercial, risk or operational perspective. The forum membership includes the BMO Climate Institute, Sustainability team, Enterprise Risk, Indigenous Banking, Fair & Responsible Banking, Employee & Community Giving, Sustainable Finance, Data & Analytics, Equity Research, and Global Asset Management.

Strategy

We are integrating climate-related opportunities into our business, building on our existing strengths and capabilities.

Meeting the goal of net-zero emissions by 2050 will require transformation across every sector of the economy. As a global bank, we aim to facilitate this transformation by partnering with our clients to accelerate the low-carbon transition, including identifying and advancing climate solutions that meet net-zero objectives and social justice goals. Our clients will play a critical role in the transition to a net-zero carbon economy and we believe this transition presents opportunities – from gains in efficiency to growing customer demand for sustainable finance and transition-finance products.

Our ambition is clear: **to be our clients' lead partner in the transition to a net-zero world.** We have developed and are executing a four-part enterprise-wide strategy to deliver on our climate-related commitments and to capture commercialization opportunities by working with our clients on their decarbonization journeys. The strategy is delivered by BMO operating groups, overseen by the ESG Executive Committee and supported by the BMO Climate Institute. The BMO Climate Institute serves as an enterprise resource to accelerate BMO's climate-related transition efforts and as an internal and external convenor to bridge the science, policy and economics of climate change and help shape the market for climate-related solutions. We are enhancing our climate-related capabilities and aim to build capabilities that enable ongoing, decision-useful analysis of progress against both risk management and opportunity capture.

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BMO's Climate Ambition

To be our clients' lead partner in the transition to a net-zero world

Commitment

Acting on our commitment to a sustainable future, we're playing our part to drive the transformation toward a net-zero world.

- Maintain carbon neutrality and 100% renewable electricity purchases for our operations and pursuing a 30% emissions reduction goal by 2030.
- Target net-zero financed emissions in our lending by 2050 with intermediate targets for financed emissions reduction that will be achieved in partnership with clients.
- Commit to transparency in emissions measurement and performance.

Capabilities

BMO's Energy Transition and Sustainable Finance groups, supported by the BMO Climate Institute, provide thought leadership at the intersection of climate change and finance, allowing us to be the premier advisor to clients and partner on climate risk and opportunity.

- Leverage BMO's sophisticated analytical capabilities to understand the impacts of climate change.
- Generate insights that enable our business, clients and partners to adjust and flourish in the evolving climate landscape.
- Provide thought leadership informed by data-driven research and expertise.

Client Partnership

We are committed to helping our clients adapt to climate change, offering a tailored suite of green advisory, investment and lending products and services to support their transition to a net-zero global economy.

- Engage with customers to advance climate adaptation strategies.
- Enable our clients' net-zero transitions with a tailored suite of green advisory, investment and lending products.
- Be a 'one-stop-shop' for clients to meet the full range of ESG needs.

Convening for Climate Action

The BMO Climate Institute is driving insights and bringing together industry, government, researchers and investors to catalyze the climate conversation, collaborate on solutions and accelerate a socially and economically just net-zero transition.

- Unite BMO employees and equip them with knowledge to inform meaningful climate policy and business decisions.
- Develop solutions for climate-sensitive sectors in North America.
- Explore the synergies between climate and social justice goals.

Commitment

Our climate strategy and the actions we can take to facilitate economy-wide emissions reduction in partnership with our clients are informed and guided by our commitment to and participation in industry initiatives. We are implementing approaches developed by these initiatives to help us better understand the climate-related risks and opportunities associated with our business operations and financing capabilities.

Net-Zero Banking Alliance (NZBA)

Industry-led and convened by the United Nations, the NZBA brings together leading banks that are committed to working with their clients to align their lending and investment activities with pathways to net-zero emissions by 2050. We joined the NZBA in October 2021 and are setting intermediate and longer-term financed emissions reduction targets that we will seek to achieve by working with our clients.

Partnership for Carbon Accounting Financials (PCAF)

PCAF is a global partnership of financial institutions that work together to develop and implement a harmonized approach to assess and disclose the greenhouse gas (GHG) emissions associated with their loans and investments. We joined PCAF in January 2021, and have begun to quantify and disclose financed emissions in accordance with PCAF's Global GHG Accounting and Reporting Standard for the Financial Industry (the PCAF Standard) as an important step toward setting Paris-aligned targets for our portfolio.

Principles for Responsible Banking (PRB)

The PRB provide a framework for a sustainable banking system. We joined in February 2021, committing to align our business strategy with the United Nations Sustainable Development Goals (UN SDGs), the Paris Climate Agreement and relevant national and regional frameworks. Using PRB methodologies, we have identified climate change as one of the most significant impacts associated with our portfolio and have set targets to reduce those impacts as described in our 2022 Reporting and Self-Assessment Template.

Net Zero Asset Managers initiative (NZAM)

NZAM is an international group of asset managers committed to supporting the goal of net-zero GHG emissions by 2050 or sooner, in line with global efforts to limit warming to 1.5°C, and to supporting investing aligned with net-zero emissions by 2050 or sooner. BMO GAM was a founding signatory in December 2020 and has set interim targets toward a goal of 100% net-zero assets under management by 2050. BMO GAM has adopted the Paris Aligned Investment Initiatives' Net Zero Investment Framework to measure and manage our progress toward these commitments.

International Sustainability Standards Board (ISSB)

BMO supports the ISSB in its aim to develop a common set of consistent, comparable and reliable global sustainability standards to meet stakeholder needs. BMO supported Canada's successful bid to host an office of the ISSB in Montreal, Quebec and remains engaged with the ISSB process.

Reducing our carbon footprint: Environmental management system

In 2022, we began developing an environmental management system (EMS) across the enterprise that conforms to the requirements of ISO 14001, the internationally recognized standard that can be used to help organizations manage their environmental responsibilities. This work will continue into 2023. This EMS tool will help us systematically achieve our intended environmental outcomes and goals, ultimately adding value for our organization, our key stakeholders and the environment itself.

BMO's enterprise-wide EMS covers two key areas:

- Scope 1 GHG emissions related to corporate real estate (CRE) and company-owned transportation; Scope 2 GHG emissions related to CRE; and Scope 3 GHG emissions related to purchased goods and services, waste generated in operations and business travel; and
- BMO's Carbon Neutrality Program, including renewable energy certificates (RECs) and carbon offsets

Our existing EMS, in place since 2010, is aligned with the principles of ISO 14001 and to our own sustainable design and construction guidelines which include energy performance specifications for office and retail construction and renovation projects. We maintain ISO 14001 certification at two office buildings in Canada and have achieved Leadership in Energy and Environmental Design (LEED) certification at 13 locations globally.

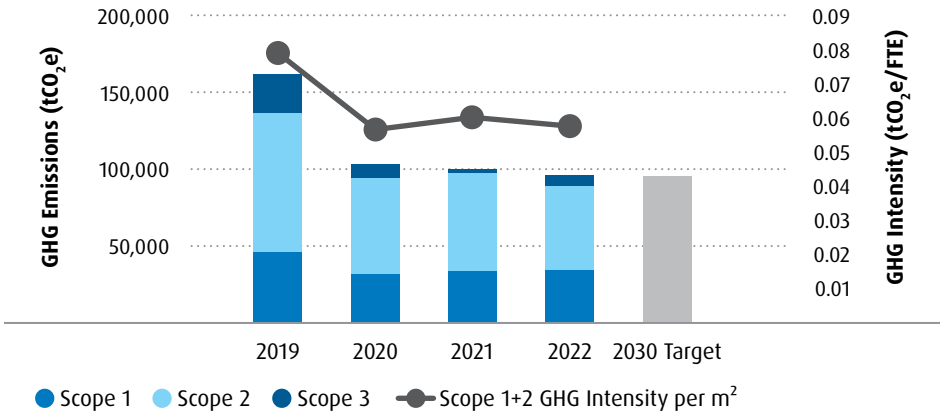
Our operational EMS helps us manage and enhance our environmental performance, fulfill key stakeholder expectations, and achieve our environmental objectives.

In 2022, we conducted gap analyses and needs assessments for a portion of our office, retail and critical sites. We focused on sites with relatively high energy use and emissions, identifying opportunities to optimize our energy efficiency and reduce our emissions footprint. We are currently developing decarbonization action plans.

Commitment to carbon neutrality and 100% renewable electricity purchases

BMO first achieved carbon neutral status in our operations in 2010 and we have continued to maintain carbon neutrality each year. Our carbon neutral strategy strives to ensure net-zero emissions in our operations and stimulates the market for emissions management technologies. It is based on a three-pronged approach[1] that includes:

- **Reducing operational emissions:** We track and analyze our Scope 1 and 2 GHG emissions using an operational control approach aligned with the GHG Protocol. We also track our operational Scope 3 GHG emissions associated with waste generation and business travel. BMO has set and achieved four successive multi-year enterprise-wide emissions reduction targets since 2008. In 2019, we set a new target to reduce operational GHG emissions by 30% by 2030, from a 2019 baseline using science-based approaches. We are making progress toward this target by investing in energy-saving initiatives such as lighting retrofits, heating and cooling infrastructure upgrades, as well as building envelope and operational efficiency improvements. Managing the environmental impact of our operations is important as we transition to a net-zero world. See page 36 for the metrics and targets we use to track our operational GHG emissions.



- **Matching electricity with renewable sources:** In 2019, we set an annual goal to match 100% of our global electricity use with electricity procured from renewable sources. We purchase Renewable Energy Certificates (RECs), which helps to clean the electrical grids where we operate while investing in the renewable energy market and creating demand to stimulate its growth.
- **Investing in high-quality carbon offsets:** We purchase offsets that match our remaining Scope 1, Scope 2 and operational Scope 3 emissions and we have begun to integrate carbon offsets into our carbon neutrality strategy.

CarbonCure

Supporting innovation through our carbon neutrality program

BMO has agreed to purchase carbon credits for 5,750 metric tonnes of carbon dioxide (CO_2) from CarbonCure over a period of five years. CarbonCure provides the concrete industry with proprietary technology that introduces recycled CO_2 into fresh concrete to reduce its carbon footprint without compromising performance. Once injected, the CO_2 undergoes a mineralization process and becomes permanently embedded. This results in economic and climate-related benefits for concrete producers – truly a win-win.

CarbonCure's award-winning carbon removal technologies reduce the carbon footprint of concrete. The company works with hundreds of concrete producers around the world to reduce and remove tens of thousands of metric tonnes of carbon emissions annually. In turn, this generates high-quality carbon credits that deliver immediate, scalable, high-impact climate-related benefits.

By investing in these carbon credits, BMO is helping to build a global network of concrete plants that also act as carbon removal facilities, scaling and accelerating the decarbonization of the concrete industry.

CarbonCure concrete being laid at a jobsite
Photograph courtesy of CarbonCure

[1] Information on BMO's carbon neutral strategy is available on our website.

Capabilities

BMO Chicago Tower entrance from Clinton Street
Photography: Nick Ulivieri

We are investing in enhanced climate-related capabilities that will keep our climate strategy competitive, innovative and responsive to shifting market dynamics. Accelerating the evolution of our climate strategy positions us to be our clients' lead partner in the transition to a net-zero world. The BMO Climate Institute is our key enterprise resource convening and coordinating climate action across the bank and externally. In support of our strategy, we have begun planning and designing an enterprise data and analytics solution that will provide timely data to inform ongoing, decision-useful analysis and to track our progress.

The BMO Climate Institute

The BMO Climate Institute is a centre of climate expertise within the bank bridging **climate science, policy, and the economics of climate change to help shape the market for climate solutions**. It is a key venue for internal and external engagement on climate change topics, including decarbonization, physical climate resilience and climate justice. The BMO Climate Institute monitors and reports on external developments, such as new government policies and technological advancements, to BMO's banking teams to inform and drive internal climate decision-making.

The BMO Climate Institute's work is profiled in this report. This work includes research to identify high-impact, high-readiness technology options to help our clients understand the potential opportunities to decarbonize their operations and supply chains in an economically viable way, either by securing financing or by bringing lower-readiness solutions to market through investment and policy engagement.

The BMO Climate Institute focuses its work on three foundational pillars of climate action:

- **Decarbonization** – identifying the sector-specific technologies, policies, and economic and business models necessary to achieve emission reduction targets, with a focus on sectors critical to the net-zero transition.
- **Resilience** – quantifying the location-specific impact of climate change, today and in the future, and developing financing strategies to manage and mitigate these impacts for clients and the bank.
- **Climate Justice** – leveraging expertise across the enterprise to advance initiatives that increase economic opportunities for historically marginalized communities. This work involves identifying and advancing more inclusive business models, scaling the deployment of decarbonization technologies in priority areas, and ensuring active engagement and ownership for marginalized groups in emerging business opportunities associated with the low-carbon transition.

Within these pillars, the BMO Climate Institute seeks to achieve the following four objectives:

- Coordinate a one-bank approach to the climate change ecosystem
- Drive insights on climate solutions in the bank and amplify our brand externally
- Convene partnerships for bankable climate action with industry, government, academia and investors
- Inform direction and content of climate change policy

The BMO Climate Institute Fellowship Program was developed in 2022 to provide an opportunity for selected BMO employees to participate in the work of the BMO Climate Institute for part of their week. The program draws on interdisciplinary expertise across the enterprise to help advance the bank's strategy to address climate change; engages employees across the bank in the convening of partnerships that enable us to be our clients' lead partner in the transition to a net-zero world; supports the enterprise in achieving its objectives to unlock and advance climate solutions; and enables employees to incorporate climate change knowledge into their day-to-day business activities.

Data and analytics

In 2022, we established an initiative and governance approach to plan and develop an enterprise data and analytics solution – that will provide timely data to inform ongoing, decision-useful analysis and track our progress against risk management and opportunity capture. This work supports BMO's strategy to continue building a high-performing, digitally enabled and future-ready bank, and aims to address our rapidly expanding data needs to drive actionable insights and analytics. Throughout this report, reference will be made to data limitations and challenges that have been identified as barriers to our climate-related objectives. This work on data and analytics is aimed, in part, to remove obstacles towards our Climate Ambition, across the dimensions of strategy, risk management, governance and metrics and targets.

Data strategy: In 2022, we established an enterprise plan and governance structure to build technology solutions that can enhance climate and sustainability data and analytics by optimizing the acquisition, identification and utilization of relevant data across the bank. The initiative includes stakeholders from across the enterprise, including from Sustainability, Risk, Finance, Technology and Data & Analytics (DnA).

Climate Analytics Spotlight

In collaboration with the BMO DnA Data Science & Artificial Intelligence team and external partner Climate Engine, the BMO Climate Institute developed capabilities to analyze over 80 climate-related risk drivers and outcomes, including temperature, precipitation, flooding, wildfires, wind, water stress, crop health, soil moisture and others. Continuously updated with the best available science and highest-resolution geospatial data, the platform quantifies historic changes and projects the physical impacts of climate change under different global temperature scenarios and time horizons. The BMO Climate Institute is advancing experimentation within the bank on the use of this advanced technology and applying it to identify opportunities to partner with clients to build resilience into their business strategy and better understand potential risks of physical climate change impacts. In 2022, BMO's climate analytics platform was used to assess exposure of physical climate hazards across multiple time horizons and warming scenarios for more than one million unique assets. Results of this analysis have informed the development of resilience finance strategies, internal risk assessments, and market-shaping publications.

Climate Analytics in Action:

In 2022, BMO's Equity Research team, the BMO Climate Institute, BMO DnA Data Science and AI team, and Climate Engine collaborated to analyze the exposure of 70 U.S. REITs to physical climate risk for their U.S. assets. BMO's Climate Analytics Platform quantified the exposure of 39,243 individual REIT properties to exposure of inland flooding, coastal flooding, hurricane, tornado, and wildfire risks in today's climate and in 2050 under two potential scenarios based on the IPCC's RCP 4.5 and 8.5 scenarios. This analysis was conducted at the building level, providing industry-leading insights that quantified how climate change may affect future risks for U.S. REITs. Learn more about this analysis on the BMO Sustainability Leaders Podcast.

Client partnerships and commercialization

Our goal is to partner with our clients – helping them adapt to the impacts of climate change and contributing to the transition to a net-zero global economy. We are developing strategies to capture climate-related finance opportunities across each of our lines of business. Capturing these opportunities could facilitate net-zero-aligned decarbonization, but a successful transition will also require effective government policies aligned with net-zero objectives in the jurisdictions in which we operate.

Sustainable finance can be an important driver of the transition to a lower-carbon economy. We see a significant opportunity to differentiate BMO by leveraging our sustainable finance strategy to be our clients' lead partner in the transition to a net-zero world. This includes developing innovative and tailored new products and business services related to climate change, and accessing new markets with financial solutions that can assist customers throughout this vital transition.

BMO has made an enterprise-wide commitment to mobilize $300 billion in capital to support companies pursuing sustainable outcomes by 2025. This includes green, social and sustainable underwriting, advisory services, lending and investments. BMO has mobilized $91 billion◆ in 2022 and $267 billion since 2019 in capital that supports positive climate-related outcomes such as clean transportation, low-carbon energy, green buildings, waste management and sustainable agriculture as well as societal benefits to ensure a just transition for stakeholders with different vulnerabilities to climate change and the shift to a low-carbon economy.

You can read about the amounts and types of sustainable finance transactions in our 2022 Sustainability Report.

Supporting our clients on their carbon transition journey

We offer our clients a wide range of climate finance products, services and capabilities – everything from electric vehicle financing and carbon credit offset programs to ESG-integrated mutual funds and responsible investment options. Our goal is to support our clients on their carbon transition journey, providing them with insights, data, and leading-edge technology they can use to capture decarbonization opportunities and contribute to a net-zero world.

A strategic investment in climate transition capabilities and carbon markets

BMO's Climate Ambition to be our clients' lead partner in the transition to a net-zero world took a big step forward in 2022 with the announcement to acquire Radicle Group Inc. The acquisition will make BMO a market leader in emissions measurement capabilities, carbon credit origination and in environmental commodity trading.

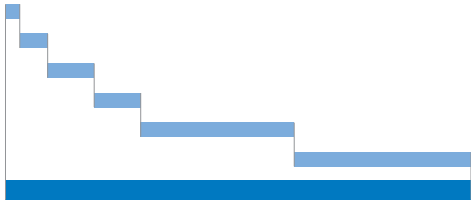
Founded in 2008, Radicle's mission is to enable planet-positive solutions by balancing economic interests with ecological impact. This aligns with BMO's Purpose and our Bold Commitments for a thriving economy, a sustainable future and an inclusive society.

Our acquisition of Radicle enhances BMO's commitment to help our clients understand and manage the risks and opportunities of the energy transition. It will enhance our ability to support our clients as an advisor on decarbonization opportunities, facilitate analysis of net-zero aligned transition and foster economic incentives tied to decarbonization.

Carbon markets continue to play an important role in curbing the effects of climate change and enabling a sustainable future. These markets have grown substantially in recent years as organizations and individuals manage risk and help scale the technologies needed to reach net-zero.

Figure 5: Sustainable financing by green outcome

($ billions)	Total since 2019	
Sustainable agriculture	$2.52	3%
Clean transportation	$5.51	6%
Waste management	$8.19	10%
Green buildings	$8.67	10%
General green[1]	$27.69	33%
Low-carbon energy	$31.78	38%
Green	**$84.36**	**100%**



Energy Transition Group

BMO Capital Markets established the Energy Transition Group (ETG) in 2021. The ETG supports clients in their pursuit of opportunities driven by the increasing momentum of the global economy's shift in production and consumption of energy.

The ETG provides knowledge, tools and support to BMO's industry groups as they engage with clients on their energy transition endeavours. It draws on industry sector specialists from within the Energy, Power Utilities & Infrastructure, Metals & Mining, Industrials, Food Consumer & Retail and Sustainable Finance groups to provide a broad range of expertise in energy transition developments and opportunities, including:

- Hydrogen and fuel cells
- Energy transition finance
- Electricity storage
- Low-carbon fuels and renewable natural gas
- Carbon capture, use and sequestration
- Energy transition minerals
- Renewable and nuclear power
- Electric mobility and zero-emission vehicles
- Nature-based solutions
- Energy demand-side management
- Circular economy solutions, including waste-to-value processes

◆ KPMG has provided limited assurance of this figure.

[1] Includes green labelled transactions or transactions that involve multiple green outcomes such as those listed here.

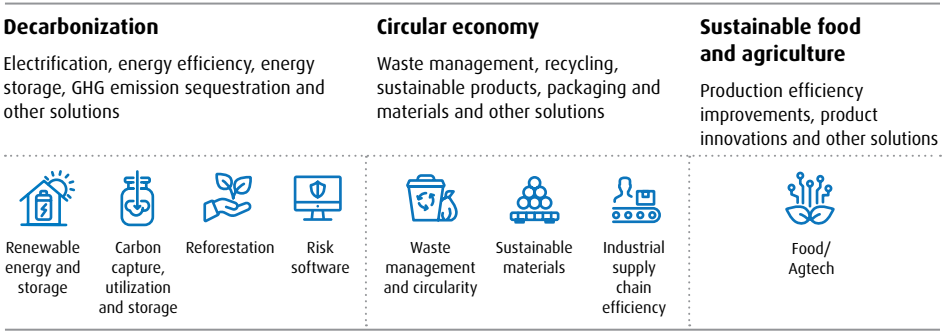
The ETG, and the Sustainable Finance team, helped mobilize capital in 2022 in a number of industry firsts for sustainable financing. The ETG supported Bruce Power's launch of the world's first nuclear green financing framework, issuing $500 million in green bonds to fund investments that will increase the output of its nuclear units and extend the plant's life beyond 2060. This green framework will help harness nuclear power's critical role in mitigating climate change. The ETG also supported the work of BMO Financial Group as joint-lead manager of the Government of Canada's first and Canada's largest green bond transaction, a $5 billion offering with over $11 billion in proceeds supporting green investments to reduce GHG emissions, enhance climate resilience, conserve nature and protect the environment. This financing program is a landmark development in Canada's sustainable finance market and will help accelerate sustainable finance adoption in Canada.

Impact investing

As part of our commitment to mobilize $300 billion in sustainable financing, we launched our Impact Investment Fund (the Fund) in 2019 and seeded it with $250 million of capital. In 2022, we increased our allocation to the Fund to $350 million, which we invest in sustainability solutions and companies that are making a positive sustainability impact. You can find information about investments made through the Fund in our 2022 Sustainability Report.

The objective of the Fund is to find and scale impactful solutions that facilitate the achievement of our corporate clients' sustainability goals across three themes and eight areas of focus.

Figure 6: BMO Impact Investment Fund themes and areas of focus



The Fund supports scalable technologies that address these areas of focus. It looks for companies with proven technology and some level of commercial revenue, and the ability to make use of additional capital to scale their business. Proof of impact is a key investment criterion. Processes for assessing impacts are outlined in our Operating Principles for Impact Management Disclosure Statement.

Gotham Greens – Farming for the future

New York-based Gotham Greens is a pioneer in indoor farming, known for growing produce locally year-round, in its network of high-tech, hydroponic greenhouses across the United States.

In September, the BMO Impact Investment Fund provided funding to this urban agriculture company, raising $310 million to help Gotham Greens complete the construction and acquisition of new greenhouse facilities, and advance its mission to decentralize agricultural production.

This mission aligns with the Fund's focus on sustainable agriculture and the growing need for more efficient local farming. By reimagining how and where fresh food is grown, the company's greenhouses impressively use up to 95% less water and 97% less land compared to conventional field farming. The proximity of its greenhouses to key metropolitan markets eliminates the need for long-distance and refrigerated transportation, improving product quality and extending shelf life, and helping to reduce food waste.

BMO's relationship with Gotham Greens began when our commercial banking group financed the company's first generation of greenhouses. Since then, Gotham Greens has not only gained strong market share, it has made a meaningful impact in the agricultural sector by developing new ways to farm, partnering with local communities and innovating for a sustainable future.

Gotham Greens leafy greens, herbs, salad dressings, dips and cooking sauces are available in more than 3,000 grocery stores including Whole Foods Markets and Albertsons.

Gotham Greens grows produce using less land, water and energy, in farming through its national network of hydroponic greenhouses
Photograph courtesy of Gotham Greens

Convening for climate action

We participate in many associations, initiatives, working groups and multi-stakeholder partnerships, all of which share one goal – to advance climate action through collaboration. These alliances support the development of climate change knowledge and expertise, including a better understanding of the risks and opportunities related to climate change and the transition to a net-zero carbon economy.

Industry associations: BMO and BMO GAM belong to numerous global industry associations dedicated to tackling climate action, including:

- Climate Action 100+
- Climate Engagement Canada (CEC)
- Institutional Investors Group for Climate Change (IIGCC)
- Net Zero Asset Managers initiative
- Net-Zero Banking Alliance

Partnerships: The BMO Climate Institute partnered with other leading institutions dedicated to reaching net-zero by 2050, including:

- Sustainable Finance Action Council (SFAC) Net-Zero Capital Allocation Working Group (NZ CAWG), established by the federal government to develop a series of recommendations for a net-zero investment strategy. BMO has leadership responsibilities on the Working Group's Steering Committee and Secretariat, with a principal mandate to provide recommendations related to:
  - Transition finance – design and align practical and specific strategies for driving private capital toward the transition to a net-zero world
  - Carbon pricing and credits – design carbon pricing guarantees and carbon credit generation protocols
  - Resilience finance – identify and evaluate financing needed for adaption and resilience to physical climate risk
- Electrifying Canada, a private sector-led initiative calling for an actionable and comprehensive framework – backed by evidence-based solutions – to electrify large portions of the Canadian economy, including transportation, buildings and industry, while ensuring the power sector can support this transition.
- The Homeowner Climate Data Working Committee (HO-CDWC), established by the Canada Mortgage and Housing Corporation to convene public and private home finance sector participants to develop solutions for cross-industry climate data and analytics related to Canada's single-family residential real estate market.

Thought Leadership: BMO convenes numerous conferences and symposiums focused on climate issues and the transition to a low-carbon economy. For example, in October 2022, we hosted the BMO Transition Think Summit 2022 in Phoenix, Arizona bringing together key stakeholders to discuss climate issues and potential solutions for decarbonizing the economy. Attendees also toured the Nikola Corporation's site and saw first hand, large new scale zero-emission vehicle technologies at work.

Client engagement: The BMO Climate Institute conducted a survey of North American small to medium-sized businesses to identify how they are adapting and acting to address climate change, and how they view the landscape of climate targets. Results and insights from the survey were published online.

Spearheading discussions on the global transition to a low-carbon economy

Climate issues remain top-of-mind for governments, industrial sectors, and the investment community. This past year, BMO hosted a number of conferences and symposiums focused on climate issues and the transition to a low-carbon economy.

At the **Global Metals and Mining Conference** in Florida, the BMO Climate Institute led a panel on *Mining's Megawatt Future*, where experts discussed opportunities for electrification and transformation in the mining industry in the face of climate change and the transition to a net-zero world.

The BMO Climate Institute, in conjunction with the Long Run Institute, also held a **Climate Symposium** hosted at Queen's Park by the Honourable Elizabeth Dowdeswell, Lieutenant Governor of Ontario. Attendees discussed some of the key challenges for Canada as a resource-based economy, and the planet more broadly, to mitigate the physical impacts of climate change and any collateral crises, from energy shortages to potential mass migration of climate refugees.

At the **BMO Global Reserve and Asset Managers Conference** in Toronto, our Chief Sustainability Officer, Michael Torrance chaired a panel dedicated to *Aligning the Financial System with Global Climate Ambition*.

At BMO's annual **Farm to Market Conference** in New York, a number of panel discussions were held on climate change and sustainability across the food and retail sector – including a presentation from BMO ESG strategist, Doug Morrow, on *Exploring the Physical and Transition Risks Facing Food and Agriculture*.

As we help build a sustainable world through banking, BMO will continue to spearhead these important conversations on climate change and the transition to a net-zero world.

BMO GAM

BMO GAM continues to engage with policy-makers to encourage robust action on climate change. BMO GAM supports the 2022 Global Investor Statement to Governments on the Climate Crisis, calling on governments to raise their climate ambition in line with the goal of limiting global temperature rise to 1.5°C, and participated in consultations with the CSA and SEC aiming to enhance and standardize climate-related disclosures for public companies.

Bank Policy Institute (BPI)

BMO is participating in the Climate Working Group of BPI, a non-partisan public policy research and advocacy group, representing leading banks in the United States.

Canadian Bankers Association (CBA) – Environmental Specialists Group and NZBA Working Group

BMO is participating in the CBA's Environmental Specialists Group – an industry forum that monitors regulatory developments and drafts submissions to domestic and international regulators on consultations related to climate risk. The forum also engages on climate scenario analysis matters and shares best practices for climate-related disclosures.

BMO is participating in the NZBA Working Group – a forum for NZBA members to discuss guidance and projects or initiatives related to the NZBA.

Canadian Chamber of Commerce – Net-Zero Council

BMO participated in the Canadian Chamber of Commerce Net-Zero Council, which is dedicated to advancing business leadership on climate change, and aiming to inform government policy through numerous channels, including through the Government of Canada's Net-Zero Advisory Body.

Climate Risk Consortium, Risk Management Association

In 2022, BMO joined the Climate Risk Consortium, the first industry consortium with the sole purpose of advancing best practices in climate risk management within the financial services industry. The consortium will advance best practices and create thought leadership across all three lines of defence, as well as other aspects of climate risk management.

Climate risk industry forums and working groups

We participate in other climate risk industry forums and working groups, including those organized by the Institute of International Finance (IIF), Institute of International Bankers (IIB), Bank Policy Institute (BPI), Global Risk Institute (GRI), Global Association of Risk Professionals (GARP), Risk Management Association (RMA) and the International Association of Credit Portfolio Managers (IACPM). These forums offer timely updates on industry and regulatory developments, opportunities to share best practices, and are avenues for industry feedback on government or regulatory discussion papers or consultations.

Climate Action 100+ (GAM)

BMO GAM is a founding member of this collaborative US$60 trillion global investor engagement initiative that is working to ensure the world's largest corporate GHG emitters take necessary action on climate change.

Climate Engagement Canada (GAM)

BMO GAM is a founding member of this collaborative investor engagement dedicated to engaging with Canadian corporations to promote a just transition to a net-zero economy. BMO GAM serves on Climate Engagement Canada's steering committee and leads five collaborative investor engagements and supports other engagements with large Canadian investee companies as an active participant.

Canadian Investor Statement on Climate Change (GAM)

BMO GAM co-authored and is a founding signatory of the Canadian Investor Statement on Climate Change, which brings together Canadian institutional investors to support the transition to a net-zero economy informed by Indigenous perspectives. The Statement calls for increased climate accountability at public companies and outlines climate actions that investors have committed to take. The Statement is supported by $5.5 trillion in assets under management representing more than 35 investors.

Equator Principles (EP) Association

BMO has been a signatory to the Equator Principles since 2005. We represent North America on the EP Association Steering Committee and were actively involved in the EP4 update, which covered climate change, Indigenous rights, and environmental and social risk management.

2022 Global Investor Statement to Governments on the Climate Crisis (GAM)

BMO GAM participated in this collaborative global investor statement, which encourages governments to raise their climate ambitions. BMO GAM, together with more than 500 other investors around the world, urges governments to align their policy decisions with a 1.5°C global temperature rise scenario, take timely climate action through domestic policy measures, and strengthen climate disclosures across the financial system.

Institutional Investors Group on Climate Change (IIGCC) (GAM)

IIGCC members are investors collaborating on climate change, working to support and enable real progress by 2030 toward a resilient net-zero future. BMO GAM is aiming to achieve these collective IIGCC targets by successfully engaging with companies, policy-makers and investors.

ISO Technical Committee 207 on Standardization in the Field of Environmental Management

A member of BMO's Sustainability team serves as the chair of the group of Canadian committees that mirror ISO's Technical Committee 207. This group focuses on creating tools to address environmental and climate impacts, including related social and economic aspects, in support of sustainable development. Scope of work includes environmental management systems, auditing, verification/validation and related investigations, environmental labelling, environmental performance evaluation, life cycle assessment, climate change and its mitigation and adaptation, eco-design, material efficiency, environmental economics and environmental and climate finance.

ISO Technical Committee 322 on Standardization in the Field of Sustainable Finance

A member of BMO's Sustainable Finance team serves as the chair of the Canadian committee that mirrors ISO's Technical Committee 322 on Standardization in the Field of Sustainable Finance. The committee works to promote the integration of sustainability considerations, including environmental, social and governance practices in the financing of economic activities.

Partnership for Carbon Accounting Financials (PCAF) Working Groups

BMO is participating with other financial institutions in working groups to develop and implement a harmonized approach to assessing and reporting GHG emissions associated with loans and investments. This initiative includes a Canadian working group, and with other working groups focused on commercial and residential real estate and motor vehicle lending.

Sustainable Finance Action Council (SFAC)

BMO is participating in the SFAC and in two of SFAC's Technical Expert Groups (TEGs). The council seeks to strengthen the mobilization of private capital to support Canada's climate ambition through the work of four Technical Expert Groups: Disclosure, Data, Taxonomy, and Capital Allocation Strategy. BMO is co-chair of the SFAC Net-Zero Capital Allocation Working Group, the mandate of which is to develop and align specific and practical recommendations for mobilizing capital flows to support the transition to net-zero. BMO is also a member of the Data TEG, which is providing advice to the Government of Canada on strategies to improve the availability and reliability of climate data.

UNEP FI-TCFD for Banks

BMO is participating in the UN Environment Programme – Finance Initiative (UNEP FI) banking program as part of our implementation of the TCFD recommendations. We are actively engaged in modules focused on climate stress testing, physical and transition risk tools, physical risk data, climate litigation, transition scenario analysis, net-zero underwriting and macroeconomic modelling.

UNEP FI Principles for Responsible Banking – Resource Efficiency Target-Setting Working Group

BMO supports the UNEP FI Principles for Responsible Banking and participates in its Working Group on Resource Efficiency Target-Setting. The group is focused on developing guidelines and setting targets related to financing the transition to a resource-efficient and circular economy.

United Nations Principles for Responsible Investment (UN PRI) (GAM)

As a signatory to the UN PRI, BMO GAM follows responsible investment practices to enhance returns and manage sustainability-related risks. BMO GAM participates in collaborative engagement initiatives organized or supported by UN PRI and plans to implement the six principles for responsible investment as set out by UN PRI, which encourages ESG integration and stewardship throughout the investment process. UN PRI works with investors to protect portfolios from risks in the transition to a low-carbon global economy.

Risk Management

We consider climate change to be a transverse risk driver that manifests through our identified material risks.

At BMO, we consider the physical and transition risks arising from climate change to be transverse risk drivers that could have an impact on the material risk exposures identified in our risk taxonomy over the short (0-1 year), medium (1-3 years) and long term (3-30 years or more). Physical risks are associated with a changing climate, which could have both acute and chronic physical effects. Transition risks are associated with the shift to a net-zero carbon economy. For a discussion of BMO's material risks and their definitions, please see the Enterprise-Wide Risk Management section of our 2022 Annual Report.

We have been incorporating specific climate change considerations as part of our enhanced E&S risk framework since 2020, when we formally identified climate change as a material risk and included it in our enterprise-wide risk taxonomy as a subset of E&S risk. In 2021, we added climate-related physical risk and transition risk to the taxonomy. We anticipate the taxonomy may evolve as we enhance our understanding of how climate-related impacts could manifest as risks to the bank.

Risk Management Framework

We are embedding climate change considerations in our Enterprise-wide Risk Management Framework (ERMF). Overseen by the CRO, the ERMF guides our risk-taking activities in order to align them with our customers' needs, shareholders' expectations and regulatory requirements.

The ERMF defines our approach to risk management, including risk governance and the risk management life cycle. Underpinned by our risk culture, it is enabled by our people, process and technology, and leverages tools including modelling and analytics, scenario analysis, stress testing, as well as the risk taxonomy that catalogues the definitions of our material risks. You can find more information about our ERMF in the 2022 Annual Report.

Our approach to embedding climate change considerations in our ERMF efficiently leverages existing risk governance mechanisms, enablers and tools, while building new teams and capabilities to identify, assess, manage, monitor and report on potential impacts of climate change on our clients, portfolios and operations.

Risk Governance

Board and Senior Management Oversight

A discussion of board and senior management oversight as well as the key roles and responsibilities across the three-lines-of-defence is found in the Governance section of this report.

Risk Appetite

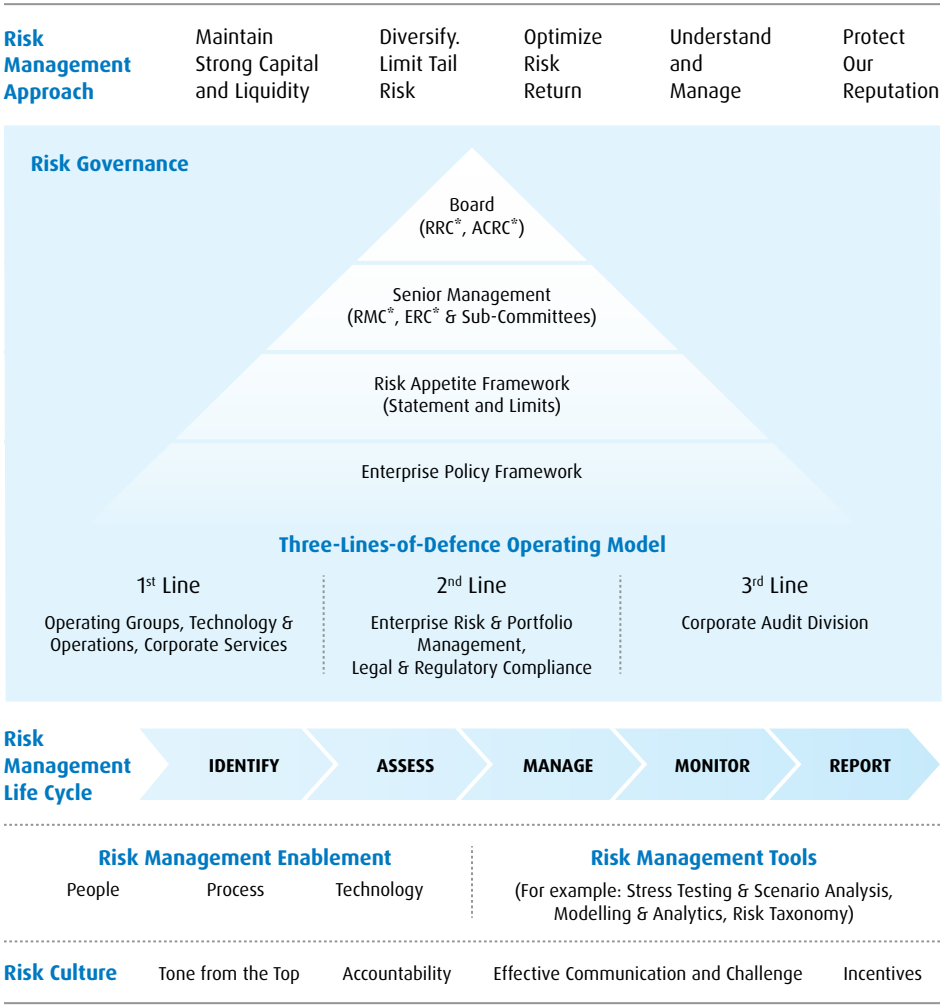
Since 2019, we have had a board-approved Enterprise Risk Appetite Statement on E&S Risk, which includes climate change. We have refined the wording of this statement over time and we are in the process of articulating and refining our risk appetite at a more granular level across all the risks identified in our taxonomy. We have made notable advances in the context of our wholesale lending risk appetite. For several years our Environmental and Social Risk Financing Guideline has set out prohibitions and escalations, and in recent years we have gained further clarity on the specific context of climate-related risk.

In addition, we have been tracking an enterprise-level climate-related Risk Appetite Key Risk Metric (RA KRM) on our board-reported Risk Appetite Dashboard. The metric tracks our lending tied to carbon-related assets (following the 2017 TCFD definition and connected to the utilities and oil and gas sectors, with some noted exclusions) as a percentage of total net loans and acceptances, net of allowance for credit losses for impaired loans. In fiscal 2023, we are adding a new complementary metric to our KRM dashboard that tracks our lending tied to the 2021 TCFD definition of carbon-related assets. In addition to energy and utilities, the expanded definition includes transportation, materials and buildings, agriculture, food and forest products. See the carbon-related assets section on page 50 in this report for more information.

Policy Framework

In 2022, we put in place a board-approved E&S Risk Corporate Policy, which is the governing documentation of our definition of E&S risk, the manner in which we are embedding E&S risk considerations in our ERMF and the roles and responsibilities of senior leadership in this context. In addition to the E&S Risk Corporate Policy, we are working to update to our full suite of enterprise Corporate Policies and Corporate Standards to reflect the distinctive characteristics of climate-related risks as each document comes up for review in the normal two-year review cycle.

Figure 7: Enterprise-wide Risk Management Framework



*RRC: Risk Review Committee, ACRC: Audit and Conduct Review Committee, RMC: Risk Management Committee, ERC: Enterprise Regulatory Committee

Identifying, assessing and managing climate-related risks

ERPM and our Sustainability team work with the lines of business – including BMO Capital Markets Sustainable Finance team, BMO GAM, and Corporate Services – to manage E&S risk within our organization and to make progress toward our sustainability goals. BMO's Net-Zero Ambition is one of those goals.

ERPM and our Sustainability team, working with the operating groups, monitor and respond to evolving international standards and regulations. We keep informed of evolving practices regarding climate-related risk by conducting independent research, participating in global forums with our peers, maintaining an open dialogue with our internal and external stakeholders, and monitoring regulatory developments, best practices and initiatives from non-regulatory international bodies.

Set out below is a discussion of the impact climate-related risk could have on our material risks.

Credit and counterparty risk

Climate-related risks could affect our exposure to credit and counterparty risk by impacting our customers' revenues, operating costs, or access to capital such that they may become unable to meet their financial commitments to BMO. Borrowers may experience losses or increases in their operating costs as a result of acute or chronic changes in climate conditions and/or climate-related policies, such as carbon emissions pricing, sector-based targets or emissions caps. Revenues may be affected by new and emerging technologies, which could disrupt the existing economic system and dampen demand for certain commodities, products and services.

These risks are addressed in our Credit Risk Management Framework, including provisions for governance and accountabilities, enhanced due diligence, and requirements for escalations and exceptions. We evaluate E&S risks, including climate-related risk, associated with clients operating in higher-risk sectors and we apply enhanced due diligence to transactions with customers operating in environmentally sensitive industries, including our Environmental & Social Risk Rating Assessment tools for petroleum, mining, and utilities and power generation. The bank aims to avoid direct financing for any project or transaction that involves exploration or development in the Arctic National Wildlife Refuge. In 2021, we introduced a Statement on Coal Lending that describes our approach to extending credit for transactions that involve thermal coal through BMO's Commercial Banking and Corporate Banking lines of business.

We avoid doing business with borrowers that have poor track records in E&S risk management. Transactions with significant environmental or social concerns may be escalated to BMO's Reputation Risk Management Committee for consideration. Our Environmental and Social Risk Financing Guideline includes direction on developing an understanding of specific climate change impacts on a borrower and its operations, including regulatory and/or legislative changes. This includes an understanding of borrowers' climate change adaptation and mitigation strategies.

Assessing environmental and social risks

In line with BMO's Purpose and the growing focus and expectations of shareholders, regulators, society, our clients and our teams, we take steps to identify, assess and manage E&S risks in accordance with our policies. As part of this work, we have developed Environmental & Social Risk Rating (ESRR) Assessment templates that are sector-specific and included in the credit risk process. There are currently three ESRR assessment templates: petroleum, mining, and utilities and power generation.

The purpose of the templates is: (i) to have a consistent approach to assessing E&S risks; (ii) to help identify higher risk files that may warrant additional due diligence or approval considerations; and (iii) to allow for better tracking of E&S risks across the enterprise.

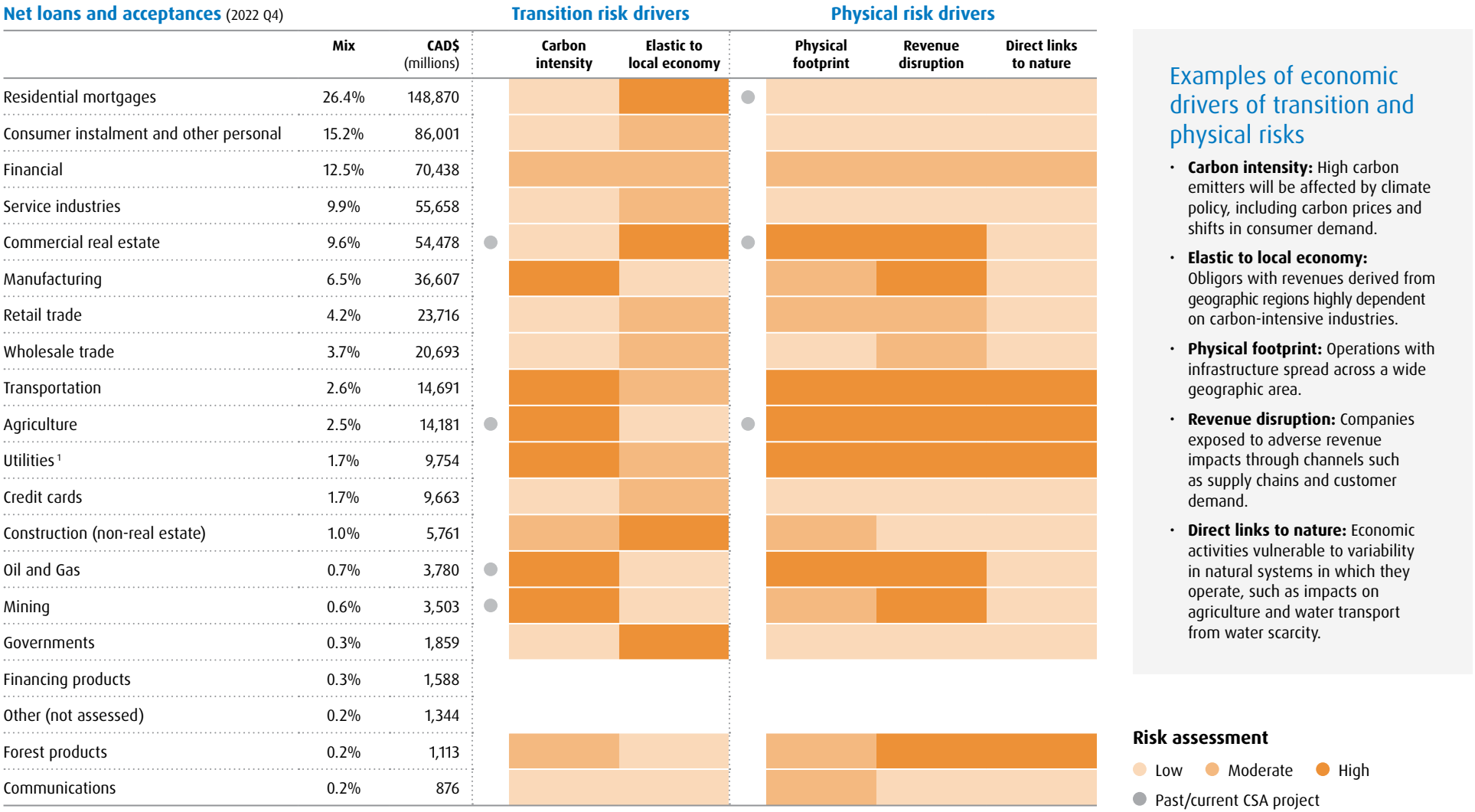
ESRRs are reviewed and updated at least annually, and in the event of certain trigger events. Recently, we have integrated consideration of clients' transition plans with specific net-zero objectives into our ESRR assessment for certain sectors, including the quantification and disclosure of Scope 3 emissions. Additionally, we are enhancing our data systems to develop the ability to aggregate and analyze the results of this analysis. Over time we aim to enhance our ability to measure, monitor and report on climate-related transition as we track towards our Climate Ambition goals and targets. This will include assessing the level of maturity of client level transition plans, with an aim to aggregate data to track progress of our client engagement strategy. Progress on implementation will be discussed in our 2023 Climate Report, expected to be released in the spring of 2024.

BMO Radicle offers Climate Smart, an in-house program and management software that helps clients calculate and track their Scope 1, 2 and 3 emissions, provides client-level insights on emissions reduction opportunities, and offers clients training and certification for carbon accounting best practices. Listen for more information on IN Tune: BMO Radicle and the World of Carbon Credits.

In 2022, we developed an initial heatmap to aid in identifying physical and transition risk across our lending portfolio. It can provide a preliminary qualitative assessment of high, medium and low risk, based on external sensitivities to climate risk sourced from BMO case studies, industry reports and regulatory exercises, including the Bank of Canada/OSFI climate scenario analysis. Future improvements in quantification capabilities and climate scenario analysis will enhance the heatmap over time.

Although it does not identify climate-related risk exposures of specific clients, the heatmap helps us prioritize our risk assessment efforts, including scenario analysis exercises. Sensitivity to climate-related risks can vary among clients within each industry sector and subsector, and the degree of impact will depend on factors such as the location of physical assets, business activities and management actions taken to mitigate the risks.

Figure 8: Sensitivity to climate risk of BMO lending exposures, as at October 31, 2022



Examples of economic drivers of transition and physical risks

- **Carbon intensity:** High carbon emitters will be affected by climate policy, including carbon prices and shifts in consumer demand.
- **Elastic to local economy:** Obligors with revenues derived from geographic regions highly dependent on carbon-intensive industries.
- **Physical footprint:** Operations with infrastructure spread across a wide geographic area.
- **Revenue disruption:** Companies exposed to adverse revenue impacts through channels such as supply chains and customer demand.
- **Direct links to nature:** Economic activities vulnerable to variability in natural systems in which they operate, such as impacts on agriculture and water transport from water scarcity.

Risk assessment

Low Moderate High

Past/current CSA project

[1] BoC-OSFI Pilot suggests Canadian utilities could benefit from the transition to a net-zero GHG economy due to high proportion of nuclear and renewable power.

Market risk

Trading and underwriting positions may be exposed to transition risk as markets respond to sudden changes in climate policy. In 2022, our Market Risk Corporate Policy was updated to include E&S risk considerations and the climate scenario analysis program evaluated the potential impact of a disorderly climate transition on the fair value of the BMO trading portfolio.

Operational non-financial risk

BMO's exposure to operational risks could be heightened by climate-related physical and transition risks. Exposure to physical risks from environmental events, such as droughts, floods, wildfires, earthquakes, and hurricanes and other storms could also potentially lead to disruptions in our operations and result in lower earnings and higher losses. Climate risk assessment is included in BMO's Property Risk Management Framework. Our business continuity management preparations, including our Emergency Response and Preparedness Plans, provide us with the capability to restore, maintain and manage critical operations and processes in the event of a business disruption.

In addition, we understand that our exposure to operational risks related to our use of resources could be heightened by climate-related transition risks. Changes in climate patterns and climate-related policies may result in increases in the operating and capital costs associated with the energy and equipment used to heat, cool and power our facilities. We manage energy consumption through energy savings projects such as lighting, HVAC and controls upgrades. If the lifespan of assets (e.g., HVAC equipment) is negatively impacted, we modify our capital forecasting. We monitor the regulatory landscape for indications of new fuel or energy taxes and carbon pricing regulations that could affect our operating costs on an ongoing basis through our internal risk management group, feedback from third-party facilities management service providers and participation in industry associations.

Changing climate patterns and climate-related policies may also affect the operating and capital costs of our suppliers. Suppliers may choose to pass these costs on to their customers, which could result in higher purchasing costs for BMO. Consistent with our Supplier Code of Conduct, BMO's Sustainable Procurement program considers current and future suppliers' sustainability performance and risk management, including risks related to climate change. We utilize a rigorous supplier selection process to determine which risks could have a substantive financial or strategic impact on our organization. All requests for proposals (RFPs) include a comprehensive set of sustainability questions that seek to provide an understanding of respondents' practices related to environmental and social responsibility.

Legal and regulatory risk

We may be exposed to greater legal and regulatory compliance risk, as well as potential litigation and liability costs. Globally, financial services regulators and supervisors are in the process of introducing principles regarding the management of climate-related financial risk, which we will consider as we continue to embed climate risk in our ERMF. Legal and regulatory risks could arise from our actual or perceived actions, or inaction, and those of our clients, in relation to climate change and other E&S risk issues, or our disclosures related to these issues.

Strategic risk

Understanding our climate-related risks and opportunities over the short, medium and longer term will help us develop climate-resilient business strategies and make decisions that are intended to reduce those risks and enhance opportunities for growth. Whichever financial mitigants are chosen to manage the risks, their effectiveness and cost may also result in shifts in our business strategies.

Government policies that support the transition to a lower-carbon economy, potential regulatory or supervisory approaches and the increasing severity of climate events may make consumers more aware of climate change and result in changes to consumer behaviour. To help reduce the future impact of climate change, retail and wholesale consumers may shift their behaviour to favour more climate-friendly consumption, request financial services and products that align with a positive climate impact or choose to change service providers. Investors are also shifting their expectations in respect of climate change and a growing number are incorporating climate-related risk considerations into investment decisions.

Conversely, government policies may diverge from consumer and investor preferences and we could be prompted, through policies, taxes and/or regulation, to offer products and services that are inconsistent with those preferences or our market-based capital allocation.

This increased awareness of, and demand for, climate-friendly services and products, as well as more detailed reporting on banks' climate-related risk profile, may inform and influence adjustments to our business and investment strategies.

Reputational risk

Increasingly, investors, customers and stakeholders are calling on financial institutions to take a leadership role in addressing climate-related risks and impacts. Our approach to managing and reporting on climate-related risks and opportunities could result in new or heightened reputational risks for the bank. Indirectly, reputational risks may also emerge as stakeholders look to hold banks responsible for financing clients with operations that are viewed as responsible for negative impacts of climate change.

Monitoring climate risk in our supply chain

Climate-related physical and transition risks may affect our suppliers, which may in turn affect our business relationships. BMO's Sustainable Procurement Program considers current and future suppliers' sustainability performance and risk management, including risks related to climate change. We follow a rigorous supplier selection process to determine which risks could have a substantive financial or strategic impact on our organization. Requests for proposals include a comprehensive set of sustainability questions that seek to provide an understanding of respondents' practices related to environmental and social responsibility, including climate change.

BMO's Sustainability team partners with BMO's Procurement group to better understand our exposure to climate risk in our supply chain. We are using E&S risk data tools such as RepRisk to enhance our monitoring of E&S risk issues affecting our supply chain.

BMO joined CDP Supply Chain (CDP) in 2021 to better understand the environmental impact of our procurement activities and deepen our engagement with select suppliers on climate-related risks and opportunities. In 2022, we doubled the number of suppliers engaged through the program, accounting for approximately 70% of our supplier spend. Through CDP, suppliers provide GHG emissions data and information on their approach to managing climate-related risks and opportunities.

You will find more information about BMO's Sustainable Procurement program in our 2022 Sustainability Report.

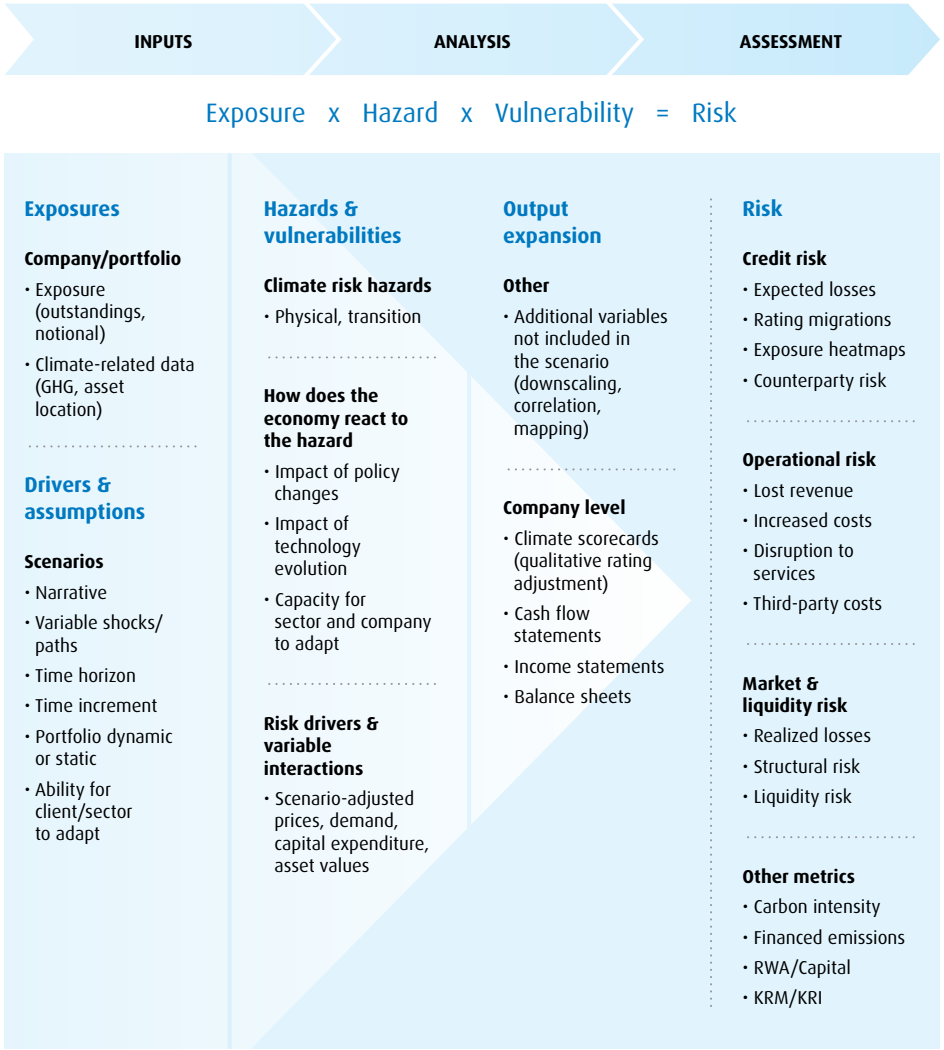
Climate-related scenario analysis

Climate-related scenario analysis can identify and assess the potential implications of a range of plausible future scenarios under conditions of uncertainty. The TCFD recommends that organizations assess the resilience of their strategy, taking into consideration different climate-related scenarios, including a scenario involving a rise in global temperatures of 2°C or less by 2100, where such information is material. Scenarios are hypothetical constructs and are not expected to deliver precise outcomes or forecasts. Instead, scenarios enable organizations to consider how the future might look and how they can prepare for those hypothetical future states.

We have established a climate-related scenario analysis (CSA) framework and program to assess climate-specific vulnerabilities in order to enhance our resilience to climate-related risks, in line with the TCFD recommendations. This program includes the evaluation of both physical and transition risks as transverse drivers that impact our exposure to the other material risks identified in our taxonomy. Analysis is prioritized for portfolios that either have high inherent climate risk exposure or are material portfolios for the bank. Applying scenario analysis to gain a deeper understanding of climate-related risks is a new and continuously evolving discipline within the financial industry and CSA capabilities are evolving in line with internal policies and regulatory requirements. As we enhance our knowledge of climate-related impacts and continue to integrate comprehensive climate-based scenarios, our approach to analyzing these scenarios will evolve as modelling techniques and data availability improve. These efforts will help identify potential material financial risks and may inform our business strategy in relation to climate change going forward.

In 2022, an expanded CSA team within Risk, in collaboration with a working group (consisting of members from our operating groups, other Risk teams, the Sustainability team and Technology & Operations), worked on building out our internal capacity to conduct climate-related scenario analysis. Taking a holistic and multi-disciplinary approach, the working group seeks to promote consistency in design and implement a repeatable climate scenario analysis program, leveraging existing stress testing capabilities and augmented with climate-specific expertise.

Our evolving approach to climate scenario analysis



This approach to scenario analysis has generated quantitative assessments of exposure to transition and physical risks for selected industries, and we continue to widen its scope to include other portfolios and, eventually, to enable an enterprise-wide assessment. Where quantitative analysis is challenging, or inconclusive, we are working to incorporate qualitative overlays. Lessons from previous pilots, as well as evolving industry best practices, are being used to inform this development and expand our analysis to other sectors in our portfolio.

In 2022, we conducted scenario analysis projects to evaluate the transition risk on our London branch portfolio of wholesale loans to the metals and mining sector, the potential impact of physical risks on our Canadian residential mortgages portfolio, and market risk to our trading and underwriting portfolio under a delayed, disorderly transition. We also began work on an exercise related to commercial real estate.

	London Metals & Mining Wholesale Loans	Residential Mortgages	Market Risk	Commercial Real Estate (U.S. & Canada)
Description	Assess sensitivity of the portfolio and individual borrowers to a low-carbon transition	Examining physical risk impacts on the residential mortgage and home equity line of credit (HELOC) portfolio, with a focus on flooding	Assessing impacts of a disorderly transition on trading and underwriting portfolios	Assess exposures in our North American CRE portfolio to specific hazards Phase 2 will extend to assessment of forward-looking potential impacts
Transition risks	Policy | Technology | Market (metals & mining)	Not assessed	Policy | Technology | Market	Not assessed
Physical risks	Not assessed	Flood	Not assessed	Flood, wildfire, extreme wind
Climate scenarios	Short-term Carbon Tax | Long term NGFS Phase 2 (REMIND)	RCP 8.5 90-95th percentile of pathways from an assembly of climate models	Bank of England (BoE) 2021 Climate Biennial Exploratory Scenario: Late Action 2021 BoC-OSFI Pilot Scenario: Below 2°C Delayed	N/A
Time horizon	Short to long-term: 2022-2050	Short and long term (2050)	Instantaneous shock, with impact assessed over a three-month period	Current state
Climate risk metrics	Climate-adjusted probability of default (PD) Credit migration	Portfolio risk: overall and at postal code/ property type granularity	Potential impact on the fair market value of BMO's trading and underwriting portfolios	Percentage of sample portfolio, broken out by property type, vulnerable to physical hazards

2022 scenario analysis on BMO's London branch

The BMO London Branch aligns its climate risk management approach with U.K. regulatory expectations, building on the work plan communicated in 2019 and the analysis performed in 2021. Over the course of 2022, a number of analytical enhancements have allowed a better understanding of client sensitivities to climate risk, focusing on the sectors most at risk in a low-carbon transition. Model enhancements include the on-boarding of the S&P Climate Credit Analysis tool, enabling counterparty and portfolio climate analysis aligned with the Network for Greening the Financial System (NGFS) scenarios. The climate risk approach continues to evolve in line with industry best practice and depends on the availability of complete, accurate and comparable data. This analysis does not represent a forecast and potential impacts are uncertain. Climate risk is embedded in the Branch risk taxonomy and risk appetite, and the CRO Europe has senior management function accountability.

Figure 9: Analysis of the Metals & Mining portfolio

Qualitative analysis	Qualitative analysis was conducted to capture key climate risk indicators at a borrower and portfolio level. Leveraging various sources, such as company reports, Bloomberg, CDP and Climate Action 100+, we gathered a number of indicators sufficient to enable a comparative view of borrowers' climate risk relative to each other and to sector averages. In addition to key climate data points, such as the emissions trend, revenue split, approach to disclosure and decarbonization strategy, external climate risk scoring was also used (MSCI, Sustainalytics). Indicators were aggregated at a portfolio level to allow for trend analysis and to inform target-setting.
Quantitative analysis	Quantitative scenario analysis was conducted to assess the long-term sensitivity of the portfolio and individual borrowers to a low-carbon transition. The portfolio was modelled over the short term (three years) and long term (30 years) using the proprietary S&P CCA model aligned with NGFS orderly, disorderly and current policy scenarios. The scenario analysis provides insights into the impact of changes in various factors, including company financials, credit ratings and probability of default at incremental time periods.

Metrics and Targets

We track and report on opportunities and risks associated with climate change.

We track and report our greenhouse gas (GHG) emissions and carbon-related assets and we organize our GHG emissions metrics and targets using the Greenhouse Gas Protocol. We quantify and disclose our Scope 1, 2 and 3 emissions, and we may also set targets for reducing those emissions. Scope 3 emissions related to our business operations and supply chain include Category 15: Investments, often referred to as financed emissions in the banking context.

In 2021, we significantly expanded our metrics and target-setting when we began to quantify and disclose financed emissions for certain sectors in accordance with the Partnership for Carbon Accounting Financials (PCAF) and its Global GHG Accounting and Reporting Standard for the Financial Industry (the PCAF Standard). We also began to model decarbonization pathways using science-based, credible, low- or no-overshoot climate transition scenarios, with the aim of developing targets and action plans in support of our Climate Ambition. In 2022, we expanded the scope of this work to include additional sectors in our portfolio.

A note about data challenges

While we have higher confidence in certain classes of climate data, such as measurements regarding our operational emissions, the availability of complete, accurate and comparable data is an industry-wide challenge to generating climate-related metrics and analysis. We continue to face significant challenges and complications in quantifying financed emissions with metrics suitable for target-setting, largely because reporting across industry sectors is not yet standardized and in many cases data quality is low or data availability is limited. The financial sector, and the whole economy, needs more high-quality data, including emissions and activity data, to enable decision-useful quantification of financed emissions and target-setting.

Data challenges

We continue to improve the climate-related data that we utilize by partnering with third-party data providers and making investments in our enterprise data analytics initiative (see page 21). Data improvements include building and refining our climate-related data collection, tracking and analysis capabilities. Over time, our investments will result in more complete and timely data to inform ongoing, decision-useful analysis of progress against both risk management and opportunity capture. As the quantity and quality of the data improve, we anticipate that we may periodically restate our baseline emissions and, possibly, our emissions reduction targets. While a lag may occur in the progress made against any recalibrated targets, we are actively striving for better data and modelling capabilities and transparently updating our calculations, as necessary.

To set, track and report on progress toward meeting our emissions reduction targets, Bank of Montreal must rely on production, emissions, financials and other data obtained from clients and third-party sources. Moreover, although we believe these sources to be reliable, we have not independently verified or assessed the assumptions underlying the data we have obtained from these third parties, including our clients, that we use to set, track and report on our progress towards meeting our interim targets, and we cannot guarantee the accuracy of such third-party data or assumptions. Further, our use of this third-party data shall not be taken as an endorsement of the third-party or its data or be construed as granting any form of intellectual property. Certain third-party data, such as Scope 3 emissions and emissions factors, may also change over time as standards, measurement and estimation methodologies evolve. These factors and related uncertainties could have a material effect on our emissions reduction targets and our ability to meet these targets. Additionally, the data needed to define our pathway towards reaching our interim targets may be unavailable, inconsistent, or limited in quality across the sectors we choose to focus on. Given the inherent complexity and uncertainty, and the significant issues with some of the underlying data, estimates, assumptions and judgments, believed to be reasonable at the time of the preparation of this report, may eventually turn out to be inaccurate, and any interim targets set may need to be adjusted.

In the absence of sufficient and high-quality data, we have produced estimates based on assumptions and extrapolations. We have prioritized the best available data in accordance with the PCAF Standard's data hierarchies which score data on a scale of 1-5, where data with a score of 1 is the most certain. While imperfections remain, we have not allowed that to delay implementation of our net-zero strategy. The urgent nature of climate action requires us to make immediate progress on our net-zero commitments.

Use of attribution factors in calculating financed emissions

There are many factors that can influence the financed emissions for a particular sector, including changes in client mix, portfolio size, geographic mix, the emissions and production profile of clients, data quality, and attribution factors (driven by fluctuations in enterprise value). We accounted for our loan's share of borrower emissions by applying an attribution factor calculated, per PCAF, as the outstanding loan amount divided by the sum of total equity and debt (for private companies)[1] or total enterprise value including cash (EVIC; for public companies). When using EVIC as the denominator to attribute emissions, metrics can change with some of the volatility due to fluctuating market prices. This market volatility can potentially drive changes to a financial institution's financed emissions, independent of a lender's activities and a borrower's actual emissions performance, and thereby impact the usefulness of year over year comparisons and trends.

This is an issue with the PCAF methodology that is recognized by other market participants and is not unique to BMO.

[1] For private companies if total debt or total equity could not be obtained we used the total balance sheet value (i.e., the sum of total equity and liabilities, which is equal to the client's total assets), as per the PCAF Standard.

Operational greenhouse gas (GHG) emissions

Scope 1 | 2 | 3 categories 5 and 6

Understanding the environmental impact of our operations is important in our transition to a net-zero world. We focus on reducing our energy use and associated GHG emissions with an enterprise-wide energy management plan that includes operational efficiency improvements and capital upgrades to our buildings.

Proudly carbon neutral in our own operations since 2010, in 2020, we reached our goal of matching 100% of our global electricity use with investments in renewal energy certificates. We have set a target, utilizing science-based approaches, of a 30% reduction in our operational Scope 1 and Scope 2 GHG emissions by 2030 from a 2019 baseline.

We use the following environmental indicators to track and manage our GHG emissions. In 2022, we surpassed our 2030 target, due in part to the implementation of improved cooling efficiency initiatives in our data centres, and largely attributable to COVID-19 related remote working conditions. A return to the office could add to our emissions in future years, but we will continue to target a 30% reduction from 2019 baseline. The results of our performance in terms of GHG emissions are verified each year by a third-party.

Figure 10: BMO's GHG emissions intensity (Scope 1 and 2)

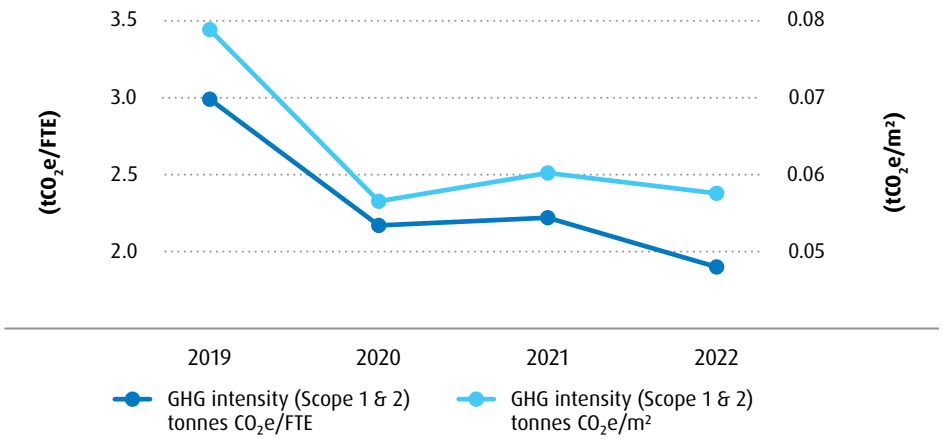


Figure 11: BMO's operational GHG emissions data	2022[1]	2021[2]	2020	2019	Target
GHG emissions from fuel (tCO_2e) (Scope 1)	**34,083**	33,661	31,621	45,672	30% reduction by 2030 from 2019 baseline
GHG emissions from electricity and steam (tCO_2e) (Scope 2 location-based)	**54,788**	63,634	62,661	90,457	
GHG emissions from electricity and steam (tCO_2e) (Scope 2 market-based)	**295**	88	242	544	
GHG emissions from waste generated in operations (tCO_2e) (Scope 3 category 5)[3]	**667**	1,047	676	982	
GHG emissions from business travel (tCO_2e) (Scope 3 category 6)[4]	**6,297**	1,919	7,778	24,655	
Total operational GHG emissions (tCO_2e)	**95,835**	100,261	102,736	161,766	
Carbon credits retired (tCO_2e)	**41,342**	36,715	40,317	71,853	Carbon neutral operations annually
GHG reductions from renewable energy credits purchased (tCO_2e)	**54,493**	63,546	62,419	89,913	
Net operational GHG emissions (tCO_2e)	**0**	0	0	0	100% annually
Global electricity use procured from renewable sources	**100%**	100%	100%	100%	100% annually

[1] An independent third party, Morrison Hershfield, has provided reasonable assurance for all of BMO's Scope 1 and Scope 2 emissions and some of Scope 3 emissions. The verification statement can be found on our website.

[2] In 2021, we shifted the time period of our operational emissions calculations in order to accelerate disclosure. Energy consumption and GHG emissions reported for 2021 reflect the period from August 1, 2020 to July 31, 2021. We did not restate results for prior years, which were calculated based on our fiscal year. All results reflect 12 months of operations and are comparable. We retained this time period in 2022.

[3] Scope 3 category 5 emissions include indirect GHG emissions from BMO's solid waste sent to municipal landfills (North America only).

[4] Scope 3 category 6 emissions include indirect GHG emissions from employee business travel in non-company owned assets.

Financed emissions

Scope 3 category 15

Financed emissions are GHG emissions of our clients that are attributable to BMO. They are a significant contributor to Scope 3 value chain emissions, and we are committed to aligning GHG emissions from our financing with the transition to a net-zero world.

In 2021, we began to quantify the GHG emissions associated with our lending activities in accordance with the PCAF Standard for those sectors in our portfolio where climate impacts are concentrated, where we have significant lending exposure, where sufficient data was available, and where we are seeing stakeholder interest. This included our lending to companies operating in the global upstream oil and gas, Canadian power generation, Canadian personal vehicle lending and Canadian residential mortgage portfolios. We also modelled decarbonization pathways for select sectors in our portfolio and developed an approach to target-setting that is aligned with the UNEP FI Guidelines for Climate Target Setting for Banks (the UNEP FI Guidelines) (see Figure 12). We set intermediate targets for sectors with sufficiently reliable data and methodologies. In line with our NZBA commitment, we have disclosed our annual financed emissions and progress on reaching the targets we set in 2021 in the Appendix to this report.

The NZBA also requires that signatories publish a high-level transition plan with an overview of the categories of actions expected to be undertaken to meet their targets and an approximate timeline. BMO's Sustainability team, the BMO Climate Institute and Enterprise Risk are working with our lines of business and external stakeholders – including governments – to understand, develop and implement strategies and actions that will enable us to make progress on reaching our financed emissions reduction targets. These strategies and actions have been documented in a board-level reviewed transition plan, and a summary for each of the sectors for which we have established targets can be found in the Appendix of this report. Banks, including BMO, cannot align their portfolios with net-zero outcomes in isolation. Reaching those outcomes depends on coordinated efforts between the public and private sectors, and our initiatives and action plans reflect this.

Figure 12: Characteristics of our target-setting approach

Sector-specific

We used a sector-based approach to identify best available data in accordance with PCAF's data quality hierarchies and baseline metrics to help us understand sector-specific decarbonization pathways. This will enable us to support our clients in their transition, deliver on our Climate Ambition and influence emissions reduction in the real economy.

Science-based and practical

Where possible, we benchmark our portfolio sector emissions and/or carbon intensity against the sectoral and/or geographic emissions pathways that science-based climate scenarios suggest would be needed to achieve a net-zero world by 2050. We evaluate those pathways in the context of industry decarbonization commitments, government policy and our understanding of the technologies available to support decarbonization and the feasibility of their implementation, based on road maps that consider economic and commercial readiness.

Widely accepted metrics

We emphasize physical carbon intensity (tonnes of carbon dioxide emissions normalized by a unit of output specific to the sector) for target-setting because it aligns with the Sectoral Decarbonization Approach of the Science-Based Targets Initiative, allows for easier comparison within sectors and between clients of different sizes, aligns with the requirements of the NZBA, and allows for growth of sectors that are providing material inputs critical for the net-zero transition. We supplement our analysis of physical carbon intensity with metrics that reflect the actions needed to drive sectoral carbon intensity reductions, such as technology alignment.

Adaptable based on data availability

Significant challenges and complications in quantifying financed emissions and target-setting remain. In these cases, we have produced estimates based on assumptions and extrapolations, using the best available data. We expect our baselines to evolve and be restated as data availability and quality improve. We also expect to update and restate our decarbonization pathway modelling as climate models, scenarios and methodologies evolve in line with climate science, and as country-specific pathways and scenarios become available.

In 2022, we advanced our financed emissions and decarbonization pathway modelling as described below. We analyzed financed emissions at the total portfolio level for business and government lending at a data quality 5 to understand concentrations of financed emissions and track progress towards 2030. We also developed sector-specific approaches for carbon-intensive sectors in our portfolio as identified in the UNEP FI Guidelines. These include: iron and steel production, aluminum production, cement manufacturing, and agriculture.

Our financed emissions analysis to date has focused on on-balance sheet lending activities, in alignment with the PCAF Standard. We acknowledge the role we play in facilitating emissions through off-balance sheet transactions, however, we have not yet begun accounting for "facilitated emissions" due to methodological complexity. We recognize the release of the PCAF Proposed Methodology for Facilitated Emissions and are evaluating its application to our financing activities.

Calculating financed emissions is an evolving process and we anticipate improvements to estimation methodologies, data capture, and data sourcing as these processes mature. Due to the evolving nature of these processes, significant volatility may be found in potential restatements of historical results and year-over-year comparisons. These potential restatements could be driven by our clients enhancing their reporting, corporate actions such as mergers and acquisitions, updated estimation methodologies and emissions estimations, as well as revisions to data sources, as improved data sources are identified. For example, our calculations use the best available emissions and production information, and exposures may vary between clients whose emissions we have to estimate, and clients who report their own emissions. As climate-related regulations are enacted and as greater numbers of companies begin to report emissions data, some clients may report emissions and production information for previous years, and this could impact our calculations for those years and year-over-year results.

An additional challenge related to our financed emissions reporting is that a change in enterprise value for a public client could impact the attributed emissions, even without a change in the client's emissions or our financing activity, and this could impact year-over-year results. For example, all else equal, a reduction in enterprise value for a public company would result in higher attributed emissions. We are monitoring for potential solutions to address this issue. For more information on data challenges see page 35 of this report.

Business and government lending portfolio analysis

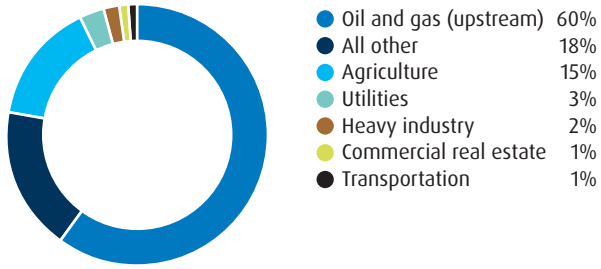
As a signatory to PCAF, we have committed to measure and disclose the GHG emissions associated with our portfolio of loans, investments and other financial products and services using GHG accounting methodologies. We began quantifying the GHG emissions associated with our lending activities in 2021, focusing on sectors and stages in those sectors' value chains where climate impacts are concentrated, where we have significant lending exposure, where sufficient data was available, and where we are seeing stakeholder interest.

In 2022, we expanded upon this analysis and assessed the Scope 1 and 2 emissions associated with our business and government lending portfolio,[1] using the PCAF methodology for business loans. This analysis includes our business banking, commercial banking and capital markets lending activity, including project finance loans as at the end of fiscal year 2020. The portfolio emissions are calculated based on our business and government loans outstanding as at October 31, 2020 and at a PCAF Data Quality Score of 5 using sectoral and geographic emission factors sourced from the PCAF emission factor database. Financed emissions calculated using PCAF emission factors may be materially different from financed emissions calculated using actual reported data.

The results are intended to provide a directional indication of portfolio emissions as there are significant limitations in data quality and availability for most sectors.

The analysis of financed emissions for 2020 using PCAF Data Quality Score of 5 indicates that the top three sectors contributing to our financed emissions are oil and gas, agriculture, and utilities as shown in Figure 13. Next year we plan to show progress on financed emissions based on this analysis. In 2021, our work on quantifying sectoral financed emissions included our oil and gas upstream portfolio and our Canadian power generation portfolio. The approach and methodology for these sectors was discussed in the 2021 Climate Report. This work was expanded in 2022 to include a sectoral analysis of our agriculture portfolio, as well as our iron and steel, aluminum, and cement portfolios. The following section provides information on this sectoral analysis.

Figure 13: Business and government lending portfolio – 2020 financed emissions profile (Scope 1 and 2)*



*All other represents sectors for which financed emissions and decarbonization pathways have not been prioritized or specifically modelled by BMO. Heavy industry represents iron and steel production, aluminum production, cement manufacturing.

Sectoral analyses and decarbonization pathway modelling

In 2022, we expanded the scope of our sectoral financed emissions and decarbonization pathway modelling (building on what had been done in 2021) to include additional carbon-intensive sectors as identified in the UNEP FI Guidelines for Target Setting for Banks. These include: iron and steel production, aluminum production, cement manufacturing, and agriculture. In 2023, we intend to analyze commercial real estate and commercial transportation. Our approach to baseline quantification, decarbonization pathway modelling and target-setting are described below. By the end of 2023 we expect to have quantified sectoral emissions representing over 80% of lending portfolio emissions as indicated by the business and government lending portfolio analysis discussed above. This will represent a significant majority of financed emissions of high-carbon-intensive sectors under the NZBA framework.

[1] To date, our financed emissions analysis focuses on on-balance sheet lending activities, in alignment with the PCAF Standard.

Iron and steel

The steel industry is currently one of the three largest industrial emitters of carbon dioxide globally.[1] Iron and steel represents a very small portion of BMO's lending activity, but we have undertaken an analysis of the sector due to its importance in the global economy. In science-based climate scenarios aligned with a net-zero outcome, demand for steel is expected to grow during the decades before 2050 to support the required expansion of energy-related infrastructure, notably renewable electricity generation and transport infrastructure.[2] Decarbonization of the steel production process is therefore an important objective to achieving economy-wide net-zero emissions.

Our baseline calculation for iron and steel:

- includes our global portfolio of iron and steel producers, identified as borrowers operating in the following NAICS[3] codes: iron and steel mills and ferro-alloy manufacturing, iron foundries, steel investment foundries, and steel foundries (other than investment).
- calculates Scope 1 and 2 CO_2 emissions from energy used in operations and process-related emissions during the iron production process.
- is based on emissions estimated in accordance with the PCAF Standard approach for business loans and a data hierarchy based on availability:
  - we sourced publicly disclosed emissions data for 44% of the portfolio
  - in the absence of emissions data, we sourced steel production volume data for 50% of the portfolio and estimated emissions using average PCAF activity-based emission factors for the following steel-making methods: basic oxygen furnace, open hearth furnace, and electric arc furnace for scrap metal for Scope 1, and in some cases leveraged physical emission intensities from decarbonization pathways for Scope 2
  - in the absence of production data, we estimated emissions using PCAF economic-based emission factors per million dollars of revenue, or per million dollars of outstanding loans, depending on available data.

Company-disclosed emissions data is not always comparable or externally assured, and there is the risk that the data may be incorrect. As well, emission factors are based on averages and could diverge from actual company emissions profiles if that data were known.

We accounted for our share of borrower emissions by applying an attribution factor calculated as the outstanding loan amount divided by the sum of total equity and debt (for private companies)[4] or total enterprise value, including cash (for public companies) as per the PCAF Standard.

We calculated the PCAF data quality of the portfolio as the average data quality score assigned to each borrower, weighted by outstanding loan amounts.

Our analysis covers the 2020 fiscal year, since company-disclosed emissions and production data were not yet available for 2021.

The scenarios show a 20%-74% reduction in absolute emissions (see Figure 16) and a 23%-77% reduction in emissions intensity (tCO_2/tonne of steel produced) (see Figure 17) for the sector by 2030, in order to achieve a pathway aligned with net-zero. The rate of decarbonization varies by scenario based on assumptions regarding the timing and extent of uptake of partial hydrogen injection into commercial blast furnaces and hydrogen-based reduced iron facilities; and scrap-based production and process electrification, paired with increased electricity generation capacity and decarbonization of the electrical grid. Some emissions from the iron and steel sector remain by 2050 in all scenarios.

Figure 14: Iron and steel financed emissions summary

	2020
Loans outstanding ($M)	263.9
Scope 1 and 2	
Financed emissions ($ktCO_2e$)	413
Portfolio PCAF data quality score	2.6
Economic emissions intensity (tCO_2e/$ millions of loans outstanding)	1,563

Data sources:
- Internal Risk Rating Tool
- S&P Trucost Capital IQ
- PCAF emission factor database
- Publicly available disclosures
- Decarbonization scenarios

Figure 15: Iron and steel data quality scoring methodology

Source of emissions data	Data quality score
Publicly disclosed without third-party assurance	2
Estimated using steel production data	3
Estimated using emissions per million dollars of revenue	4
Estimated using emissions per million dollars of outstanding loan amounts	5

Climate scenarios and decarbonization pathway modelling

We assessed decarbonization pathways for the iron and steel sector from the following climate scenarios aligned with a net-zero outcome:

Climate scenario	Scale	Assumptions
IEA – Energy Technology Perspectives 2020 Sustainable Development Scenario (IEA ETP)	Global	No dependence on unforeseen breakthrough technologies. Takes into account already established policies. Pathways may differ from what would be most cost-effective.
IEA – Net Zero Emissions (IEA NZE)	Global	Orderly transition across energy sector – ensuring security of fuel and electricity supplies at all times.
One Earth Climate Model 1.5 Pathway (OECM 1.5)	North America	Avoids a carbon budget overshoot and expands natural carbon sinks to achieve negative emissions and to compensate for the process-related emissions that are currently unavoidable with available technologies.

[1] Source: McKinsey.

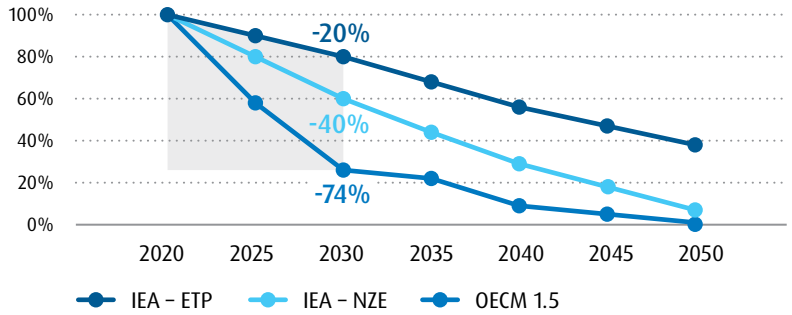
[2] Source: IEA,and One Earth Climate Model (OECM), United Nations Environment – Finance Initiative

[3] NAICS is an abbreviation for the North American Industry Classification System, a standard used to classify business activities.

[4] For private companies if total debt or total equity could not be obtained we used the total balance sheet value (i.e., the sum of total equity and liabilities or total assets), as per the PCAF Standard.

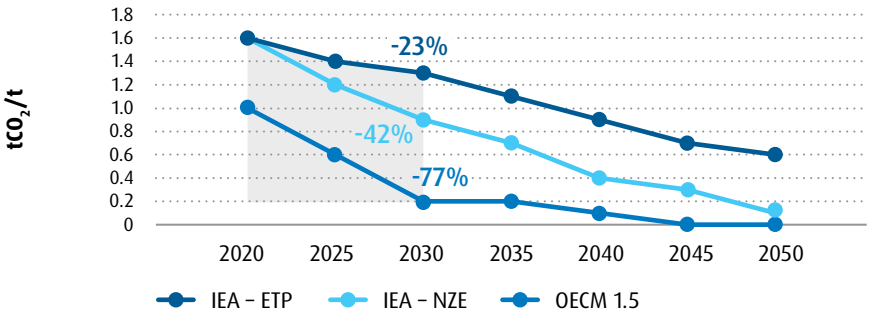
Our exposure to the iron and steel sector is $264 million, or 0.1% of loans outstanding in 2020. As most of the companies in our loan portfolio are private, there is insufficient emissions and production data available. The quantification of our financed emissions and physical intensities therefore is largely based on estimates and we are unable to derive an accurate physical emissions intensity for the portfolio.

Figure 16: Iron and steel production Scope 1 and 2 absolute emissions reduction pathways



As we are unable to accurately track emission reductions for our iron and steel portfolio, we have not set a reduction target. Evolving data quality and availability, methodologies and scenarios may allow us to update our analysis and approach in the future. In the meantime, we remain committed to actions that can help the sector reduce GHG emissions in-line with a net-zero pathway.

Figure 17: Iron and steel production Scope 1 and 2 emissions intensity pathways
(tCO_2/tonne of steel produced)



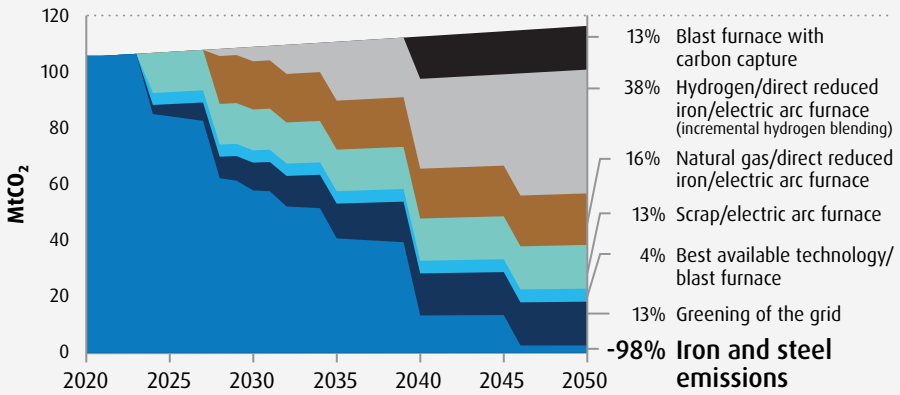
Iron and Steel Decarbonization Roadmap

In 2022, the BMO Climate Institute, with support from SINAI Technologies, conducted an analysis of decarbonization opportunities for North American iron and steel production to assess the technological and commercial viability of achieving a net-zero sector. Figure 18 illustrates that, while Paris-aligned decarbonization for iron and steel production is technologically feasible, it is not yet commercially viable. Achieving a net-zero pathway, therefore, will require innovative financing structures that provide a blend of capital from the public, corporate, and finance sector to advance solutions that are not currently economical. From a technology perspective, the sector could realize a reduction in emissions of between 90-100% by 2050, primarily through transitioning to electric arc furnaces (EAF), using green hydrogen-based direct reduced iron (DRI). Where a transition to EAFs is not feasible, blast furnace carbon capture could be utilitized to achieve the remaining reductions needed for net-zero. This net-zero roadmap, however, is dependent on the U.S. and Canada advancing three key initiatives:

1. Increase the domestic supply of scrap metal and high-grade iron ore as critical feedstock for the DRI-EAF process. Increasing the supply of these materials will be constrained by permitting and approval delays associated with iron ore mining development. Both countries will also require incentives for steel producers to switch from lower cost and higher emitting iron, which is imported from countries that not only have a higher emission footprint per tonne of material produced, but also contain geopolitical risks.
2. Transition to a 100% renewable power grid by 2035 to ensure that DRI-EAF facilities are drawing from zero-emitting power sources. Electrifying Canada, an initiative the BMO Climate Institute co-chaired, concluded that Canada's electricity system will require at least a doubling of total clean electricity supply by 2050 to meet the power needs of industrial process electrification.
3. Improve the economics of hydrogen and carbon capture. Cost-competitive hydrogen production will be required between 2030 and 2040 to replace natural gas as a reducing agent in EAFs. Carbon capture will then need to scale in 2040-2050 to abate remaining emissions.

Given North America's abundant iron ore potential and green energy supply, we see tremendous opportunity for iron and steel producers to become global leaders in low-carbon steel. Through 2023, the BMO Climate Institute will continue to explore and share insights into the investments, policies and value chains required to accelerate commercial and technological readiness of solutions and how we can support BMO's business teams in creating investible decarbonization opportunities for our clients.

Figure 18: Decarbonization roadmap for upstream and downstream steelmaking (Scope 1, 2 and 3 emissions, excluding iron ore mining)



Aluminum

Primary aluminum production is highly energy-intensive. Aluminum currently comprises over 2% of global emissions [1] and plays a key role in the energy transition as an input to solar panels, mounting structures, wind turbines, EV light-weighting, and electrical applications. As the North American refining/smelting market will likely remain a fundamental part of the energy transition and electric vehicle manufacturing in the long-term, it is crucial to advance and accelerate decarbonization in this sector.

Demand for aluminum is expected to grow leading up to 2050, in line with economic growth, greater urbanization and related infrastructure, and rising demand for aluminum products used in low-carbon solutions such as lightweight vehicles and solar energy installations. Decarbonizing the sector will rely on a transition to more secondary production from scrap aluminum, which requires approximately one-tenth of the energy of primary production and does not generate process-related emissions. The availability of scrap aluminum will put an upper limit on the potential for secondary production.[2] Since electricity makes up a large share of the sector's energy demand, decarbonization of the electrical grid is an important factor.

Our baseline calculation for aluminum:

- includes our global portfolio of aluminum producers, identified as borrowers operating in the following NAICS Codes: alumina refining and primary aluminum production, and secondary smelting and alloying of aluminum.
- calculates Scope 1 and 2 CO_2 emissions from energy used in operations and process-related emissions from primary aluminum smelting.
- is based on emissions estimated in accordance with the PCAF Standard approach for business loans and a data hierarchy based on availability:
  - in the absence of any publicly disclosed emissions data, we sourced aluminum production volume data for 34% of the portfolio and estimated emissions using PCAF activity-based emission factors, and in some cases leveraged physical emission intensities from decarbonization pathways for Scope 2.
  - in the absence of production data, we estimated emissions using PCAF economic-based emission factors per million dollars of revenue, or per million dollars of outstanding loans, depending on available data.

We acknowledge that emission factors are based on averages and could diverge from actual company emissions profiles if that data were known.

We accounted for our loan's share of borrower emissions by applying an attribution factor calculated as the outstanding loan amount divided by the sum of total equity and debt (for private companies) [3] or total enterprise value, including cash (for public companies) as per the PCAF Standard.

We calculated the PCAF data quality of the portfolio as the average data quality score assigned to each borrower, weighted by outstanding loan value.

We have not been able to calculate a physical emissions intensity for this portfolio due to a lack of reported emissions and production data.

Our analysis covers fiscal year 2020 since sufficient 2021 data was not yet available.

Figure 19: Aluminum financed emissions summary

	2020
Loans outstanding ($M)	155.9
Scope 1 and 2	
Financed emissions ($ktCO_2e$)	482
Portfolio PCAF data quality score	4.2
Economic emissions intensity (tCO_2e/$ millions of loans outstanding)	3,090

Data sources:
- Internal Risk Rating Tool
- S&P Trucost Capital IQ
- PCAF emission factor database
- Decarbonization scenarios

Figure 20: Aluminum data quality scoring methodology

Source of emissions data	Data quality score
Estimated using aluminum production data	3
Estimated using emissions per million dollars of revenue	4
Estimated using emissions per million dollars of outstanding loan amounts	5

Climate scenarios and decarbonization pathway modelling

We assessed decarbonization pathways for the aluminum sector from the following climate scenarios aligned with a net-zero outcome:

Climate scenario	Scale	Assumptions
IEA – Energy Technology Perspectives 2020 Sustainable Development Scenario (IEA ETP)	Global	No dependence on unforeseen breakthrough technologies. Takes into account already established policies. Pathways may differ from what would be most cost-effective.
One Earth Climate Model 1.5 Pathway (OECM 1.5)	North America	Avoids a carbon budget overshoot and expands natural carbon sinks to achieve negative emissions and to compensate for process-related emissions that are currently unavoidable with available technologies.
International Aluminum Institute 1.5C (IAI 1.5) (Based on IEA NZE) [4]	Global	Orderly transition across energy sector – ensuring security of fuel and electricity supplies at all times. Almost no aluminum is lost to landfills or incinerators due to better collection systems by 2050, product lifetimes are extended and demand is in line with the needs of net-zero societies.

[1] Source: World Economic Forum.

[2] Sources: IAI; IEA.

[3] For private companies if total debt or total equity could not be obtained we used the total balance sheet value (i.e., the sum of total equity and liabilities, which is equal to the client's total assets), as per the PCAF Standard.

[4] The IEA NZE scenario was not modelled as it does not have pathways for aluminum. The IAI 1.5 scenario was developed based on IEA NZE energy data.

The scenarios show a 23%-64% reduction in absolute emissions (see Figure 21) and a 20%-67% reduction in emissions intensity (tCO_2/tonne of aluminum produced) (see Figure 22) for the sector by 2030 in order to achieve a pathway to net-zero. Some emissions from the aluminum sector remain by 2050 in all scenarios. The rate of decarbonization varies by scenario based on assumptions made regarding the timing and extent of integration of secondary production, which is dependent on better scrap collection and sorting. The IAI 1.5 scenario projects the lowest absolute reduction in emissions and the lowest emissions intensity by 2050, as it assumes almost no aluminum is lost to landfills or incinerators after 2035 due to better collection systems. More than half of emissions from aluminum production are associated with the generation of electricity used during the smelting process, so in all scenarios, decarbonization is dependent on process electrification, paired with increased electricity generation capacity and decarbonization of the electrical grid.

Our exposure to the aluminum sector was $156 million or less than 0.1% of loans outstanding in 2020. Most of the companies in our loan portfolio are private and there is insufficient emissions and production data available. The quantification of our financed emissions and physical intensities, therefore, is largely based on estimates and we are unable to derive an accurate physical emissions intensity for the portfolio. As we are unable to accurately track emission reductions for our aluminum portfolio, we have not set a reduction target. Evolving data quality and availability, methodologies and scenarios may allow us to update our analysis and approach in the future. In the meantime, we remain committed to actions that can help the sector reduce GHG emissions in line with a net-zero pathway.

Figure 21: Aluminum production Scope 1 and 2 absolute emissions reduction pathways

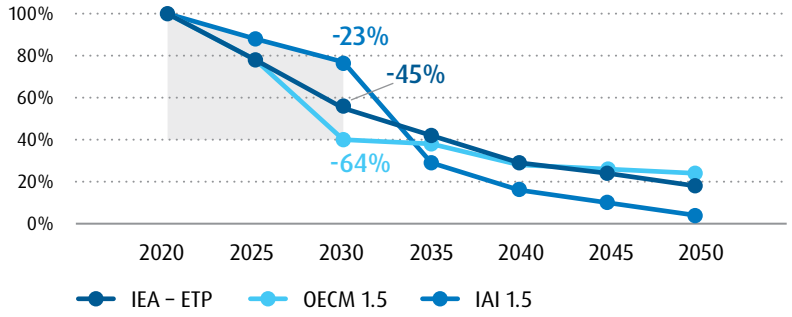
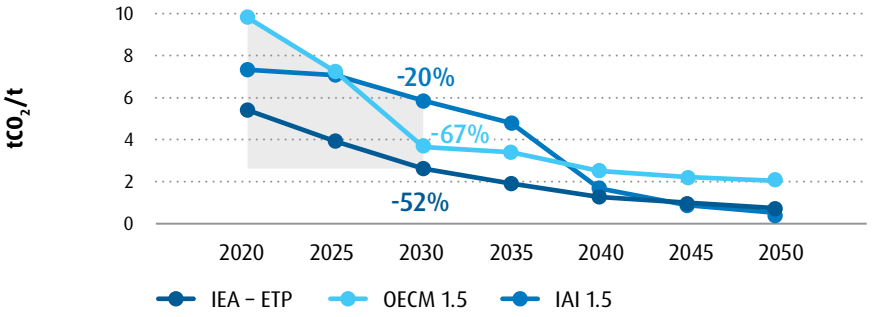


Figure 22: Aluminum production Scope 1 and 2 emissions intensity pathways
(tCO_2/tonne of aluminum produced)



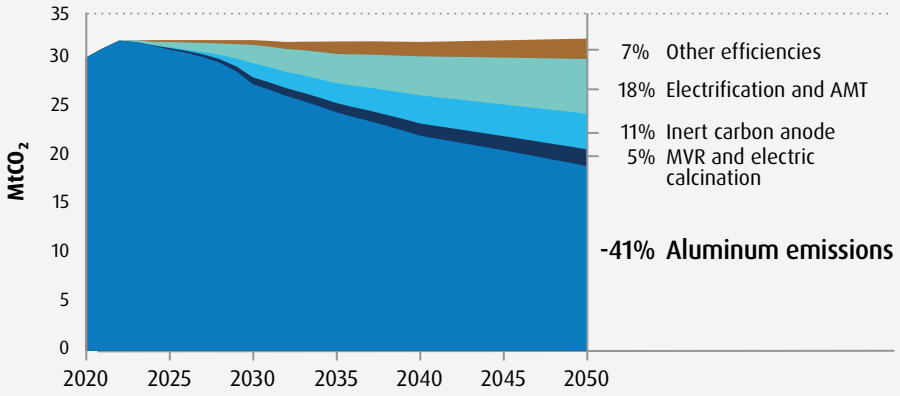
Decarbonization Roadmap for Aluminum

In 2022, the BMO Climate Institute, with support from Wood Mackenzie[1], conducted an analysis of decarbonization opportunities for aluminum production to assess the technological and commercial viability of achieving a net-zero sector. Figure 23 illustrates that there is no one single technology to reduce GHG emissions in aluminum production. As electricity consumption is the main driver of emissions in the sector, our analysis indicates that aluminum could see a potential 40% reduction in emissions by 2050 in North America, primarily through access to clean electricity. Over half of the total emissions reduction opportunities identified, including electrolysis, mechanical vapor recompression (MVR), electric calcination, smelting electrification (from coal to renewables and gas), and ampere moderation technology (AMT), will require access to more zero emitting electricity than currently exists today. While North America has a relatively clean grid compared to the rest of the world, electrification will require at least a doubling of Canada's total clean electricity supply over the next 30 years to support industrial electrification.

Achieving a deeper level of reductions to approximately 70% will require rapid advancement in the technology and commercial readiness of other high abatement potential solutions in the aluminum sector. The acceleration of inert carbon anodes through industry and government collaborations such as the ground-breaking partnership in Project ELYSIS between Alcoa, Rio Tinto, and Apple, along with the governments of Canada and Quebec, should be prioritized to achieve direct emissions reduction from smelting. We are also evaluating the role of inert wettable cathodes, multipolar cells, and hydrogen fuel refining for deeper GHG reductions in smelting and refining. Like most of heavy industry, carbon capture technologies continue to be a key enabler for net-zero by removing remaining emissions.

Through 2023, the BMO Climate Institute will continue to explore and share insights into the investments, policies and value chains required to unlock these solutions at scale and ensure our clients can access and leverage decarbonization opportunities to achieve their own net-zero strategies.

Figure 23: Decarbonization roadmap for the aluminum sector (Scope 1 and 2)



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Cement

Globally, cement is the second-largest emitter of carbon dioxide and the third-largest industrial consumer.[1] The sector represents approximately 7% of global GHG emissions and is expected to grow with continued use of construction materials.[1]

Cement is one of the more challenging sectors within heavy industry to decarbonize due to the significant amounts of thermal energy required in the creation of clinker, which comprises 80% of emissions in the value chain.[2] This challenge presents a potential barrier in achieving net-zero in the built environment as cement is one of the most widely used commodities.

Our baseline calculation for cement:

- includes our global portfolio of cement manufacturers, identified as borrowers operating in the following NAICS codes: cement manufacturing, and gypsum product manufacturing.
- calculates Scope 1 and 2 CO_2 emissions from energy used in operations and process-related emissions from the release of CO_2 during the calcination of limestone.
- is based on emissions estimated in accordance with the PCAF Standard approach for business loans and a data hierarchy based on availability:
  - in the absence of publicly disclosed emissions data, we sourced cement production volume data for 62% of the portfolio and estimated emissions using PCAF activity-based emission factors, and in some cases leveraged physical emission intensities from decarbonization pathways for Scope 2.
  - in the absence of production data, we estimated emissions using PCAF economic-based emission factors per million dollars of revenue, or per million dollars of outstanding loans, depending on available data.

We acknowledge that emission factors are based on averages and could diverge from actual company emissions profiles if that data were known.

We accounted for our share of borrower emissions by applying an attribution factor calculated as the outstanding loan amount divided by the sum of total equity and debt (for private companies)[3] or total enterprise value, including cash (for public companies) as per the PCAF Standard.

We calculated the PCAF data quality of the portfolio as the average data quality score assigned to each borrower, weighted by outstanding loan amounts.

We have not been able to calculate a physical emissions intensity for this portfolio due to a lack of reported emissions and production data for clients in this portfolio.

Our analysis covers the 2020 fiscal year since sufficient data was not yet available for 2021.

Figure 24: Cement financed emissions summary

	2020
Loans outstanding ($M)	193.4
Scope 1 and 2	
Financed emissions ($ktCO_2$)	362
Portfolio PCAF data quality score	3.4
Economic emissions intensity (tCO_2/$ millions of loans outstanding)	1,870

Data sources:
- Internal Risk Rating Tool
- S&P Trucost Capital IQ
- PCAF emission factor database
- Decarbonization scenarios

Figure 25: Cement data quality scoring methodology

Source of emissions data	Data quality score
Estimated using cement production data	3
Estimated using emissions per million dollars of revenue	4
Estimated using emissions per million dollars of outstanding loan amounts	5

[1] Source: SBTi.

[2] Source: Analysis conducted by Wood Mackenzie on behalf of the BMO Climate Institute

[3] For private companies if total debt or total equity could not be obtained we used the total balance sheet value (i.e., the sum of total equity and liabilities, which is equal to the client's total assets), as per the PCAF Standard.

Climate scenarios and decarbonization pathway modelling

We assessed decarbonization pathways for the cement sector from the following climate scenarios aligned with a net-zero outcome:

Climate scenario	Scale	Assumptions
IEA – Energy Technology Perspectives 2020 Sustainable Development Scenario (IEA ETP)	Global	No dependence on unforeseen breakthrough technologies. Takes into account already established policies. Pathways may differ from what would be most cost-effective.
IEA – Net-zero Emissions (IEA NZE)	Global	Orderly transition across energy sector – ensuring security of fuel and electricity supplies at all times.
One Earth Climate Model 1.5 Pathway (OECM 1.5)	North America	Avoids a carbon budget overshoot and expands natural carbon sinks to achieve negative emissions and to compensate for process-related emissions that are currently unavoidable with available technologies.

The scenarios show a 17%-33% reduction in absolute emissions (see Figure 26) and an 18%-39% reduction in emissions intensity ($MtCO_2$/Mt of cement produced) (see Figure 27) for the sector by 2030. The rate of decarbonization varies by scenario based on assumptions made regarding the timing and extent of uptake of blended cement, reductions in the clinker-to-cement ratio and deployment of innovative technologies such as carbon capture, utilization and storage (CCUS). Some emissions from the cement sector remain by 2050 in all scenarios.

BMO's lending exposure to the cement sector was $193 million or less than 0.1% of loans outstanding in 2020. Most of the companies in our loan portfolio are private and there is insufficient emissions and production data available. The quantification of our financed emissions and physical intensities is largely based on estimates and we are unable to derive an accurate physical emissions intensity for the portfolio. As we are unable to accurately track emission reductions for our cement portfolio, we have not set a reduction target. Evolving data quality and availability, methodologies and scenarios may allow us to update our analysis and approach in the future. In the meantime, we remain committed to actions that can help the sector reduce GHG emissions in line with a net-zero pathway.

Figure 26: Cement production Scope 1 and 2 absolute emissions reduction pathways

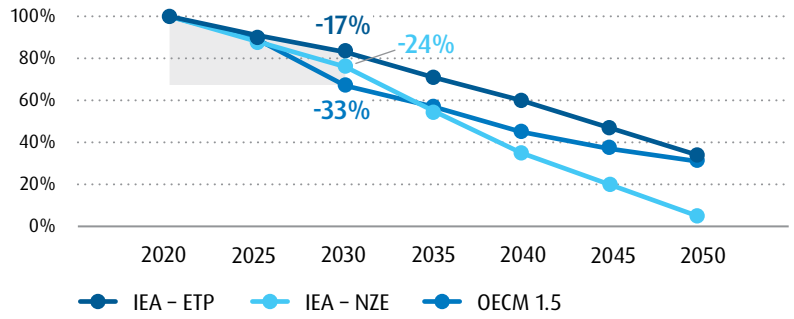
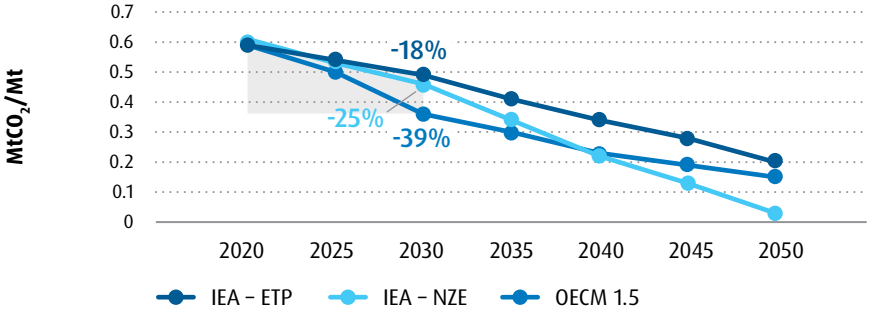


Figure 27: Cement production Scope 1 and 2 emissions intensity pathways
($MtCO_2$/megatonne of cement produced)



Decarbonization Roadmap for Cement

The BMO Climate Institute, with support from Wood Mackenzie[1], conducted an analysis of decarbonization opportunities for the North American cement sector to assess the technological and commercial viability of achieving net-zero. Figure 28 illustrates abatement opportunities for the sector to 2050. Our evaluation of these opportunities considered abatement potential, costs, commercial readiness, technological maturity, and policy support. Decarbonization of the cement industry is challenging due to the clinker production process, which requires significant amounts of thermal energy and produces emissions-intensive chemical reactions. Reducing the amount of clinker required to manufacture cement is likely to be the primary focus area of large-scale cement decarbonization, alongside the application of carbon capture technologies. While cement is a small part of our own lending, it is an important material for the entire global economy. The roadmap we have developed will help us to identify those decarbonization technologies that are technologically and commercially viable today and those that require targeted policy or investment support to improve their technological and commercial readiness.

Our analysis illustrates that successful commercialization of high-impact technologies could help the cement industry lower Scope 1 and 2 emissions by up to 86% (70% if including Scope 3). Due to the reliance on heating limestone to produce clinker, the primary decarbonization technology for the sector will be amine-based carbon capture.[2] While this technology is one of the more mature carbon capture technologies, its current high incremental costs make it commercially unviable.

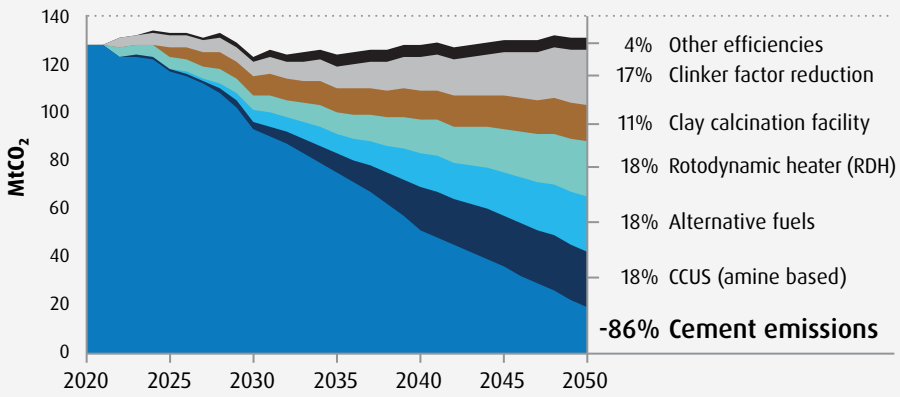
Alternative fuels to replace traditional thermal fuel sources in the kiln are also high-impact solutions that could be scaled, ranging from biomass to tired and refused derived fuels, or a proof in concept solution such as hydrogen-fuelled kilns that require more targeted R&D and policy clarity, along with a significant reduction in cost. Other technology profiles that could be leveraged include rotodynamic heaters (RDH), which use electricity to heat clinker kilns. Electrification, however, faces the same challenge as other industrial sectors, namely the availability of clean electricity at the levels required. RDH would be a large user of clean electricity. Alternatives to clinker include clay calcination, which could allow cement producers to replace up to 30% of limestone-based clinker. Current limitations of clay calcination include high capital and infrastructure costs.

When evaluating the practical implementation of a net-zero pathway, the BMO Climate Institute identified several industry and government enablers to help advance these technologies:

1. Informing policy to help promote pilot projects. Cement has less decarbonization solutions on the market compared to other industrial sectors. Government support to ensure a steady pipeline of pilot projects can help companies ensure their solutions are quickly and efficiently tested, scaled, or reinvented as required to keep cement on pace with a net-zero pathway.
2. Increasing government-funded R&D, particularly in areas of clinker factor reduction and carbon capture, utilization and storage (CCUS). R&D spending in cement has been historically sparse and cement technologies often fail to reach commercial maturity. This can be attributed to the potential performance loss associated with alternative cementitious materials, scaling issues, supply constraints, and incremental costs. There are, for example, clinker factor reduction projects that have demonstrated performance improvement over alternatives, such as clay calcination, at a larger scale. Similarly, amine-based CCUS could benefit from accelerated R&D to identify strategies for reducing costs and improving performance.
3. Developing concessional financing structures to invest in low carbon cement. Emerging low-carbon technologies often face several market barriers, including high upfront capital cost, poor market penetration, and varying supply constraints. Government backstops could lower the perceived risks associated with low-carbon cement projects and attract private capital to accelerate solutions at scale.

BMO's Energy Transition Group has prioritized CCUS as a key decarbonization vertical for client coverage. By covering the entire CCUS value chain, the team can support a wide range of existing clients, while cultivating new relationships. BMO is also the first North American bank to buy carbon credits generated through CarbonCure, which supports a reduction of cement content in concrete. We will continue to work with industry and other partners to advance our understanding of the technical challenges and refine our role in facilitating decarbonization in the sector. See page 19 to learn more about CarbonCure.

Figure 28: Decarbonization roadmap for the cement sector (Scope 1 and 2)



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[2] Amine-based CCUS uses amine solvents to capture CO_2 post-combustion and has comparatively higher capture rates (reaching or exceeding 90%) relative to other CCUS processes.

Agriculture

Agriculture, forestry and other land use account for 24% of global GHG emissions, with most of this attributable to agriculture.[1] Agriculture activities result in emissions of a number of gases, the most significant of which are carbon dioxide, methane and nitrous oxide. Conversely, agriculture can also help slow climate change by storing carbon on agricultural lands. Storing, or sequestering, carbon in soil as organic matter and perennial vegetation, as well as in woodlots, reduces the amount of carbon dioxide in the atmosphere. The challenge for the agriculture and agri-food sector is to mitigate GHGs and adapt to the impacts of climate change without jeopardizing food security. Given the increase in food demand expected in the next decades, creating stable, sustainable food production will be crucial.

It is estimated that 10% of Canada's GHG emissions and 11% of U.S. GHG emissions are from the farming of crops and livestock, excluding emissions from the use of fossil fuels or from fertilizer production.[2, 3] Canadian and U.S. farmers are relatively GHG-efficient and could position the industry as a global leader in developing climate-smart agricultural systems.

Both governments have not yet established an emissions reduction target for agriculture due to the distributed nature of the industry, the related challenges of reducing emissions at scale, and the critical importance of the sector. Instead, the Canadian and U.S. governments are focused on increasing support to farmers to expand the capacity of farmlands to store carbon and are planning to encourage the adoption of clean technologies and natural climate solutions to sequester carbon.[4] They are also advancing strategies with farmers and industry to reduce key emission sources from the sector. In December 2020, as part of its Strengthened Climate Plan, *A Healthy Environment and a Healthy Economy*, the Government of Canada announced a number of measures affecting the agriculture sector with the objective of reducing GHG emissions and increasing carbon sequestration. One of these measures is a national target: a 30% reduction in absolute levels of GHG emissions arising from fertilizer application from 2020 levels by 2030.[5] Nitrogen fertilizer plays an important role in agriculture. Efforts to achieve emissions reduction will focus on improving nitrogen management and optimizing fertilizer use, rather than a mandatory reduction in the use of fertilizers. The Government of Canada is working collaboratively with partners and stakeholders in the agriculture sector to identify opportunities that will enable it to successfully reach this target.[6]

Having both announced strengthened climate targets in advance of COP26 in 2021, Canadian and U.S. governments reiterated their climate commitments at COP27. Canadian and U.S. governments made some announcements and commitments to specific projects/to reduce emissions with new regional partnerships, but these were not as material as setting (or updating) sector-specific reduction targets.

Our baseline calculation for agriculture:

- includes our global portfolio of agriculture borrowers, identified as borrowers operating in 60 unique agriculture NAICS codes that cover all agriculture production, including farms, forestry and fishing.
- calculates Scope 1 and 2 CO_2e emissions from energy used in operations and crop residue decomposition, methane emissions from enteric fermentation and manure management, and nitrous oxide emissions from synthetic fertilizer use.[7]
- is based on emissions estimated in accordance with the PCAF Standard approach for business loans and a data hierarchy based on availability:
  - In the absence of farm-level emissions or production data, we estimated emissions using PCAF economic-based emission factors per million dollars of revenue, or per million dollars of outstanding loans, depending on available data.

We acknowledge that emission factors are based on averages and could diverge from actual farm-level emissions profiles if that data were known.

We accounted for our share of borrower emissions by applying an attribution factor calculated as the outstanding loan amount divided by the sum of total equity and debt and applied it to all companies in the portfolio.[8]

We calculated the PCAF data quality of the portfolio as the average data quality score assigned to each borrower, weighted by outstanding loan amounts.

We have not been able to calculate a physical emissions intensity for our portfolio due to a lack of reported emissions and production data. Calculating a physical emissions intensity for the agriculture portfolio would require a common denominator, such as tonnes of dry matter or tonnes of fresh weight produced, across all borrowers. This data was not available across our portfolio of borrowers. We continue to seek these datasets and will consider alternate methods of data collection should no external sources be identified.

Figure 29: Agriculture financed emissions summary

	2020
Loans outstanding ($M)	13,268
Scope 1 and 2	
Financed emissions ($ktCO_2e$)	6,991
Portfolio PCAF data quality score	4.3
Economic emissions intensity (tCO_2e/$ millions of loans outstanding)	527
Data sources	• Internal Risk Rating Tool • PCAF emission factor database

Figure 30: Agriculture data quality scoring methodology

Source of emissions data	Data quality score
Estimated using emissions per million dollars of revenue	4
Estimated using emissions per million dollars of outstanding loan amounts	5

[1] Source: United States Environmental Protection Agency.
[2] Source: United States Environmental Protection Agency.
[3] Source: Agriculture Canada, Greenhouse gases and agriculture
[4] Source: Government of Canada, Canada's 2030 Emissions Reduction Plan.
[5] Source: Agriculture Canada.
[6] Source: Agriculture Canada.
[7] Source: Agriculture and Agri-Food Canada.
[8] For private companies if total debt or total equity could not be obtained we used the total balance sheet value (i.e., the sum of total equity and liabilities, which is equal to the client's total assets), as per the PCAF Standard.

Climate scenarios and decarbonization pathway modelling

We assessed decarbonization pathways for the agriculture sector from the following climate scenarios aligned with a net-zero outcome:

Climate scenario	Scale	Assumptions
Network for Greening the Financial System (NGFS) REMIND MAgPIE 2.1-4.2 – Net Zero 2050	Global	Rapid technology change, mid-level deployment of carbon dioxide removal technology, and immediate and smooth policy reception by the public, with regional variation.
One Earth Climate Model 1.5 Pathway (OECM 1.5)	North America	Avoids a carbon budget overshoot and expands natural carbon sinks to achieve negative emissions and to compensate for process-related emissions that are currently unavoidable with available technologies.

In both scenarios, emissions from agriculture decline over the years before 2035, after which time they begin to grow again as food production increases to meet rising demand from a growing population. The scenarios show a 45%-47% reduction in absolute emissions (see Figure 31) and a 48% reduction in emissions intensity (tCO_2e/tonne of dry matter produced) (see Figure 32) for the sector by 2030. The scenarios do not account for the carbon sequestration potential of the sector and the negative emissions that could be achieved with practices that increase carbon sequestration in the soil. Emissions intensity declines at a slower rate than absolute emissions to 2030 because absolute emissions decline more rapidly than agricultural production increases. This rate slows after 2030 when production volumes begin to increase more rapidly.

The GHG emissions from a farm depend, in part, on the commodity or commodities being produced, the farming techniques being applied and the location of the farm. To achieve decarbonization of the sector, decarbonization strategies that are commodity-specific should be pursued. To develop an understanding of the decarbonization pathways for various agricultural commodities, we examined several of these pathways for Canada and the United States using the IMAGE 3.0 Integrated Assessment Model. These decarbonization pathways were developed jointly by Ecofys (now Guidehouse), the Netherlands Environmental Assessment Agency and the University of Aberdeen. The model provides users with decarbonization pathways for nine agricultural commodities for their cradle-to-farm gate emissions. These nine commodities represented more than 40% of BMO's total outstanding loan exposure to the agriculture sector in the 2020 fiscal year (see Figure 33).

Data challenges for financed emissions quantification for the agriculture sector are substantial. We have experimented with ways to approximate emissions data for key subsectors of our lending portfolio. For example, dairy is the largest exposure within our agriculture portfolio, accounting for 24% of agriculture lending in 2020. Dairy farming is also one of the most GHG-intensive agricultural activities. Data limitations are significant, with little or no data available for key variables including production data and farm level emissions. In 2022, we attempted to derive a physical intensity metric for dairy farming in order to inform a possible target for that commodity.

Figure 31: Agriculture production Scope 1 and 2 absolute emissions reduction pathways

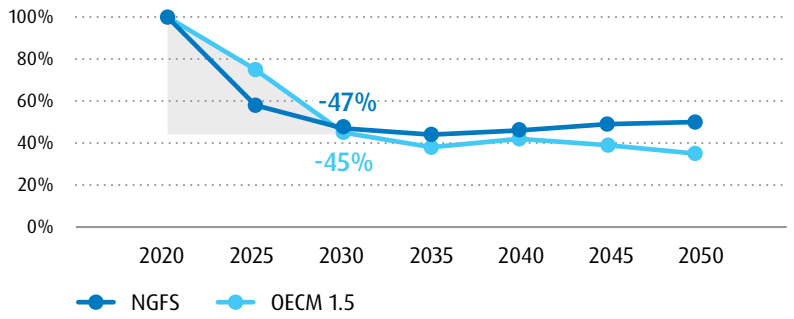
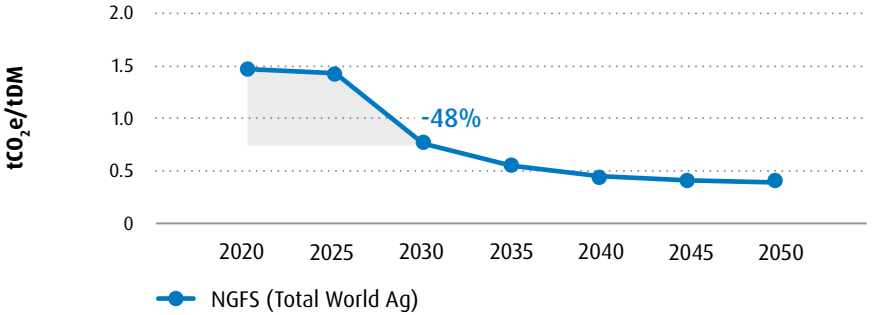
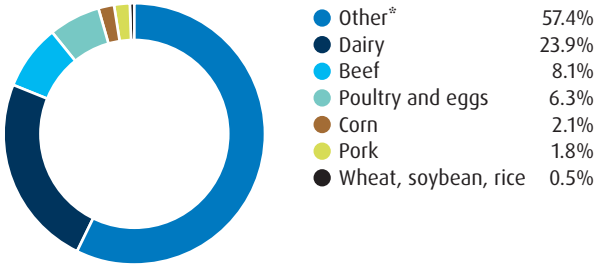


Figure 32: Agriculture production Scope 1 and 2 emissions intensity pathways
(tCO_2e/tonne of dry matter produced)



An emissions intensity pathway based on the OECM scenario could not be determined due to lack of production data.

Figure 33: BMO's 2020 loan exposure by agricultural commodity (%)



*Other represents various types of farming activities, including fruit and vegetable farming.

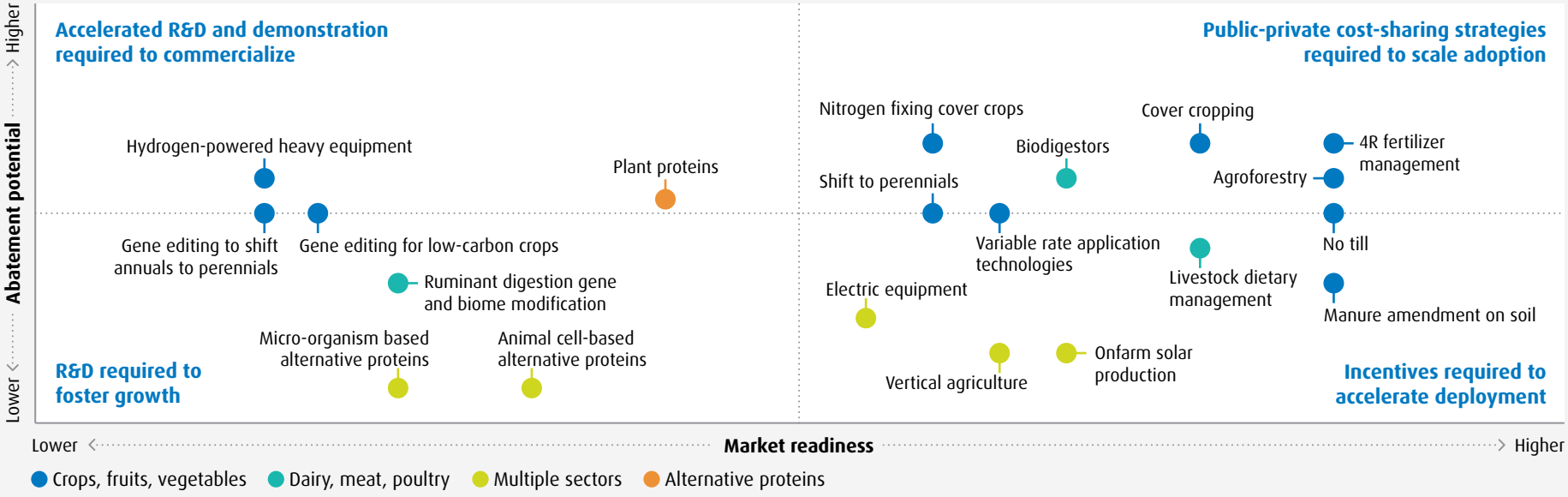
In the absence of farm-level emissions or production data, we estimated dairy production (litres of milk) using borrower revenue where available and the average farm revenue per litre of milk produced in Canada and the United States. After testing this model, we concluded that the approach would not be reliable, since each borrower in the portfolio may have a different production volume and revenue profile and revenue may be derived from activities other than dairy farming. Thus, an analysis that would be suitable for reliable quantification and disclosure could not use average revenue as a satisfactory replacement of actual farm level production data. Estimating production would also not allow us to track the decarbonization of our portfolio over time or derive an accurate physical emissions intensity for the portfolio. Given these data limitations affecting the agriculture portfolio as a whole and segments such as dairy farming, we are not setting a financed emissions reduction target for the sector at this time. We continue to seek these datasets and will consider alternate methods of data collection should no external sources be identified.

Precision farming technology

BMO recognizes that feeding a growing population while reducing emissions from food systems remains critical to achieving Paris-aligned targets and delivering on multiple UN Sustainable Development Goals. Policy-makers are committing billions of dollars towards advancing farmers' ongoing efforts to reduce emissions through the deployment of precision agriculture and low- or zero-emission farming technologies, on-farm renewable energy production, and soil carbon sequestration.

In 2022, the BMO Climate Institute evaluated technologies against a net-zero pathway to support the development of a decarbonization roadmap for the sector, illustrated in Figure 34. Through 2023 we will continue to monitor the technological and commercial readiness of these technologies, along with abatement potential and policy-related support, including incentives and innovative financing structures to accelerate solutions.

Figure 34: Key decarbonization technologies for the agriculture sector



Carbon-related assets

Lending to carbon-related assets is a board-level key risk metric for BMO's Risk Appetite.

In its 2017 guidance, the TCFD defined carbon-related assets as net loans and acceptances connected to the energy and utilities sectors as a percentage of total net loans and acceptances, net of an allowance for credit losses for impaired loans. The definition does not include water utilities, independent power producers, electricity transmission and distribution companies, renewable electricity producers, nuclear electricity producers and waste management companies. In 2021, the TCFD updated its guidance document *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*, including a revised definition of carbon-related assets. The revised definition of carbon-related assets included all four non-financial groups identified by the TCFD: energy, transportation, materials and buildings, and agriculture, food and forest products. This expanded definition was not a board-level key risk metric in 2022. In the 2023 fiscal year, the board will begin to monitor our exposure to carbon-related assets under the TCFD 2021 definition.

In 2021, we established risk tolerance thresholds for lending to carbon-related assets based on the original TCFD 2017 guidance definition, linked quantitatively to our financed emissions reduction targets. The thresholds came into effect at the beginning of the 2022 fiscal year, and will be updated annually, taking into account decarbonization pathway modelling, TCFD recommendations, current industry practices and government policy objectives such as the Government of Canada's targeting of a 40%-45% reduction in emissions from 2005 levels by 2030.

Our 2022 lending to carbon-related assets, based on the TCFD 2017 guidance, was approximately $8.0 billion, representing 1.4% ◆ of our total lending portfolio. Our lending to carbon-related assets has been declining since 2019, as a result of strategic decisions on capital allocation and prioritization of opportunities taken by the bank. Our lending to carbon-related assets using the 2021 TCFD expanded definition was $112 billion, representing 19.8% ◆ of our total lending portfolio.

Figure 35: BMO's lending to carbon-related assets

	2022	2021	2020	2019
Lending to carbon-related assets – Metric 1 (non-renewable energy and power generation focus) (%) [1]	1.4 ◆	1.9	3.0	3.3
Lending to carbon-related assets – Metric 2 (includes Metric 1 plus transportation, materials and buildings, and agriculture, food and forest products) (%) [2]	19.8 ◆	–	–	–

◆ KPMG has provided limited assurance of this figure.

[1] This metric formula was recommended in TCFD 2017 version and provides line of sight to non-renewable energy and power exposure. Carbon-related assets Metric 1 is defined as the value of net loans and acceptances connected to the energy and utilities sectors as a percentage of total net loans and acceptances, net of allowance for credit losses for impaired loans. It does not include water utilities, independent power producers, electricity transmission and distribution companies, renewable electricity producers, nuclear electricity producers and waste management companies.

[2] This metric formula was recommended in the TCFD 2021 version and includes sectors covered in Metric 1 and other sectors including transportation, materials and buildings, and agriculture, food and forest products.

Appendix

A: Sectoral financed emissions measurement and progress toward targets

Upstream oil and gas – Global

Figure A.1: Upstream oil and gas financed emissions summary		2021	2020	2019
Canada	**Loans outstanding ($M)**	2,425 ◆	3,003 ◆	2,917
	Scope 1 and 2			
	Financed emissions ($ktCO_2e$)	665 ◆	1,146 ◆	887
	Portfolio PCAF data quality score	1.7 ◆	1.7 ◆	2.1
	Economic emissions intensity (tCO_2e/$ millions loan outstanding)	274 ◆	382 ◆	304
	Physical emissions intensity (tCO_2e/TJ)	5.6 ◆	5.9 ◆	5.3
Rest of world [1]	**Loans outstanding ($M)**	2,046 ◆	5,120 ◆	5,636
	Scope 1 and 2			
	Financed emissions ($ktCO_2e$)	605 ◆	1,210 ◆	1,382
	Portfolio PCAF data quality score	3.6 ◆	3.5 ◆	4.0
	Economic emissions intensity (tCO_2e/$ millions loan outstanding)	296 ◆	236 ◆	245
	Physical emissions intensity (tCO_2e/TJ)	3.2 ◆	3.0 ◆	3.4
Global	**Loans outstanding ($M)**	4,471 ◆	8,123 ◆	8,553
	Downstream Scope 3			
	Financed emissions ($ktCO_2$)	19,320 ◆	37,645 ◆	38,914
	Portfolio PCAF data quality score	3.3 ◆	3.1 ◆	3.4
	Economic emissions intensity (tCO_2/$ millions loan outstanding)	4,321 ◆	4,635 ◆	4,550
	Physical emissions intensity (tCO_2/TJ)	62.6 ◆	63.2 ◆	62.2
Data sources	• Internal Risk Rating Tool • S&P Trucost Capital IQ • Publicly available disclosures • IPCC Guidelines for National Greenhouse Gas Inventories (2006)			

Figure A.2: Upstream oil and gas targets

Activity focus	Global upstream oil and gas portfolio	
Emissions scope	Scope 1 and Scope 2 emissions	Downstream Scope 3 emissions
Metric	Carbon intensity (tCO_2e/TJ of primary energy)	Absolute emissions (tCO_2e)
Net-zero-aligned target	Targeting a 33% reduction in portfolio emissions intensity by 2030.	Targeting a 24% reduction in absolute Scope 3 emissions by 2030.

CAUTION: During the COVID-19 pandemic in 2020, corporate valuations for the oil and gas sector declined substantially. Applying the PCAF Standard, such declines result in an increase in attributed emissions, even where there may not be an actual increase in reported emissions or an increase in lending to the client. In fact, an analysis of the actual reported absolute emissions for publicly traded oil and gas clients in our portfolio (for which corporate valuation data exists) showed that Scope 1 and 2 emissions for 2020 were relatively flat to 2019 levels. By contrast the attributed emissions for this same subset, calculated per the PCAF Standard, showed an increase of almost 40%. The increase was largely due to changes in corporate valuations as noted above, and not due to an increase in actual emissions.

In 2021, reported absolute emissions for this subset increased 3% year over year, while attributed emissions declined approximately 40% as corporate valuations recovered resulting in lower attribution rates relative to 2020. This challenge with the PCAF Standard impairs comparability of financed emissions data from year to year.

◆ KPMG has provided limited assurance of this figure.

[1] In 2020, we announced a decision to wind-down our non-Canadian investment and corporate banking energy business. We anticipate the majority of run-off will occur before 2030.

Actions to achieve target

Implementation Strategy

Products, services, policies, activities, or decision-making to advance the achievement of BMO's targets

Actions	Impact on Client and Sectoral Decarbonization
Developing sustainable finance products, including transition bonds, with financing contingent on decarbonization KPIs	Sustainable financing to support companies pursuing sustainable outcomes. Proceeds may help clients realize decarbonization strategies through achieving KPIs such as improvements in energy efficiency, reduction in GHGs, increases in the amount of renewable power, sustainable procurement, etc.
Tracking energy transition financing	Automated tracking of labelled loan products using drop-down menu to tag whether a loan is green, transition, sustainability-linked or social. There is also manual tracking of advisory services and sustainable bond underwriting, as well as manual tracking of sustainable investments, equity and debt financing, and lending authorized for sustainable clients. Tracking energy-related financing activities improves insights across the enterprise and informs internal data-driven decisions related to decarbonization efforts.
Acquired Radicle to develop carbon credit generation and trading capabilities	Originating carbon credits with clients through decarbonization projects; which helps create financial incentives for clients to engage in climate-aligned activities and build out low-carbon portfolio. Carbon pricing and carbon market opportunity cost can be integrated into client data profiles to promote identification of opportunities and risk related to carbon intensity.
Radicle's Climate Smart Software	BMO Radicle offers Climate Smart, an in-house program and management software that helps clients calculate and track their Scope 1, 2 and 3 emissions, provides client-level insights on emissions reduction opportunities, and offers training and certification for carbon accounting best practices.

Engagement Strategy

Efforts to educate, advise, and/or collaborate with clients, industries, and governments on the transition

Actions	Impact on Client and Sectoral Decarbonization
Created the Energy Transition Group (ETG)	Help clients identify energy transition opportunities with key insights into hydrogen, CCUS, and alternative energy sources toward reducing client emissions in the energy sector.
Create new capital deployment partnership	Unlocks private capital that would otherwise not be available for decarbonization investment and financing.
Early stage tracking of Energy Transition Group activity with clients	Energy Transition Group tagging function on Salesforce to flag when there has been an ETG engagement with a client allows BMO to evaluate and monitor client engagement on sustainable finance and ETG-related activities. This supports a more systematic way of engaging with clients and will inform future engagement strategy.
Tracking client transition action plan activities	Early stages of collecting data on client transition action plans through a credit risk process. The environmental and social risk rating (ESRR) assessment templates were created to assess, identify, and track E&S risks across the enterprise, and are reviewed and updated annually. Recently, we integrated queries regarding the alignment of client transition plans with specific net-zero objectives into our ESRR assessment for oil and gas among other sectors.

Power generation – Canada

Figure A.3: Power generation financed emissions summary [1]	2020	2019
Loans outstanding ($M)	1,100 ◆	1,339
Scope 1		
Financed emissions ($ktCO_2$)	332 ◆	360
Portfolio PCAF data quality score	3.1 ◆	3.5
Economic emissions intensity (tCO_2/$ millions loan outstanding)	302 ◆	269
Physical emissions intensity (tCO_2/MWh of electricity generated)	0.16 ◆	0.20

Data sources
- Internal Risk Rating Tool
- Emission factors from Canada's National Inventory Report (2020)
- Publicly available disclosures
- S&P Trucost Capital IQ

Figure A.4: Power generation by source (% of total loans outstanding) [2]	2021	2020	2019
Low-carbon [3] generation in portfolio	89%	79%	76%
Fossil fuel-based generation in portfolio	11%	20%	19%
Other (unclassified)	0%	1%	5%

Figure A.5: Power generation targets

Activity focus	Canadian power generation portfolio
Emissions scope	Scope 1 emissions from fuel combustion for electricity generation
Metric	Carbon intensity (tCO_2/MWh of electricity generated) Share of low-carbon power generation in the portfolio
Net-zero-aligned target	Targeting a Canadian portfolio carbon intensity of 0.06 tCO_2/MWh by 2030, which is indicated by an 88% share of low-carbon power generation.

Actions to achieve target

Implementation strategy

Products, services, policies, activities, or decision-making to advance the achievement of BMO's targets

Actions	Impact on Client and Sectoral Decarbonization
Pursuing clean power generation financing opportunities	Support electrification and increase the share of renewable electricity generation aligned with net-zero by 2050 policy objectives.

Engagement strategy

Efforts to educate, advise, and/or collaborate with clients, industries, and governments on the transition

Actions	Impact on Client and Sectoral Decarbonization
Working with clients to advise on, and finance, new and existing clean energy generation and associated technologies	Identification and advancement of energy transition opportunities for our clients, increasing the share of low-carbon power generation in our portfolio.

◆ KPMG has provided limited assurance of this figure.

[1] Revised 2019 baseline for power generation portfolio to 0.20 tCO_2/MWh from originally disclosed 0.11 tCO_2/MWh, reflecting a change in data inputs for a subset of our portfolio companies and model refinements.

[2] Prior periods restated to align with current period methodology.

[3] Includes hydro, wind, solar, biomass and nuclear.

Personal motor vehicles – Canada

Figure A.6: Personal motor vehicles financed emissions summary	2021	2020	2019
Loans outstanding ($M)	8,190◆	7,809	7,752
Scope 1 and 2			
Financed emissions ($ktCO_2$)	794◆	828	855
Portfolio PCAF data quality score	3.1◆	3.1	3.1
Economic emissions intensity (tCO_2/$ millions loan outstanding)	97◆	106	110
Physical emissions intensity ($kgCO_2$/vehicle-km financed)	0.22◆	0.23	0.23
Zero-emissions vehicles (ZEV) share[1]			
ZEV in portfolio (% of total loans outstanding)	2.9%	0.9%	0.6%
New ZEV in portfolio of new loans originated (% of loans outstanding)	11.0%◆	1.7%	2.0%

Data sources
- U.S. Department of Transportation National Highway Traffic Safety Administration for vehicle information
- U.S. Department of Energy for fuel efficiency (2021)
- Statistics Canada for annual distance travelled (2009)
- Emission factors from Canada's National Inventory Report (2021)
- PCAF emission factors database

Figure A.7: Personal motor vehicles target

Activity focus	Canadian personal motor vehicle lending portfolio
Emissions scope	Scope 1 and 2 "tank-to-wheel" emissions from vehicle fuel combustion and electricity consumption
Metric	Share of new loan originations to zero emissions vehicles
Scenario	IEA NZE Government of Canada
Net-zero-aligned target	Targeting 100% of new loans for new light-duty cars and passenger trucks in Canada to be ZEV by 2035.

Actions to achieve target

Implementation strategy

Products, services, policies, activities, or decision-making to advance the achievement of BMO's targets

Actions	Impact on Client and Sectoral Decarbonization
Relationship building with large ZEV players	Client relationship development with dealers has led to an increased share of ZEV loans, and further supports deployment of EVs in North America.
Advancing various initiatives to identify ZEV financing growth opportunities	Work is being undertaken to optimize client relationship opportunities, strategic initiatives and internal incentives, where feasible, to find growth opportunities.

Engagement strategy

Efforts to educate, advise, and/or collaborate with clients, industries, and governments on the transition

Actions	Impact on Client and Sectoral Decarbonization
Thought leadership materials for clients and public engagement	Thought leadership materials engaging with clients on the ZEV transition, including research from the BMO Climate Institute, Sustainability Leaders Podcast, and direct communications with clients.
Engaging with new market entrants	Advancing dialogue with new market entrants to potentially expand the breadth of ZEV opportunities at the bank, and contributing to the commercialization of companies critical to the EV transition.

◆ KPMG has provided limited assurance of this figure.

[1] 2019 and 2020 updated to reflect model refinements to more accurately capture the share of ZEVs in our portfolio.

Residential real estate – Canada

Figure A.8: Residential mortgages financed emissions summary	2021	2020	2019
Loans outstanding ($M) [1]	110,051◆	102,693	99,148
Scope 1 and 2			
Financed emissions ($ktCO_2$)	1,057◆	1,123	1,155
Portfolio PCAF data quality score	4.1◆	4.2	4.2
Economic emissions intensity (tCO_2/$ millions loan outstanding)	9.6◆	10.9	11.7
Physical emissions intensity ($kgCO_2/m^2$ financed) [2]	28.0◆	29.2	29.2

Data sources
- Natural Resources Canada for average household energy use (2019)
- Emission factors from Canada's National Inventory Report (2021)

◆ KPMG has provided limited assurance of this figure.

[1] Loans outstanding include only eligible assets per the PCAF methodology for residential real estate and therefore vary from residential mortgages outstanding loan balances reported in BMO's Supplementary Financial Information package.

[2] Physical emissions intensity is calculated for properties where floor area data was available (81% of the portfolio in 2019, 85% in 2020 and 87% in 2021).

Independent Practitioner's Limited Assurance Report

To the management of Bank of Montreal ("BMO"):

We have undertaken a limited assurance engagement with respect to the selected indicators presented in the table below, that, based on our work performed and evidence obtained, nothing has come to our attention that causes us to believe that they have not been properly prepared and presented, in all material respects, based on the applicable criteria (as defined below).

Topic	Selected Indicator(s)
Sustainable finance [1]	• Capital to companies pursuing sustainable outcomes ($ billions)
Climate change [1]	• Lending to carbon-related assets – Metric 1 (non-renewable energy and power generation focus) (%) • Lending to carbon related assets – Metric 2 (includes Metric 1 plus transportation, materials and buildings, and agriculture, food and forest products) (%)
Financed emissions – Upstream Oil and Gas (Global) [2, 3]	• Loans outstanding ($ millions) • Financed emissions ($ktCO_2e$) for Scope 1 and 2, and Downstream Scope 3 • Portfolio Partnership for Carbon Accounting Financials (PCAF) data quality score • Economic emissions intensity (tCO_2e/$ millions loan outstanding) • Physical emissions intensity (tCO_2e/TJ)
Financed emissions – Power Generation (Canada) [3]	• Loans outstanding ($ millions) • Financed emissions ($ktCO_2$) for Scope 1 • Portfolio PCAF data quality score • Economic emissions intensity (tCO_2/$ millions loan outstanding) • Physical emissions intensity (tCO_2/MWh of electricity generated)
Financed emissions – Personal Motor Vehicles (Canada) [2]	• Loans outstanding ($ millions) • Financed emissions ($ktCO_2$) for Scope 1 and 2 • Portfolio PCAF data quality score • Economic emissions intensity (tCO_2/$ millions loan outstanding) • Physical emissions intensity ($kgCO_2$/vehicle-km financed) • New Zero Emission Vehicles (ZEVs) in portfolio of new loans originated (% of loans outstanding)
Financed emissions – Residential Real Estate (Canada) [2]	• Loans outstanding ($ millions) • Financed emissions ($ktCO_2$) for Scope 1 and 2 • Portfolio PCAF data quality score • Economic emissions intensity (tCO_2/$ millions loan outstanding) • Physical emissions intensity ($kgCO_2/m^2$ financed)

[1] As at and for the year-ended, October 31, 2022

[2] As at and for the year-ended, October 31, 2021

[3] As at and for the year-ended, October 31, 2020

The selected indicators (collectively, the "subject matter information") are denoted by the symbol ◆ in the accompanying BMO 2022 Climate Report (the "Report") as at and for the year-ended, October 31, 2022.

Other than as described in the preceding paragraph, which sets out the scope of our engagement, we did not perform assurance procedures on the remaining information included in the Report, and accordingly, we do not express a conclusion on this information.

Management's Responsibilities

There are no mandatory requirements for the preparation, publication, or review of the subject matter information. As such, BMO applies the following "applicable criteria":

- For selected indicators within Financed emissions topics, the Global GHG Accounting and Reporting Standard for the Financial Industry (2020) issued by the Partnership for Carbon Accounting Financials. The Standard can be found at https://carbonaccountingfinancials.com/files/downloads/PCAF-Global-GHG-Standard.pdf; and
- For selected indicators within Sustainable finance and Climate change topics, BMO's own internally-developed measurement methods as described in the Glossary on pages 87-90 within BMO's 2022 Sustainability Report and Public Accountability Statement which can be found at https://our-impact.bmo.com/reports/.

Management is responsible for the preparation and presentation of the subject matter information in accordance with the applicable criteria. Management is responsible for determining the appropriateness of the use of the applicable criteria and for ensuring that BMO complies with the applicable laws and regulations. Management is also responsible for such internal control as management determines necessary to enable the preparation and presentation of the subject matter information that is free from material misstatement, whether due to fraud or error.

Practitioner's Responsibilities

Our responsibility is to express a limited assurance conclusion on the subject matter information based on evidence we have obtained. We conducted our limited assurance engagement in accordance with Canadian Standards on Assurance Engagements (CSAE) 3000 (Revised), *Attestation Engagements Other than Audits or Reviews of Historical Financial Information* and CSAE 3410, *Assurance Engagements on Greenhouse Gas Statements*. These standards require that we plan and perform our procedures to obtain a meaningful level of assurance about whether subject matter information is properly prepared and presented, in all material respects, as the basis for our limited assurance conclusion.

The nature, timing and extent of procedures performed depends on our professional judgment, including an assessment of the risks of material misstatement, whether due to fraud or error, and involves obtaining evidence about the subject matter information.

Our engagement included, amongst others, the following procedures performed:

- Inquiries of BMO's management, relevant staff at the corporate and business unit level, including those with responsibility for sustainability reporting governance, management and reporting;
- Assessment of the suitability, application and disclosure of the applicable criteria in respect of the subject matter information;
- Where relevant, performance of walkthroughs to understand the processes for data collection and reporting of the subject matter information;
- Comparisons of the reported data for the subject matter information to underlying data sources on a sample basis;
- Inquiries regarding key assumptions and the re-performance of calculations on a sample basis; and
- Review of the presentation of the subject matter information to determine whether the presentation is consistent with our overall knowledge of, and experience with, the performance of BMO.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

We believe the evidence we obtained is sufficient and appropriate to provide a basis for our conclusion.

Practitioner's Independence, Quality Control, and Competence

We have complied with the relevant rules of professional conduct/code of ethics applicable to the practice of public accounting and related to assurance engagements, issued by various professional accounting bodies, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

The firm applies Canadian Standard on Quality Management 1, *Quality Management for Firms that Perform Audits or Reviews of Financial Statements, or Other Assurance or Related Services Engagements* which requires the firm to design, implement and operate a system of quality management, including policies or procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Significant Inherent Limitations

Non-financial information, such as that contained in the Report, is subject to more inherent limitations than financial information, given the qualitative characteristics of the underlying subject matter and methods used for determining this information. The absence of a significant body of established practice on which to draw allows for the selection of different but acceptable evaluation techniques, which can result in materially different measurements and can impact comparability.

Specific Purpose of Subject Matter Information

The subject matter information has been prepared and presented based on the applicable criteria. As a result, the subject matter information may not be suitable for another purpose.

Conclusion

Our conclusion has been formed on the basis of, and is subject to, the matters outlined in this report.

We believe the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Based on the procedures performed and evidence obtained, no matters have come to our attention to cause us to believe that the subject matter information contained within the Report for the year-ended October 31, 2022 is not properly prepared and presented, in all material respects, based on the applicable criteria identified above.

Chartered Professional Accountants, Licensed Public Accountants

Toronto, Canada

February 28, 2023

Important notice regarding this report

Cautionary statement regarding forward-looking information

Certain statements in this report are forward-looking statements under the United States Private Securities Litigation Reform Act of 1995 (and are made pursuant to the 'safe harbour' provisions of such Act) and applicable Canadian securities legislation. These forward-looking statements include, but are not limited to, statements with respect to sustainable lending and underwriting targets, sustainable investment targets, BMO's Climate Ambition, net-zero financed emissions targets and reducing operational GHG emissions. Forward-looking statements are typically identified by words such as "targeting", "committed", "commitment", "ambition", "goal", "expect", "plan", "will", "may", "aim to" and other similar expressions.

By their nature, forward-looking statements are based on various assumptions and are subject to inherent risks and uncertainties. Certain statements made in this report use a greater number and level of assumptions and estimates and are over longer time frames than many of our required disclosures. These assumptions and estimates are highly likely to change over time. Certain statements in this report are based on hypothetical or severely adverse scenarios and assumptions, and these statements should not necessarily be viewed as being representative of current or actual risk or forecasts of expected risk. While future events discussed in this report may be significant, any significance should not be read as necessarily rising to the level of materiality of the disclosures required under Canadian or U.S. federal securities laws. In addition, our climate risk analysis and net-zero strategy remain under development, and the data underlying our analysis and strategy remain subject to evolution over time. As a result, we expect that certain disclosures made in this report are likely to be amended, updated or restated in the future as the quality and completeness of our data and methodologies continue to improve.

We caution readers of this report not to place undue reliance on our forward-looking statements as the assumptions underlying such statements may not turn out to be correct and a number of factors could cause actual future results, conditions, actions or events to differ materially from the targets, commitments, ambitions, plans or goals expressed in the forward-looking statements. Such factors include, but are not limited to: the availability of comprehensive and high-quality GHG emissions data, the evolution of our lending portfolios over time, the need for active and continued participation of stakeholders (including enterprises, financial institutions and governmental and non-governmental organizations), the development and deployment of new technologies and industry-specific solutions, international cooperation, the development of regulations internationally, our ability to successfully implement various initiatives under expected time frames, the compliance of various third parties with our policies and procedures and legal requirements and those other factors set out in the Enterprise-Wide Risk Management section of BMO's 2022 Annual Report that may affect our future results and our ability to anticipate and effectively manage risks arising from all of the foregoing factors. We caution that the foregoing list is not exhaustive of all possible factors. For further information on the assumptions, risks, uncertainties, and other factors affecting the Bank's emissions targets, see the A Note about Data Challenges section on page 35 and the Financed Emissions section on page 37. These factors should be considered in addition to other uncertainties and potential events, and the inherent uncertainty of forward-looking statements.

BMO does not undertake to update any forward-looking statement, whether written or oral, that may be made, from time to time, by the organization or on its behalf, except as required by law.

Non-GAAP and Other Financial Measures

Results and measures in BMO's Management's Discussion and Analysis dated December 1, 2022 for the fiscal year ended October 31, 2022 ("2022 Annual MD&A") and this document are presented on an International Financial Reporting Standards ("IFRS") basis. We use the terms IFRS and Generally Accepted Accounting Principles ("GAAP") interchangeably. Adjusted net income by geography is a non-GAAP ratio. Readers are cautioned that non-GAAP measures and ratios do not have standardized meanings. They are unlikely to be comparable to similar measures and ratios presented by other companies and should not be viewed in isolation from, or as a substitute for, GAAP results. For additional information regarding the composition of our non-GAAP and other financial measures, an explanation of how non-GAAP and other financial measures provide useful information, any additional purposes for which management uses such measures, and a quantitative reconciliation of adjusted net income to the most directly comparable financial measure in BMO's financial statements for the period ended October 31, 2022, see Non-GAAP and Other Financial Measures starting on page 24 and the Glossary of Financial Terms starting on page 131 of the 2022 Annual MD&A. This information and the reconciliation are incorporated by reference. The 2022 Annual MD&A is available on SEDAR at www.sedar.com and on BMO's website at www.bmo.com/investorrelations.

Other Disclaimers

This report includes voluntary disclosures on sustainable lending and underwriting targets, sustainable investment targets, operational GHG emissions and targets, climate-related opportunities and risks, governance, strategy, risk management and metrics and targets that may not be, and are not required to be, incorporated into our mandatory disclosures, where we use a definition of materiality established under applicable securities laws for the purpose of complying with the disclosure rules and regulations promulgated by applicable securities regulators and applicable stock exchange listing standards.

Nothing in this report shall constitute, or form part of, an offer to sell or a solicitation of an offer to buy or subscribe for any security or other instrument of the Bank or any of its affiliates, or as an invitation, recommendation or inducement to enter into any investment activity, and no part of this document shall form the basis of, or be relied upon in connection with, any contract, commitment or investment decision. Offers to sell, sales, solicitations of offers to buy or purchases of securities issued by the Bank or any of its affiliates may only be made or entered into pursuant to appropriate offering materials prepared and distributed in accordance with the laws, regulations, rules and market practices of the jurisdictions in which such offers, solicitations or sales may be made. Professional advice should be sought prior to any decision to invest in securities.

Third-party references and website references and/or links throughout this report are provided for convenience only, and the content on the referenced websites is not incorporated by reference into this report. Such third-party references and website references and/or links do not imply an affiliation, sponsorship or endorsement.

Need help?
Email us at: sustainability@bmo.com

BMO's Sustainability Leaders Podcast

BMO's Sustainability Leaders podcast series introduces you to the innovative minds and diverse perspectives that are pushing the boundaries in sustainability good practice.

https://sustainabilityleaders.bmo.com/en/home/sustainability-leaders-podcast/

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