

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Manulife Financial Corporation is a leading international financial services group that helps people make their decisions easier and lives better. We operate primarily as John Hancock in the United States, and as Manulife elsewhere. We provide financial advice and insurance, as well as wealth and asset management solutions, for individuals, groups and institutions. Our principal operations are in Asia, Canada and the United States where we have served customers for more than 100 years.

Manulife had a global workforce of approximately 35,000 employees as of December 31, 2017 and our business is structured in four divisions plus a corporate group function:

Canadian Division: Founded in 1887, Manulife's Canadian Division offers a diverse range of insurance, investment and banking solutions to individuals, business owners and employers.

Asia Division: We have been conducting business in Asia since 1897 and have one of the longest histories of continuous operation in Asia of any international insurer. We operate in 12 markets, with our largest operations being in Hong Kong and Japan.

U.S. Division: In the U.S., we operate primarily under the John Hancock brand, which celebrated its 150th anniversary in 2012. We are one of the largest life insurers in the U.S. John Hancock offers a broad range of insurance and wealth management products and services for individuals and businesses.

Investment Division: Manulife's Investment Division manages the Company's general fund on-balance sheet assets and, through Manulife Asset Management, manages third party assets for institutional clients and investment funds in key markets around the world. Manulife Asset Management also provides investment management services to affiliates' retail clients through product offerings of Manulife and John Hancock. The Division manages a broad range of investments including public and private bonds, public and private equities, mortgages, real estate, oil and gas, power and infrastructure, timberland, farmland and provides asset allocation solutions.

Corporate and Other: Comprised of Group Functions, which supports the divisions.

In this report we include additional information from several of the Investment Division's operating subsidiaries, including:

Hancock Natural Resource Group (HNRG): We specializes in global farmland and timberland portfolio development and management. Assets are managed on behalf of our clients through the Hancock Agricultural Investment Group (HAIG) and the Hancock Timber Resource Group (HTRG). HAIG is one of the largest institutional managers of agricultural real estate in the U.S. and the first U.S. based institutional farmland manager to offer international investment options. HAIG manages over USD 2.9 billion (December 31, 2017) of farmland assets in the major agricultural regions of the United States, as well as Australia and Canada.

HTRG is the world's largest global timberland investment manager for institutional investors, with USD 11.0 billion (December 31, 2017) in global assets managed from investment locations in Australia, Canada, Chile, New Zealand and the United States.

Manulife Real Estate: Manulife Real Estate manages a portfolio of properties across North America and Asia with more than 62.5 million square feet of floor space. Manulife Real Estate has fully integrated in-house capabilities and 80 years of experience as an active investor, owner, developer and asset manager of commercial real estate. Diversified by both geography and asset type, our assets include office, industrial, residential and select retail properties. The portfolio breakdown by square feet is 46 per cent U.S., 52 per cent Canada, and 2 per cent Asia as of December 31, 2017.

NAL: Based in Calgary, Alberta, NAL Resources Management Ltd. (NAL) is a fully integrated oil and gas manager, with a team of full-time corporate staff focused on direct property ownership and operating control of oil and gas producing assets in Western Canada. NAL currently operates approximately 40,000 barrels of oil equivalent per day of production and the production mix for 2017 was approximately 45 per cent crude oil, 43 per cent natural gas, and 12 per cent natural gas liquids.

Regional Power: We have been in the business of developing, building, refurbishing and operating hydroelectric power plants since 1985. We currently operate eleven hydro plants throughout Canada with a combined total generating capacity of 106 megawatts of clean renewable energy, enough to power approximately 45,000 homes.

We also include highlights from our renewable energy project finance team, a dedicated team of renewable energy financing specialists that invest Manulife's on-balance sheet assets in wind, geothermal, photovoltaic solar, hydroelectric, landfill gas and biomass waste-to-energy projects. Since 2002, Manulife has invested \$12.6 billion in renewable energy and energy efficiency projects.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Row 1	January 1 2017	December 31 2017	No	<Not Applicable>
Row 2	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 3	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 4	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>

C0.3

(C0.3) Select the countries/regions for which you will be supplying data.

Canada

United States of America

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

CAD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your consolidation approach to your Scope 1 and Scope 2 greenhouse gas inventory.

Operational control

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

No

C1.1c

(C1.1c) Why is there no board-level oversight of climate-related issues and what are your plans to change this in the future?

	Primary reason	Board-level oversight of climate-related issues will be introduced within the next two years	Please explain
Row 1	Manulife's Enterprise Risk Committee, an executive-level committee, is responsible for reviewing and approving Manulife's Environmental Risk Policy. This policy sets the standard for environmental risk management at Manulife, which would include issues related to climate change. Management of strategy, implementation and performance of climate-related issues is carried out at the Business Unit level and only if a climate-related issue presents itself as a material risk will it be reported to the Board's Risk Committee by the Chief Environmental Officer (Chief EO) via Manulife's Enterprise Risk Management (ERM) function. In addition to issue-specific reporting, the management of climate change is captured in ERM's Evolving Risk Inventory, which is reported to the Board's Risk Committee at least twice a year.	Yes, we plan to do so within the next two years	We plan to develop a more robust mechanism for monitoring and reporting climate-related issues within the next two years, which will include more direct board oversight.

C1.2

(C1.2) Below board-level, provide the highest-level management position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Sustainability committee	Both assessing and managing climate-related risks and opportunities	Quarterly
Business unit manager	Both assessing and managing climate-related risks and opportunities	Quarterly
Other C-Suite Officer, please specify (Chief Environmental Officer)	Both assessing and managing climate-related risks and opportunities	Quarterly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored.

Corporate: Because of the varied nature of our operating subsidiaries, climate-related issues related to our real assets are managed at the Business Unit level through Business Unit Environmental Officers (BU EOs) as they are specialists within their sectors.

Environmental risks, including those related to climate, are reported by the BU EOs to Manulife's Chief Environmental Officer (Chief EO), who performs an assessment and provides consolidated reporting to Enterprise Risk Management (ERM), which then reports any material issues to Manulife's senior management and the Board's Risk Committee. This occurs on a quarterly basis, and in addition, we use the annual CDP reporting process to capture more in-depth information related to climate change. In addition to issue-specific reporting, the management of climate change is captured in ERM's Evolving Risk Inventory, which is reported to the Board's Risk Committee at least twice a year.

Real Estate: Sustainability, including issues related to climate, are overseen by the Executive Sustainability Steering Committee, which is chaired by Manulife Real Estate's Global Head of Real Estate Asset Management and consists of senior real estate executives from key departments and regions. The committee includes the most senior managers from Property and Asset Management (Canada and the US), Engineering and Technical Services, Investments, Corporate Real Estate, Leasing, Marketing and Communication, Human Resources and Corporate Citizenship. The Committee oversees progress toward achieving our sustainability vision and ensures we meet our commitments and adhere to corporate policies and practices. The Executive Sustainability Steering Committee meets quarterly to discuss sustainability strategy, sustainability program advancement and portfolio performance. During committee meetings, strategy and performance progress are presented and decisions regarding strategy direction and initiatives are made. Strategy and performance relating to climate change risks and opportunities are addressed through analysis of greenhouse gas emissions, greenhouse gas reduction targets, renewable energy strategy and performance and performance in industry ESG benchmarking initiatives including the Global Real Estate Sustainability Benchmark (GRESB).

HNRG: HNRG's CFO and COO are executive level positions that both report to HNRG's CEO. Both positions have responsibilities for climate-related issues across both farmland and forestry operations.

NAL: NAL has initiated several core business strategies including a Carbon Footprint Reduction strategy with associated targets and goals. This strategy is sponsored by our VP, Financial and Information Services. The primary group for taking action are the Health, Safety and Environment (HSE) and Operations groups which consists of managers, engineers and consultants that collaborate with a multitude of industry associations and other external groups searching for technologies and solutions to proactively reduce NAL's carbon footprint. Key committees that monitor climate-related issues include NAL Executive, NAL's Board of Directors and HSE Committee.

Renewable Energy: Climate related issues are informally monitored through detailed transaction memos that are drafted by the Corporate Finance team and are approved by Corporate Credit. Project performance is monitored on a monthly basis over the duration of the investment.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

Yes

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues.

Who is entitled to benefit from these incentives?

All employees

Types of incentives

Monetary reward

Activity incentivized

Other, please specify (Behaviour change related indicator)

Comment

Manulife runs a number of programs, some of which include monetary rewards/prizes for employees engaging in more sustainable behaviour.

Who is entitled to benefit from these incentives?

Facilities manager

Types of incentives

Monetary reward

Activity incentivized

Energy reduction target

Comment

One aspect of determining bonuses for Facility managers is based on if they meet the energy reduction target.

C2. Risks and opportunities

C2.1

(C2.1) Describe what your organization considers to be short-, medium- and long-term horizons.

	From (years)	To (years)	Comment
Short-term	0	3	
Medium-term	3	15	
Long-term	15	40	

C2.2

(C2.2) Select the option that best describes how your organization's processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.

A specific climate change risk identification, assessment, and management process

C2.2a

(C2.2a) Select the options that best describe your organization's frequency and time horizon for identifying and assessing climate-related risks.

	Frequency of monitoring	How far into the future are risks considered?	Comment
Row 1	Annually	>6 years	As an example, in our forestry operations, risks are considered as far as 20-25 years into the future.

C2.2b

(C2.2b) Provide further details on your organization's process(es) for identifying and assessing climate-related risks.

Corporate: Manulife considers a climate-related risk and opportunities to be substantive if it has a negative impact on our financial position or our ability to operate. These impacts may be direct or indirect and may include business losses or disruption resulting from extreme weather conditions; the impact of changes in legal or regulatory framework made to address climate change; or increased mortality or morbidity resulting from environmental damage or climate change. Management of material climate-related issues for our real assets is carried out at the Business Unit level. Systems for risk identification, assessment and management are built into existing policies and procedures and are specific to the asset (e.g. oil and gas, real estate, forestry, agriculture etc.). Further details are provided below. Business Unit Environmental Officers (BU EOs) report environmental issues, including specific issues as a result of, or related to, climate change, to Manulife's Chief Environmental Officer (Chief EO) on a quarterly basis. The Chief EO performs an assessment and reports to Enterprise Risk Management (ERM) any material environmental issues, which would be reported to the Board's Risk Committee through consolidated reporting. In addition to issue-specific reporting, the management of climate change is captured in ERM's Evolving Risk Inventory, which is reported to the Board's Risk Committee at least twice a year. ERM scans for trends/insights via industry publications and other channels and disseminates any relevant information to Business Units and other internal stakeholder as required. The Chief EO does the same and acts as a resource to BU EOs in their development of processes related to climate management. The Chief EO is also responsible for working with BU EOs to measure and report on Manulife's greenhouse gas emissions and other environmental indicators. This occurs on a quarterly basis, and in addition, we use the annual CDP reporting process to capture more in-depth information related to climate change.

Real Estate: As building owners and managers, we minimize our environmental footprint by systematically investing in resource efficiency and embedding conservation practices throughout our operations. In our investment practices, we list sustainability issues and risks that must be considered in due diligence checklists. A "Sustainability in Investment and Due Diligence Summary Form" is completed for all investments, is signed off on by the investment manager and is provided as part of the investment package. This form specifically asks if there are any climate related risks identified during the due diligence process. For operations, in 2017, we rolled out our Sustainable Building Standards. These standards encourage implementation of best practices in 13 sustainability aspects ranging from energy management and alternate transportation. The standards enable benchmarking of our sustainability performance and understanding of business outcomes. We measure our greenhouse gas emissions each year as well as related metrics including percentage of energy from renewable sources and number of electric vehicle charging stations. Further, we have set five-year targets for energy, water and waste and a long-term greenhouse gas emissions target for 2040 that aligns with national and international greenhouse gas emission reduction commitments. We report our progress to investors and other stakeholders through our Real Estate Sustainability Report and by responding to the annual GRESB for each fund and the PRI Direct Property Investing module.

HNRG: HNRG's CFO uses quarterly risk registry updates to assess climate-related risks and opportunities; whereas the HNRG COO uses those registries to manage related risk as described below.

NAL: NAL's primary source to assist in the identification of climate-related risks is through participation in the committees organized and managed by the Canadian Association of Petroleum Producers (CAPP). Our internal process includes the quantification of climate risks using internal emission manager software, including carbon pricing sensitivities when evaluating investment decisions, and actively seeking, testing and implementing carbon reduction technologies.

Renewable Energy: The risks of climate change are highlighted in our credit memos as we focus on changing hydrology from glacial melt or rain patterns or wind shifts in our wind projects. These risks are covered off by having debt service reserves and structuring transactions to have good coverage ratios such that transactions can absorb volatility in weather patterns. Risks at each project are identified at the time of the credit memo or initial investment and then the projects performance is monitored quarterly over the life of the investment.

C2.2c

(C2.2c) Which of the following risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Corporate level: Chief EO works in tandem with Regulatory and Public Affairs group to monitor current regulations and cascade through the organization as appropriate. Manulife's Legal and Compliance function is responsible for monitoring compliance with current regulations. BU level: Business unit Environmental Officers are responsible for monitoring regulatory changes in their sectors.
Emerging regulation	Relevant, always included	Corporate level: Chief EO works in tandem with Regulatory and Public Affairs group to monitor emerging regulations and cascades through the organization as appropriate. BU level: Business unit Environmental Officers are responsible for monitoring regulatory changes in their sectors.
Technology	Relevant, sometimes included	NAL: NAL assess technological solutions for lowering emissions and the costs associated with implementing these technologies as compliance costs rise.
Legal	Relevant, always included	Renewable Energy Financing: there may be legal/policy risk of termination of renewable energy contracts by sovereign.
Market	Relevant, sometimes included	Real Estate: Increasing demand for sustainable and energy efficient properties, particularly in the commercial office portfolio may lead to risk of properties underperforming or not meeting tenants' sustainability demands. Additionally, tenants and investors place greater expectations on companies to manage and disclose their sustainability performance.
Reputation	Relevant, always included	Regional Power: Regional Power works to ensure project objectives align with local stakeholder expectations to optimize our long-term returns. Risks and opportunities are identified during site selection and the development stages of our projects. We focus on selecting sites with limited points of environmental and community opposition and work to ensure sites meet environmental and technical requirements so economic restrictions won't be imposed.
Acute physical	Relevant, always included	Corporate level: An acute physical risk for Manulife is business disruption due to severe weather events. Manulife has business continuity policies, plans and procedures in place that take into account the risk of business disruption due to severe weather events.
Chronic physical	Relevant, always included	HNRG: As part of HNRG's risk assessments, the impact and management of chronic physical conditions such as drought and water scarcity are built into investment due diligence and operational procedures.
Upstream	Relevant, always included	Corporate: we require all vendors to sign a vendor code of conduct that includes environmental performance.
Downstream	Not relevant, explanation provided	Not applicable: as a life and health insurer, our clients/products aren't directly linked to climate change, although we have begun exploring indirect links between health and severe weather events.

C2.2d

(C2.2d) Describe your process(es) for managing climate-related risks and opportunities.

Company level: Manulife's Chief Environmental Officer (Chief EO) monitors current and emerging regulatory environment to identify and assess climate-related risks and cascades through the business units as appropriate. Business Unit Environmental (BU EOs) are responsible for environmental risk management, including climate, for their BUs and work in tandem with the Chief EO to assess and manage climate-related issues. We have regular contact with government, industry groups, peers and members of civil society to inform our understanding of external drivers and we prioritize based on business needs. Priority areas are those where we can improve to meet industry best practices or where there is a reputational advantage to take a leadership position.

Real Estate: Real Estate considers climate and natural hazard risks during its acquisition due diligence process. 3rd party consultants perform building assessments and rely on local studies and guidelines where available. Environmental assessments, building status reports and insurance renewals are conducted periodically depending on the risk profile of a property. The Engineering and Technical Services team assesses portfolio-level CC risks and opportunities and tracks and benchmarks energy and GHG emissions. Each of our properties are committed to following our Sustainable Building Standards, which encourage best practices in 13 sustainability aspects ranging from energy management and alternate transportation. The standards allow benchmarking of our performance and understanding of business outcomes. Further, we have set five-year targets for energy, water and waste and a long-term GHG emissions target to 2040 that aligns with national and international GHG emission reduction commitments. In 2017, our Renewable Energy Working group examined opportunities to increase renewable energy procurement and generation.

HNRG: Climate risk is assessed as part of the due diligence process for new acquisitions, where future water availability, fire and pest risk (among other issues) and carbon market opportunities are identified. Our investment goal is to build diversified investment portfolios that are likely to reduce risks over the life of the asset. An investment is either not made if climate change risk is too high or risks are mitigated by portfolio diversification. Prioritization of opportunities is based on return expectations. Once assets are acquired, management of climate-related risks becomes a matter of routine business. For example, forestry assets are managed to reduce the risk of wildfire which may be exacerbated by a change in climate. Similarly, water management for agricultural properties is a daily responsibility for farm managers and therefore routine even with increased warming and potentially restricted water flows in some environments.

Regional Power: We look to finance projects with long term access to renewable resources located in jurisdictions with defined development approval processes that have both a strong social license and economic contract and that will allow adequate cash flow over the life of the project meeting internal capital return requirements.

NAL Resources: Using the AS.NZ4360:2004 framework, we identify, analyse, mitigate and monitor risks across risk categories. The categories include financial, operational, legal/regulatory, human resources and reputational risks. Risks are evaluated on the consequence and likelihood of the risk occurring, within a 1 yr. and 5 yr. time frame, and then are prioritized utilizing a risk assessment matrix. Identified risks are monitored and reported on a quarterly basis.

Renewable Energy: The majority of our investments are supported by long term power purchase agreements with provincial utilities which are strong investment grade counterparties. These transactions are structured with strong debt service coverage ratios and reserves so they are able to withstand variable resource performance over the 20 to 40 years of the investment.

One identified transitional risk is reputational risk associated with the development of small hydro-electric projects by Regional Power. We work to ensure project objectives align with local stakeholders ensure ongoing success of the project through permitting, development and operational stages, which can span decades. Risks and opportunities are identified during site selection and the development stages of our projects. We focus on selecting sites with limited points of environmental and community opposition and work to ensure sites meet environmental and technical requirements so economic restrictions won't be imposed.

One identified physical risk is chronic risks associated with changes in precipitation patterns and extreme variability in weather patterns with HNRG. We include climate risk assessment as part of the due diligence process for new acquisitions and insure during this process that future water availability, fire and pest risk are identified.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Mandates on and regulation of existing products and services

Type of financial impact driver

Policy and legal: Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

The Montreal Protocol is leading to the phase-out of HCFC-22 gases in air conditioning equipment. A significant portion of the air conditioning units in Real Estate's portfolio uses HCFC refrigerants (primarily R-22), which is a potent GHG. Due to phase-out regulations in Canada and the U.S., HCFC-22 refrigerants are being eliminated from the supply chain and no HCFC-22 (R-22) equipment will be manufactured in or imported into Canada. These policies could increase service and maintenance requirements as HCFC equipment may need to be retired before its typical replacement period.

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

Medium-low

Potential financial impact

5000000

Explanation of financial impact

Assuming that 25%-50% of properties in Real Estate offices portfolio will require a chiller retrofit, capital costs could be in the range of \$5 million per year. In 2017, chiller replacements in Chicago received almost \$600,000 in government rebates to reduce this cost.

Management method

HCFC chillers, we try where possible to use low-GHG alternative gases. We are currently assessing the scale of this risk for operations and plan to compile a consolidated inventory of chiller equipment across the portfolio to design a strategy to comply with phase-out regulations.

Cost of management

0

Comment

There is no additional cost for managing this risk. It is part of Manulife Real Estate's Operations and Engineering and Technical Services group mandate.

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Increased pricing of GHG emissions

Type of financial impact driver

Policy and legal: Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

Carbon taxes and cap and trade programs came into effect in Alberta and Ontario (TBD based on new provincial government) in 2017, two provinces where Real Estate has operations, as well as in the state of California. A national price for carbon will be rolled out in Canada and some US States where Real Estate operates. Carbon pricing schemes increase operating costs and disproportionately impacts costs for less efficient properties.

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

Medium-low

Potential financial impact

4800000

Explanation of financial impact

The Canadian Tax Journal estimates that a \$50 per tonne Carbon tax would mean a 30% price increase in natural gas and a 13% price increase in electricity. This would translate to additional costs of \$4.8 million for all Canadian operations by 2022. Other regions, such as California, would also see proportionally similar costs.

Management method

Estimated budget increases from carbon pricing is included in property budgets, which rolls up to business planning. For example, in 2016, Real Estate's utility management consultants Solution 105 provided estimated cost increases to properties in Alberta for their 2017 budgeting process.

Cost of management

0

Comment

There is no additional cost for managing this risk. It is part of Manulife Real Estate's Operations and Engineering and Technical Services group mandate.

Identifier

Risk 3

Where in the value chain does the risk driver occur?

Customer

Risk type

Transition risk

Primary climate-related risk driver

Market: Changing customer behavior

Type of financial impact driver

Market: Reduced demand for goods and/or services due to shift in consumer preferences

Company- specific description

Increasing demand for sustainable and energy efficient properties, particularly in the commercial office portfolio may lead to risk of properties underperforming or not meeting tenants' sustainability demands. Additionally, tenants and investors place greater expectations on companies to manage and disclose their sustainability performance.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

Medium-low

Potential financial impact

1682000

Explanation of financial impact

Over the past 5 years, Manulife certified an average of 7 properties per year to LEED and 94 properties to Energy Star and BOMA BEST certification. Assuming an average additional cost for LEED certification of \$200,000 and \$3,000 for BOMA BEST and Energy Star, this results in an annual cost of almost \$1.5 million.

Management method

Given the rising demand among commercial tenants Manulife continues to invest in sustainability to attract and retain tenants and sustain occupancy. As of end of 2017, Manulife had 41.2 million square feet certified to LEED, BOMA BEST or Energy Star. An increase of 12.5M square feet in 2017.

Cost of management

0

Comment

There is no additional cost for managing this risk. It is part of Manulife Real Estate's Operations and Engineering and Technical Services group mandate. In addition to certification costs, capital expenses for energy efficiency-related refurbishments, and operational expenses for increased asset management efforts are estimated to represent up to 5% of total annual costs in the real estate portfolio.

Identifier

Risk 4

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Enhanced emissions-reporting obligations

Type of financial impact driver

Policy and legal: Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

Mandatory building disclosure for energy and water performance is in place in many US cities where Real Estate operates and was launched in the Province of Ontario in 2018. Other cities and regions will likely follow. These regulations add transparency may reduce demand for properties that are below average efficiency. These regulations may require capital to improve efficiency to make properties marketable.

Time horizon

Current

Likelihood

About as likely as not

Magnitude of impact

Low

Potential financial impact

Explanation of financial impact

Estimated financial impacts are difficult to assess as costs for any property will depend on local market performance relative to similar properties. Property costs may include lower vacancy rates in poorly performing properties or capital costs to improve efficiency. There are also small costs to comply with disclosure requirements.

Management method

Properties are required to disclose performance in Chicago, New York and Boston, due to municipal programs. Many properties

utilize third party consultants to comply with regulations and verify data. In 2017, Real Estate began updating its utility management system as part of a larger IT system update. The updated system is expected to facilitate compliance with future reporting requirements.

Cost of management

0

Comment

There is no additional cost for managing this risk. It is part of Manulife Real Estate's Operations and Engineering and Technical Services group mandate.

Identifier

Risk 5

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Physical risk

Primary climate-related risk driver

Chronic: Changes in precipitation patterns and extreme variability in weather patterns

Type of financial impact driver

Reduced revenue and higher costs from negative impacts on workforce (e.g., health, safety, absenteeism)

Company- specific description

Extreme high temperatures or increased presence of storms increase the risk of disrupted electricity supply resulting in the need to operationalize business continuity plans and ensure back-up fuel sources (i.e. generators). Also, extreme weather may result in increased absenteeism.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

Medium-low

Potential financial impact

Explanation of financial impact

Real Estate has not assessed the scale of this risk in financial terms, but we expect disruptions caused by extreme temperatures to have minimal impact on financial returns given the distributed nature of Real Estate's operations and the business continuity plans already in place for such events. Real Estate has already equipped properties with generation capacity to provide electricity during black-outs. Both at the time of acquisition, and on a rolling review basis, we identify flood risk, and prepare flood plans. These are conducted both by our Technical Services team, and our insurance provider.

Management method

Most properties have a business continuity plan to respond to supply disruptions. We also view improved energy efficiency as a method to manage the risk of extraordinary energy costs during periods of high electricity demand. Energy is tracked at all properties that pay for utilities. Annual performance at all properties is examined and reported internally by our energy management provider, Solution105.

Cost of management

5000000

Comment

The cost to develop and implement business continuity plans and flood plans is low, and mainly relates to internal employee training costs. With respect to energy costs, the extraordinary costs related to extreme weather in the real estate portfolio are estimated at \$5 million per year.

Identifier

Risk 6

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Enhanced emissions-reporting obligations

Type of financial impact driver

Policy and legal: Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

Alberta and Saskatchewan carbon tax implementation and integration with federal regulations is an unknown at this time. It is not clear how the carbon tax will be calculated for oil and gas producers. There will be an increased operational cost associated but we are challenged to accurately quantify it. Unmitigated carbon tax may result in certain types of production becoming uneconomic within NAL and industry.

Time horizon

Long-term

Likelihood

Very unlikely

Magnitude of impact

High

Potential financial impact

40000000

Explanation of financial impact

Federal Carbon tax rising to \$50/tonne by 2023. Unmitigated cost annually of ~\$40MM by 2023

Management method

Commenced implementation of an internal carbon price. Evaluating carbon reduction investment opportunities on a case-by-case basis.

Cost of management

250000

Comment

Capital costs on a per case basis. G&A costs of ~\$250k/year

Identifier

Risk 7

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Technology: Costs to transition to lower emissions technology

Type of financial impact driver

Technology: Costs to adopt/deploy new practices and processes

Company- specific description

Cost of compliance is increasing and likely continue to rise. The federal government is contemplating dropping the reporting threshold to 10,000 tonnes CO2e/year, which will capture more NAL facilities. Risk of future increase of carbon tax beyond \$50/tonne.

Time horizon

Long-term

Likelihood

Virtually certain

Magnitude of impact

Medium-low

Potential financial impact

500000

Explanation of financial impact

Draft regulatory framework recommending measuring and reporting high emission intensity sites three times (3x) per year

Management method

We are currently evaluating how this will be managed

Cost of management

200000

Comment

Cost to manage will increase as site visit required 3x year for high emission intensity sites

Identifier

Risk 8

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Enhanced emissions-reporting obligations

Type of financial impact driver

Policy and legal: Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

There are several new pieces of legislation implemented or pending. It is unclear how these will affect NAL's business going forward. We are engaged with industry associations and our peers to better understand the risks and opportunities, and how the legislation will be implemented.

Time horizon

Long-term

Likelihood

Virtually certain

Magnitude of impact

Low

Potential financial impact

Explanation of financial impact

Unknown at this time

Management method

Unknown at this time

Cost of management

Comment

Unknown at this time

Identifier

Risk 9

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Physical risk

Primary climate-related risk driver

Chronic: Rising mean temperatures

Type of financial impact driver

Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)

Company- specific description

One risk to our renewable energy investment portfolio is the changing environment. Rising temperatures may change rainfall and/or wind patterns and impact the amount of energy produced by the projects. We have structured these projects to meet certain coverage ratios which will help mitigate these effects.

Time horizon

Long-term

Likelihood

About as likely as not

Magnitude of impact

Low

Potential financial impact

10000000

Explanation of financial impact

Any variation in the resource would be absorbed by the strong coverage ratios that are embedded in the portfolio. We would actually not expect any real losses here except possibly in years 30 – 40 of some of the hydro projects.

Management method

Managed by current portfolio team.

Cost of management

0

Comment

Managed by current portfolio team. No additional cost of management.

Identifier

Risk 10

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Exposure to litigation

Type of financial impact driver

Policy and legal: Write-offs, asset impairment, and early retirement of existing assets due to policy changes

Company- specific description

Another risk that could impact certain projects would be political risk. The risk that certain contracts could be changed or terminated. We believe we have legal protection against these types of events as common law would be expected to prevail but nevertheless, this could be viewed as a risk.

Time horizon

Unknown

Likelihood

About as likely as not

Magnitude of impact

Low

Potential financial impact

10000000

Explanation of financial impact

Any variation in the resource would be absorbed by the strong coverage ratios that are embedded in the portfolio. We would actually not expect any real losses here except possibly in years 30 – 40 of some of the hydro projects and we estimate this to be around \$10MM.

Management method

Managed by current portfolio team.

Cost of management

0

Comment

Managed by current portfolio team. No additional cost of management.

C2.4**(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?**

Yes

C2.4a**(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.****Identifier**

Opp1

Where in the value chain does the opportunity occur?

Customer

Opportunity type

Products and services

Primary climate-related opportunity driver

Development and/or expansion of low emission goods and services

Type of financial impact driver

Increased revenue through demand for lower emissions products and services

Company- specific description

Commercial office tenants are increasingly looking to occupy properties that have superior environmental performance and support tenants' corporate sustainability objectives. Real Estate believes that its reputation as a leading owner and manager of green commercial real estate in North America has a positive impact on Manulife Real Estate's ability to attract and retain high-quality tenants and positively influence own Real Estate employees who work in those properties.

Time horizon

Current

Likelihood

Likely

Magnitude of impact

Medium-low

Potential financial impact**Explanation of financial impact**

Research published in the Journal of Portfolio Management (Sep. 2015) shows that properties with sustainability ratings or certifications (e.g. Energy Star, LEED, BOMA BEST) command rental rates that are roughly 3.7 per cent higher per square foot than otherwise identical properties. The same study demonstrates numerous other benefits, including lower rent concessions, higher occupancy and lower operating costs. From this study, it can be extrapolated that a LEED certification for example can add 10% on the market value of a property.

Strategy to realize opportunity

Energy efficiency investment and green building certification is managed at the asset-level with sign-off at the corporate-level. Manulife Real Estate encourages property managers to take advantage of local/regional energy efficiency incentives and green building schemes, such as LEED and BOMA Best (Canada). As of end of year 2017, Manulife had 41.2 million square feet certified to LEED, BOMA BEST or Energy Star. Real Estate integrates best sustainability practices in developments as well. In 2017, Manulife rolled out its Sustainable Building Standards at all properties. In 2017, 707 Fifth St, Calgary was awarded LEED CS Gold

for its strong sustainability design and features.

Cost to realize opportunity

0

Comment

Costs associated with building certifications are incorporated into a building's operating budget; or incorporated into the development proforma and new development budget. The cost of LEED certification varies depending on the type of certification being pursued. For new construction, LEED Gold certification can add up to 4 per cent to the cost of construction and more than \$100,000 in additional design/consulting fees. The cost of LEED certification for existing buildings varies depending on performance, and ranges from \$100,000 to \$500,000 depending on required building upgrades and external consulting fees

Identifier

Opp2

Where in the value chain does the opportunity occur?

Customer

Opportunity type

Products and services

Primary climate-related opportunity driver

Development and/or expansion of low emission goods and services

Type of financial impact driver

Increased revenue through demand for lower emissions products and services

Company- specific description

As tenant organizations place greater emphasis on their corporate sustainability goals, there is an opportunity to provide them with additional services related to climate change. One example would be providing tenants with renewable energy to power their operations. This can be achieved both from on-site renewable energy generation and by off-site renewable procurement.

Time horizon

Short-term

Likelihood

Likely

Magnitude of impact

Medium-low

Potential financial impact

700000

Explanation of financial impact

The primary benefits of a renewable energy strategy and tenant offering would be differentiation and to be seen as a good corporate citizen. If, Real Estate were able to procure or generate renewable electricity and sell to 20% of tenants to cover their electricity demand, at an average rate of \$5 per MWh, this could generate an additional \$700,000 annually.

Strategy to realize opportunity

In 2016 and 2017, Real Estate developed a strategy for renewable energy, which included large scale procurement and tenant offerings. In 2018, Real Estate seeks to validate its tenant offering strategy and secure commitment to increase renewable energy procurement in the portfolio.

Cost to realize opportunity

Comment

Management costs include time required to develop a renewable energy. This cost is still being assessed as part of our strategy.

Identifier

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Energy source

Primary climate-related opportunity driver

Use of lower-emission sources of energy

Type of financial impact driver

Returns on investment in low-emission technology

Company- specific description

Decreasing costs to produce renewable energy compared to rising overall costs for energy production create an opportunity to invest in renewable energy. Entering into long-term power purchase agreements (PPAs) provide an opportunity to support emissions reductions at properties and generate returns.

Time horizon

Short-term

Likelihood

Likely

Magnitude of impact

Medium-low

Potential financial impact

Explanation of financial impact

Impacts of the opportunity depend on many factors, including deal size and structure and future energy prices. It is therefore difficult to estimate. One PPA examined in Boston in 2016 had an estimated net present value savings ranging from \$500,000 - \$22 million.

Strategy to realize opportunity

In 2016, Real Estate participated in a consortium looking to procure renewable energy through a PPA although decided not to pursue the project. Real Estate also engaged Manulife investment teams to identify potential for sourcing renewable energy deals internally.

Cost to realize opportunity

Comment

The cost of management was predominantly time required by real estate employee to participate in the purchasing consortium. An energy consultant was utilized to assess the deal and help develop an overall strategy. This cost is still being assessed as part of our strategy.

Identifier

Opp4

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Resource efficiency

Primary climate-related opportunity driver

Other

Type of financial impact driver

Other, please specify (Resource effic., increased assets value)

Company- specific description

Manulife owns a significant portfolio of timber and agricultural land. With rising average temperatures induced by a changing climate, it is likely that we will experience a longer growing season in many regions which could increase productivity and thus the overall value of our land assets.

Time horizon

Long-term

Likelihood

Likely

Magnitude of impact

Medium

Potential financial impact

Explanation of financial impact

A significant portion of our agricultural land is located in North America. The IPCC reports that over the first few decades of this

century, moderate climate change would increase aggregate yields of rain-fed agriculture by 5–20%, but with important variability among regions. While it is difficult to predict what impact changing temperatures will have on the value of our agricultural assets over the next several decades, it could be in the range of +10-20%.

Strategy to realize opportunity

1. Identify those crops that farmers can produce competitively in a global market. Competitively produced crops include such staples as corn, soybeans, almonds, and walnuts. We eliminate crops that do not pass this screen. 2. Identify the low-cost production regions for those crop types that were identified in step (1). For example, although corn and soybeans can be grown in almost every state, we purchase land that produces these crops almost exclusively in the Midwest and the Mississippi Delta, avoiding higher-cost production areas. 3. Identify those properties in the low-cost production regions that have the highest expected risk-adjusted returns. Climate change-related risks figure into this analysis. This is the "bottom-up" part of the strategy, where our acquisition team and our property management partners focus their efforts. Potential acquisitions are screened to make sure properties meet client objectives and have attractive risk/return characteristics.

Cost to realize opportunity

0

Comment

The cost of managing the opportunity will likely not be materially different than managing assets today; rather management options will change. As such, cost of risk management in previous column is 0.

Identifier

Opp5

Where in the value chain does the opportunity occur?

Supply Chain

Opportunity type

Products and services

Primary climate-related opportunity driver

Development of new products or services through R&D and innovation

Type of financial impact driver

Other, please specify (Reduced exposure to GHGs/ carbon pricing)

Company- specific description

NAL has partnered with a company to replace and install low bleed controllers to reduce venting.

Time horizon

Current

Likelihood

Virtually certain

Magnitude of impact

Medium

Potential financial impact

2300000

Explanation of financial impact

Estimated reduction of emissions is 45,000 tonnes per year. Using the Federal government backstop of \$50/tonne equates to a reduction of carbon tax paid of ~\$2.3MM

Strategy to realize opportunity

Utilizing 3rd party company to assist management of the initiative

Cost to realize opportunity

0

Comment

Company we have partnered with installed the equipment at their cost in exchange for sharing the carbon credits which they would in turn market and sell to pay for the equipment. Once the capital expenditure has been covered, the 3rd party is sharing in net carbon tax benefits.

Identifier

Opp6

Where in the value chain does the opportunity occur?

Supply Chain

Opportunity type

Products and services

Primary climate-related opportunity driver

Development of new products or services through R&D and innovation

Type of financial impact driver

Other, please specify (Reduced exposure to GHGs/ carbon pricing)

Company- specific description

NAL is exploring additional technology to capture venting from production tanks.

Time horizon

Current

Likelihood

Very likely

Magnitude of impact

Medium-high

Potential financial impact

1100000

Explanation of financial impact

Estimated reduction of 21,000 tonnes of emission. Using the federal backstop of \$50/tonne equates to a reduction of carbon tax paid of \$1.1MM

Strategy to realize opportunity

NAL uses an emission software to track and report on emission from equipment Cost to realize opportunity: 50,000

Cost to realize opportunity

50000

Comment

Exploring options to capture and use vented gas from production tanks would be a capital cost to NAL, which is unknown at this time. We are continuing to explore options.

Identifier

Opp7

Where in the value chain does the opportunity occur?

Supply Chain

Opportunity type

Products and services

Primary climate-related opportunity driver

Development of new products or services through R&D and innovation

Type of financial impact driver

Other, please specify (Reduced exposure to GHGs/ carbon pricing)

Company- specific description

NAL will be testing solar powered chemical pumps in 2018. If successful, these pumps will replace gas-actuated pumps that vent.

Time horizon

Current

Likelihood

Virtually certain

Magnitude of impact

Medium-high

Potential financial impact

1100000

Explanation of financial impact

Estimated reduction of 21,000 tonnes of emission. Using the federal backstop of \$50/tonne equates to a reduction of carbon tax paid of \$1.1MM

Strategy to realize opportunity

NAL uses an emission software to track and report on emission from equipment Cost to realize opportunity: 25,000

Cost to realize opportunity

25000

Comment

Costs included managing emission software inventory, generating reports and analysis of flow/rates. Does not include purchase of the pumps, maintenance or repair or operations of the devices.

Identifier

Opp8

Where in the value chain does the opportunity occur?

Supply Chain

Opportunity type

Products and services

Primary climate-related opportunity driver

Development of new products or services through R&D and innovation

Type of financial impact driver

Other, please specify (Reduced exposure to GHGs/ carbon pricing)

Company- specific description

NAL is assessing 12 additional technologies aimed at GHG reduction

Time horizon

Current

Likelihood

Unknown

Magnitude of impact

Unknown

Potential financial impact**Explanation of financial impact**

Unknown

Strategy to realize opportunity

Unknown

Cost to realize opportunity**Comment**

NAL is assessing 12 technologies aimed at GHG reduction

Identifier

Opp9

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Energy source

Primary climate-related opportunity driver

Shift toward decentralized energy generation

Type of financial impact driver

Reputational benefits resulting in increased demand for goods/services

Company- specific description

A continued decline in solar panel prices will see more commercial properties adding solar panels to their roofs. We have already financed a small number of portfolios and anticipate more will come. These do need some support from local government and this has generally been halted in Ontario but we do believe over time these types of assets will come back and be financeable.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium

Potential financial impact

100000000

Explanation of financial impact

We see the potential from these types of portfolio financings in the range of \$100 million of EVA (Economic Value Add). This would be the profitability over comparable public transactions or opportunity cost investments.

Strategy to realize opportunity

Managed by current portfolio team.

Cost to realize opportunity

0

Comment

Managed by current portfolio team. No additional cost to realise opportunity.

Identifier

Opp10

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Markets

Primary climate-related opportunity driver

Other

Type of financial impact driver

Other, please specify (Increased review, greater demand)

Company- specific description

As with the above, our portfolio is dependent to some degree on the policy of government and the utilities providing Power Purchase Agreements to the market. We are at a low point in the cycle right now as BC, Ontario and Quebec are absorbing the costs from the previous cycle but anticipate within the next 5 years this part of the market will come back as these provinces enter new rounds of renewable energy growth.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium

Potential financial impact

250000000

Explanation of financial impact

As above, this number is an incremental value add number. We would typically participate in a large percentage of the new transactions in the Canadian market if and when they come to fruition. The amount would be earned over a 3 or 4-year period.

Strategy to realize opportunity

Managed by current portfolio team.

Cost to realize opportunity

0

Comment

Managed by current portfolio team. No additional cost to realise opportunity.

Identifier

Opp11

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Markets

Primary climate-related opportunity driver

Access to new markets

Type of financial impact driver

Increased diversification of financial assets (e.g., green bonds and infrastructure)

Company- specific description

Increased diversification of financial assets (e.g., green bonds and infrastructure) Company- specific description: In 2017, Manulife became the first life insurance company in the world to issue a green bond. The funds from the S\$500 million issue will be allocated based on Manulife's Green Bond Framework, which include making investments in renewable energy, sustainable buildings and other green infrastructure. We sought a second-party opinion on our Green Bond Framework, a document that sets out our thinking about green bonds, their purpose, and the governance and oversight we intend to apply to holding and issuing them. We also obtained certification for the bond from the Climate Bonds Initiative, a not-for profit organization that reviews specific transactions and how the proceeds are linked to assets that qualify as green.

Time horizon

Current

Likelihood

Very likely

Magnitude of impact

Unknown

Potential financial impact

0

Explanation of financial impact

At this point, it is unclear whether a green bond provides any pricing advantages. It does provide increased brand exposure and enhances our reputation with key stakeholders, including investors with ESG/green mandates, and regulators.

Strategy to realize opportunity

Managed by current Treasury function.

Cost to realize opportunity

Comment

There were marginal additional costs for verification of the framework and ongoing reporting.

C2.5

(C2.5) Describe where and how the identified risks and opportunities have impacted your business.

	Impact	Description
Products and services	Impacted for some suppliers, facilities, or product lines	Real Estate: established the Renewable Energy Working Group to develop a business plan to provide a clean energy offering to its tenants. This is a multi-stakeholder group that includes members from Manulife's specialized renewable energy project finance team and Regional Power to determine if there is an opportunity to leverage internal capabilities. Manulife Real Estate has also developed and implemented a real estate sustainability strategy to increase the environmental performance of its portfolio to make it more appealing to Fortune 500 and other top tier tenants with sustainability objectives.
Supply chain and/or value chain	Impacted for some suppliers, facilities, or product lines	Corporate: Manulife has in place a vendor code of conduct that includes adherence to environmental standards to ensure vendors perform to a minimum standard, helping reduce reputational risk to Manulife. The code must be signed by all vendors.
Adaptation and mitigation activities	Impacted for some suppliers, facilities, or product lines	Real Estate: investment and operational due diligence now includes assessments related to mitigation (e.g. energy efficiency opportunities) and adaptation (e.g. understanding impacts of severe weather events on critical equipment)
Investment in R&D	Impacted for some suppliers, facilities, or product lines	NAL: encouraged partnerships with companies and other external organizations to develop creative ways to source new technologies/innovations in processes to lower GHG emissions from operations
Operations	Impacted for some suppliers, facilities, or product lines	Real Estate: In 2017, Manulife Real Estate rolled out its Sustainable Building Standards program. This program applies to all properties, including those managed by third parties. The program seeks to manage risks from increasing energy costs, carbon pricing and regional disclosure initiatives by driving best practices in energy management at all properties. The standards also seek to capture opportunities from building certifications and tenant engagement on sustainability issues. The program impacts include additional costs and time to develop resources and implement programs at the property level. Costs are expected to be offset by increased returns from efficiency or otherwise justified to manage downside risk. NAL: impacted by cost incurred for changing out equipment. Carbon pricing model integrating into capital projects impacts return on investment. Impacts associated with acquisition economics.
Other, please specify	Please select	

C2.6

(C2.6) Describe where and how the identified risks and opportunities have factored into your financial planning process.

	Relevance	Description
Revenues	Not yet impacted	Real Estate: developing a renewable energy offering for tenants.
Operating costs	Impacted for some suppliers, facilities, or product lines	Real Estate: integrates climate related items into budgets to address risks and opportunities including energy audits and building certifications. These items may increase operating costs, however any increases are typically offset by savings from annual energy reductions.
Capital expenditures / capital allocation	Impacted for some suppliers, facilities, or product lines	Real Estate: At select properties, capital projects, such as installation of battery storage and electric vehicle charging stations increase capital expenditures. Ideally, these items are either offset by savings from energy efficiency or help to increase tenant satisfaction and decrease vacancy.
Acquisitions and divestments	Not yet impacted	Real Estate: Climate impacts are specifically examined during investments and are included in Manulife Real Estate's "Sustainability in Investment and Due Diligence Summary Form". No acquisitions have been abandoned or altered yet due specifically to climate change. It is expected that this may change in the near future as climate risks in different real estate markets become more transparent and are either priced into acquisitions or properties are not selected for investment.
Access to capital	Impacted	Corporate: We raise capital on an ongoing basis and in 2017 and again in 2018, saw market opportunities to issue green bonds. We are the 1st global life insurer to issue green bonds.
Assets	Not evaluated	
Liabilities	Not evaluated	
Other	Please select	

C3. Business Strategy

C3.1

(C3.1) Are climate-related issues integrated into your business strategy?

Yes

C3.1a

(C3.1a) Does your organization use climate-related scenario analysis to inform your business strategy?

No, but we anticipate doing so in the next two years

C3.1c

(C3.1c) Explain how climate-related issues are integrated into your business objectives and strategy.

i. A company-specific explanation of how business objectives and strategy have been influenced by climate-related issues can be seen in our Real Estate division where setting long-term GHG emission targets has been influenced by the increased importance of making the portfolio more sustainable. Each year, the Real Estate Executive Sustainability Steering Committee sets sustainability objectives. In 2017, these objectives included achieving a reduction of two per cent in energy consumption at properties where Manulife manages the utilities, and setting performance targets for water usage, waste management, greenhouse gas emissions. Select sustainability objectives were integrated into personal objectives for 2018. Annual objectives for the Executive Sustainability Steering Committee are integrated into strategy and operations by Committee members. Another area our business strategy has been influenced is in our investment strategy and the role renewable energy plays in our investment mix. In 2017, our new investments in renewable energy projects totalled \$1.7 billion. Since 2002, our cumulative investment in renewable energy projects is \$12.6 billion.

ii. Manulife Real Estates business strategy is linked to a newly set long-term GHG emission target (2040) and energy target of a 10% energy reduction by 2022. This energy target is intensity based with a 2017 baseline. These targets will inform capital investments, operational procedures and portfolio mix.

iii. One of the most substantive business decision made during the reporting year was having our GHG emissions externally verified for the first time. This is part of the ongoing development of our corporate GHG emissions reporting program. In 2017, we developed GHG accounting procedure to standardize methodologies and processes across our multiple business units and to expand on our reporting coverage and increase the quality of our reporting. We developed this tool to stay ahead of evolving international climate-related regulatory requirements as well as responding to stakeholder expectations regarding corporate disclosure practices.

iv. The aspects of climate change that have influenced the strategy include:

HNRG: Regulatory changes (e.g., California Sustainable Groundwater Management Act) and opportunities to develop climate beneficial projects that are adaptive to a changing climate have influenced business strategy. We continue to enhance our agricultural due diligence requirements on water availability to ensure that new acquisitions have a secure and stable water supply under regulatory structures such as the California Sustainable Groundwater Management Act. Specific business decisions include engagement in the development of Groundwater Sustainability Plans in California and water markets in Australia. Adaptation strategies are informed by HNRG's participation in the Climate Smart Land Network and MIT's Joint Program on the Science and Policy of Global Change.

Regional Power: Government regulations/policy launched in response to climate mitigation and adaptation requirements have influenced the strategy. For example, jurisdictions around North America have created programs and policies to incentivize renewable energy projects (e.g. Province of Ontario's Green Energy Act and feed-in tariff program and Alberta Electricity System Operator's Renewable Electricity Program). These government initiatives have created new opportunities for our project financing teams and for Regional Power and our renewable power investment has grown significantly over the past decade.

v. Renewable Energy Financing: the renewable energy sector is currently a primary area of strategic growth for our project financing teams as a result of government policy to promote the development of low carbon energy sources. We expect this to continue to be an area of growth in the short term (i.e. 3 years) as jurisdictions across North America seek to renew energy generation infrastructure to comply with national and subnational climate-related legislation.

vi. Real Estate: we aspire to be seen as a leader in sustainable real estate, and all our funds/portfolios received GRESB's Green Stars in 2017. We see this as driving value for our fund investors, shareholders and other stakeholders.

vii. Renewable Energy Financing: Our project finance team is unique among North American life insurance companies in that we directly originate the majority of our renewable energy investment opportunities. For example, we recently arranged \$812 million in senior secured debt in support of the construction and long-term operation of 12 renewable power projects located in Canada, holding a significant proportion for Manulife's own account.

viii. Manulife held sessions on climate change and the Paris Agreement for senior executives and other key Manulife employees to inform them of the agreement, and how it is likely to impact the external operating environment and Manulife business units.

C3.1g

(C3.1g) Why does your organization not use climate-related scenario analysis to inform your business strategy?

Business units perform a variety of climate-related analysis specific to their sectors. At the corporate level, we are currently reviewing how to operationalize the TCFD recommendations, including the possibility of using climate-related scenario analysis. We are participating in various industry working groups to inform our in-house practices, including the UNEP FI Investor Pilot of the TCFD recommendations.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Intensity target

C4.1b

(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).

Target reference number

Int 1

Scope

Scope 1+2 (location-based)

% emissions in Scope

27

% reduction from baseline year

2

Metric

Metric tons CO2e per square foot*

Base year

2016

Start year

2016

Normalized baseline year emissions covered by target (metric tons CO2e)

0.0063

Target year

2017

Is this a science-based target?

No, and we do not anticipate setting one in the next 2 years

% achieved (emissions)

100

Target status

Expired

Please explain

We target an annual 2% reduction in energy consumption and associated carbon emissions per square foot in our real estate portfolio.

% change anticipated in absolute Scope 1+2 emissions

1

% change anticipated in absolute Scope 3 emissions

0

Target reference number

Int 2

Scope

Scope 1+2 (location-based)

% emissions in Scope

27

% reduction from baseline year

10

Metric

Metric tons CO2e per square foot*

Base year

2017

Start year

2017

Normalized baseline year emissions covered by target (metric tons CO2e)

0.0058

Target year

2022

Is this a science-based target?

No, and we do not anticipate setting one in the next 2 years

% achieved (emissions)

0

Target status

New

Please explain

We are targeting a 10% energy reduction between 2017 to 2022 associated with carbon emission per square foot in our real estate portfolio .

% change anticipated in absolute Scope 1+2 emissions

-3

% change anticipated in absolute Scope 3 emissions

0

Target reference number

Int 3

Scope

Scope 1

% emissions in Scope

56

% reduction from baseline year

50

Metric

Metric tons CO2e per barrel of oil equivalent (BOE)

Base year

2017

Start year

2017

Normalized baseline year emissions covered by target (metric tons CO2e)

0.027

Target year

2022

Is this a science-based target?

No, and we do not anticipate setting one in the next 2 years

% achieved (emissions)

0

Target status

New

Please explain

We are targeting a 50% reduction in greenhouse gas emission intensity over five years in our oil and gas division, NAL Resources

% change anticipated in absolute Scope 1+2 emissions

-46

% change anticipated in absolute Scope 3 emissions

0

C4.2

(C4.2) Provide details of other key climate-related targets not already reported in question C4.1/a/b.

Target

Energy usage

KPI – Metric numerator

Energy usage Energy use (ekWh)

KPI – Metric denominator (intensity targets only)

Per square foot

Base year

2017

Start year

2017

Target year

2022

KPI in baseline year

19.2

KPI in target year

17.3

% achieved in reporting year

0

Target Status

New

Please explain

We are targeting a 10% energy reduction between 2017 to 2022 associated with equivalent kWh (ekWh) per square foot in our real estate portfolio

Part of emissions target

INT 2

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

Target

Waste

KPI – Metric numerator

Waste diversion rate (%)

KPI – Metric denominator (intensity targets only)**Base year**

2017

Start year

2017

Target year

2022

KPI in baseline year

52

KPI in target year

62

% achieved in reporting year

0

Target Status

New

Please explain

We are targeting a 65% waste diversion rate by 2022 associated in our real estate portfolio

Part of emissions target**Is this target part of an overarching initiative?**

No, it's not part of an overarching initiative

Target

Other, please specify (Water)

KPI – Metric numerator

Water use (L)

KPI – Metric denominator (intensity targets only)

Per square foot

Base year

2017

Start year

2017

Target year

2022

KPI in baseline year

61

KPI in target year

60.5

% achieved in reporting year

0

Target Status

New

Please explain

We are targeting a 7.5% water reduction between 2017 to 2022 associated with litres per square foot in our real estate portfolio

Part of emissions target

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Yes

C4.3a

(C4.3a) Identify the total number of projects at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of projects	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation		
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	28	12645
Not to be implemented	0	0

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Activity type

Low-carbon energy purchase

Description of activity

Other, please specify (Renewable energy purchases)

Estimated annual CO2e savings (metric tonnes CO2e)

12645

Scope

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

0

Investment required (unit currency – as specified in CC0.4)

82440

Payback period

>25 years

Estimated lifetime of the initiative

<1 year

Comment

Manulife Real Estate - 28 buildings purchased renewable energy in 2017. A total of 42,131 MWh of renewable energy was purchased.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Financial optimization calculations	Investments in emissions reduction are primarily driven by a strong business case for energy efficiency. Retrofits, building upgrades, retro-commissioning and other efficiency projects are implemented across the portfolio on an ongoing basis. Government incentives further contribute to the business case, increasing rate of return on efficiency projects.
Dedicated budget for other emissions reduction activities	Select properties and regions have a dedicated budget for purchasing renewable energy credits.
Employee engagement	Real Estate provides tools and training to investment, property management and operations staff regarding integrating sustainability, including energy efficiency and related carbon reductions into investment and asset management processes.
Compliance with regulatory requirements/standards	Real Estate complies with and exceeds all regulatory and code requirements for energy efficiency.
Internal incentives/recognition programs	Real Estate rolled out its Sustainable Building Standards program in 2017. This program rewards properties for implementing strong sustainability practices in 13 sustainability focus areas, of which 4 can be directly linked to mitigating climate impacts.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation

Group of products

Description of product/Group of products

Manulife Asset Management has developed and implemented low carbon/fossil fuel free investment strategies for institutional clients.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Low carbon investment strategies)

% revenue from low carbon product(s) in the reporting year

0.1

Comment

Revenue is not a good denominator for value of services for lifecos because it includes investment gains and losses. This value is below 1%.

Level of aggregation

Group of products

Description of product/Group of products

John Hancock Investments launched four new environmental, social and governance (ESG) funds

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Low carbon investment funds)

% revenue from low carbon product(s) in the reporting year

0.1

Comment

Revenue is not a good denominator for value of services for lifecos because it includes investment gains and losses. This value is below 1%.

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

383761

Comment

Scope 2 (location-based)

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

299072

Comment

Scope 2 (market-based)

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

291488

Comment

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.

ISO 14064-1

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Row 1

Gross global Scope 1 emissions (metric tons CO2e)

431932

End-year of reporting period

<Not Applicable>

Comment

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Row 1

Scope 2, location-based

283146

Scope 2, market-based (if applicable)

270707

End-year of reporting period

<Not Applicable>

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

Yes

C6.4a

(C6.4a) Provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure.

Source

Mobile Sources - owned and leased

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

No emissions excluded

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions excluded

Explain why the source is excluded

Manulife's owned and leased vehicles is considered to be a small source of GHG emissions relative to our owned and leased real estate portfolio. Efforts continue to focus on improving GHG emission reporting from our owned and leased real estate portfolio at this time.

Source

Refrigerants - real estate portfolio

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

No emissions excluded

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions excluded

Explain why the source is excluded

Our real estate property managers are not currently required to report refrigerant top-ups or other proxy data that would allow for calculating these GHG emissions. We estimate that refrigerants represent less than 1% of our emissions.

Source

Back-up fuel consumption - real estate portfolio

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

No emissions excluded

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions excluded

Explain why the source is excluded

We currently do not track diesel use for back-up power in our real estate portfolio. Based on individual building-level inventories, we estimate these emissions represent less than 1% of our total real estate emissions.

Source

Hancock National Resource Group (HNRG)

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

Emissions are not relevant

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions excluded

Explain why the source is excluded

The portion of HNRG's assets owned by Manulife make up less than 1% of Manulife's General Account assets and therefore is not material and has not been included at this time.

(C6.5) Account for your organization's Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Metric tonnes CO2e

13632

Emissions calculation methodology

We calculated the GHG emissions associated with our transactional and office paper. We apply a conversion factor of 2.541 mtCO2e/tonne of paper purchased. This emission factor is taken from the Environmental Paper Network 2015, Paper Calculator. We used the emission factor for uncoated freesheet, 0% recycled to be conservative in our calculation.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

Explanation

Capital goods

Evaluation status

Relevant, not yet calculated

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status

Relevant, not yet calculated

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Upstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

As a financial institution, emissions associated with upstream transportation and distribution are not considered material in the context of our Scope 3 value chain emission inventory.

Waste generated in operations

Evaluation status

Relevant, calculated

Metric tonnes CO2e

2699

Emissions calculation methodology

We measure the amount of waste to landfill in our real estate portfolio and apply a mixed municipal solid waste emission factor of 0.39 mtCO2e/tonne for waste. The emission factor comes from the EPA Waste Reduction Model (WARM), version 14, March 2016.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

25038

Emissions calculation methodology

Employee business travel by air and by passenger car mileage is tracked centrally by our procurement team who works with our travel partners in Canada and the U.S. Emission factors for air travel are provided by the UK Defra air travel factors – 2017. Three different emission factors were used 0.14 kg CO2e/km for a short haul (<417 km), 0.09 kg CO2e/km for medium haul (>+471km, <3700 km) and 0.10 kg CO2e/km for long haul (>+ 3700km). For personal car mileage the emission factor is from the EPA Emission Factor for Greenhouse Gas Inventories, Nov 2015.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Employee commuting

Evaluation status

Relevant, not yet calculated

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Upstream leased assets

Evaluation status

Relevant, not yet calculated

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Downstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Metric tonnes CO₂e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

As a financial institution, emissions associated with downstream transportation and distribution are not considered material in the context of our scope 3 value chain emission inventory.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO₂e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

As a financial institution, emissions associated with processing of sold products are not considered material in the context of our scope 3 value chain emission inventory.

Use of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO₂e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

As a financial institution, emissions associated with use of sold products are not considered material in the context of our scope 3 value chain emission inventory.

End of life treatment of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO₂e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

As a financial institution, emissions associated with end of life treatment of sold products are not considered material in the context of our scope 3 value chain emission inventory.

Downstream leased assets

Evaluation status

Relevant, not yet calculated

Metric tonnes CO₂e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Franchises

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Manulife does not operated under a franchise business model.

Investments

Evaluation status

Relevant, not yet calculated

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Other (upstream)

Evaluation status

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Other (downstream)

Evaluation status

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

C6.7

(C6.7) Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?

No

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure

0.0000122607

Metric numerator (Gross global combined Scope 1 and 2 emissions)

715078

Metric denominator

unit total revenue

Metric denominator: Unit total

58323000000

Scope 2 figure used

Location-based

% change from previous year

4

Direction of change

Decreased

Reason for change

Total revenues increased from 53.3 billion in 2016 to 58.3 billion in 2017. In addition to Manulife's focus to reduce energy at their properties through emission reduction activities.

Intensity figure

20.3

Metric numerator (Gross global combined Scope 1 and 2 emissions)

715078

Metric denominator

full time equivalent (FTE) employee

Metric denominator: Unit total

35153

Scope 2 figure used

Location-based

% change from previous year

2

Direction of change

Increased

Reason for change

Total FTE increased from 34,379 in 2016 to 35,153 in 2017.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization have greenhouse gas emissions other than carbon dioxide?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	431.48	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	203	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	242	IPCC Fourth Assessment Report (AR4 - 100 year)

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
Canada	421897
United States of America	3044
Other, please specify (Rest Of World (ROW))	6991

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Corporate	7250
Real Estate	23413
NAL Resources	401269

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam or cooling accounted in market-based approach (MWh)
Canada	145120	145066	457461	1371
United States of America	85045	72660	230005	39983
Other, please specify (Rest of World (ROW))	52981	52981	89331	0

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Corporate	39417	39417
Real Estate	135774	123335
NAL Resources	107955	107955

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Increased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined) and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption		<Not Applicable>		
Other emissions reduction activities	26985	Decreased	4	This reduction can be attributed to reduction in occupancy at many properties, more actual data provided (less estimated data), as well as Manulife's emission reduction activities that focus on reducing property energy use. The associated emissions decrease was 26,985 and our total Scope 1 and Scope 2 emissions reported in the previous year was 682,833 tCO2e, therefore we arrive at 4% through (26985/682,833)
Divestment		<Not Applicable>		
Acquisitions	59229	Increased	9	The increase is due to including emissions from acquisitions made by NAL Resources in Q4 which resulted in a doubling of production. The associated emissions increase was 59,229 tCO2e, and our total Scope 1 and Scope 2 emissions reported in the previous year was 682,833 tCO2e, therefore we arrived at 9% through (59229/682,833) *100 = 9%.
Mergers		<Not Applicable>		
Change in output		<Not Applicable>		
Change in methodology		<Not Applicable>		
Change in boundary		<Not Applicable>		
Change in physical operating conditions		<Not Applicable>		
Unidentified		<Not Applicable>		
Other		<Not Applicable>		

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Location-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 0% but less than or equal to 5%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertakes this energy-related activity
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	No

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	0	1033553	1033553
Consumption of purchased or acquired electricity	<Not Applicable>	41354	717283	758637
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	18160	18160
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Total energy consumption	<Not Applicable>	41354	1760535	1801889

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	No
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Fuels (excluding feedstocks)

Natural Gas

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

1025092

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

Fuels (excluding feedstocks)

Motor Gasoline

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

8461

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

C8.2d

(C8.2d) List the average emission factors of the fuels reported in C8.2c.

Motor Gasoline

Emission factor

2.462

Unit

kg CO2e per liter

Emission factor source

Environment Canada National Inventory Report 1990-2015, Part 2, Annex 6, Table A6-12, written 2017

Comment

Natural Gas

Emission factor

1.945

Unit

kg CO2e per m3

Emission factor source

US EPA's Emission Factors Hub, November 2015(<http://www.epa.gov/climateleaders/guidance/ghg-emissions.html>). Conversion factor for Btu to m3 taken from Portfolio Manager Technical Reference: Thermal Conversion Factors Environment Canada National Inventory Report 1990-2015, Part 2, Annex 6 Table A6-1 and A6-2, written in 2017

Comment

C8.2f

(C8.2f) Provide details on the electricity, heat, steam and/or cooling amounts that were accounted for at a low-carbon emission factor in the market-based Scope 2 figure reported in C6.3.

Basis for applying a low-carbon emission factor

Energy attribute certificates, Renewable Energy Certificates (RECs)

Low-carbon technology type

Other low-carbon technology, please specify (Unknown)

MWh consumed associated with low-carbon electricity, heat, steam or cooling

41354

Emission factor (in units of metric tons CO2e per MWh)

0

Comment

Our operations in the US and Canada have purchased REC's to cover part of their GHG emissions during the reporting year.

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 and/or Scope 2 emissions and attach the relevant statements.

Scope

Scope 1

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

Manulife CY2017 Assurance Statement.pdf

Page/ section reference

1-2

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope

Scope 2 location-based

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

Manulife CY2017 Assurance Statement.pdf

Page/ section reference

1-2

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope

Scope 2 market-based

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

Manulife CY2017 Assurance Statement.pdf

Page/ section reference

1-2

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope

Scope 3- at least one applicable category

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Attach the statement

Manulife CY2017 Assurance Statement.pdf

Page/section reference

1-2

Relevant standard

ISO14064-3

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

No, we do not verify any other climate-related information reported in our CDP disclosure

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

Alberta carbon tax

Alberta SGER

Other carbon tax, please specify (Canadian Federal Carbon Tax)

C11.1b

(C11.1b) Complete the following table for each of the emissions trading systems in which you participate.

Alberta SGER

% of Scope 1 emissions covered by the ETS

17

Period start date

January 1 2018

Period end date

December 31 2018

Allowances allocated

0

Allowances purchased

0

Verified emissions in metric tons CO₂e

0

Details of ownership

Other, please specify (Unknown at this time)

Comment

Alberta Environment has not completed the rollout of the implications related to gas plants that report under CCIR. Expect Q3 2018

C11.1c

(C11.1c) Complete the following table for each of the tax systems in which you participate.

Alberta carbon tax

Period start date

January 1 2018

Period end date

December 31 2018

% of emissions covered by tax

100

Total cost of tax paid

Comment

This coverage is 100% of NAL's Alberta emissions.

Other carbon tax, please specify

Period start date

January 1 2023

Period end date

December 31 2023

% of emissions covered by tax

100

Total cost of tax paid

40000000

Comment

Unmitigated estimate of \$40MM.

C11.1d

(C11.1d) What is your strategy for complying with the systems in which you participate or anticipate participating?

NAL: our strategy to comply with the systems in which we participate is to use internal emission manager software to continually monitor GHG emissions and prepare and send annual reports to requested government authorities. We use the information collected here to determine ways to reduce our direct GHG emissions. An example of how we have applied our strategy is the setting of a GHG target in 2017. The target is for a 50% reduction in GHG emission intensity (metric tonnes of CO₂e per BOE) over five years (2017 to 2022).

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

No

C11.3

(C11.3) Does your organization use an internal price on carbon?

Yes

C11.3a

(C11.3a) Provide details of how your organization uses an internal price on carbon.

Objective for implementing an internal carbon price

Change internal behavior

GHG Scope

Scope 1

Scope 2

Application

Carbon Tax is applied to all areas of the business including corporate building, field operations, transportation

Actual price(s) used (Currency /metric ton)

30

Variance of price(s) used

Currently in AB \$30/tonne increasing to \$50/tonne in 2023 There is currently no carbon tax in Saskatchewan

Type of internal carbon price

Shadow price

Implicit price

Impact & implication

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our customers

Yes, other partners in the value chain

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement

Education/information sharing

Details of engagement

Share information about your products and relevant certification schemes (i.e. Energy STAR)

Size of engagement

100

% Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

Real Estate fund investors increasingly care about climate risks and opportunities and want to see that they are being managed. Real Estate therefore wants to demonstrate to investors that climate change and sustainability are important and are managed in their portfolios. All investors are engaged through GRESB and sustainability reporting initiatives. 100% of our properties are included in our GRESB response. This information is all available to investors. Further we list the percentage of our portfolio with building certifications in our Sustainability Report, which is publicly available.

Impact of engagement, including measures of success

Manulife Real Estate participated in the Global Real Estate Sustainability Benchmark (GRESB) each year for all funds. GRESB is an investor led initiative to benchmark real estate funds on sustainability performance, including aspects of climate risk and opportunity. In addition, Real Estate produces a sustainability report each year for all stakeholders including investors. The sustainability report includes a section on supporting the transition to a clean economy that details how Real Estate is addressing risks and opportunities related to climate change.

Type of engagement

Education/information sharing

Details of engagement

Run an engagement campaign to educate customers about the climate change impacts of (using) your products, goods, and/or services

Size of engagement

100

% Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

Tenants' behaviour has major impacts on a building's energy usage and waste production as well as use of alternate transportation and other factors that can mitigate climate impacts. By engaging tenants, Real Estate can have a much greater impact. All Real Estate properties are encouraged to participate in some form of tenant engagement. 100% - Our Sustainable Building Standards are applicable to all properties and include tenant engagement strategies and tenant campaign materials for all properties

Impact of engagement, including measures of success

Manulife's Real Estate division engages with tenants (i.e. customers) to foster a commitment to energy conservation, waste and carbon emission reductions. E-mail communications, tenant sustainability handbooks, newsletters, building campaign posters, LCD displays in elevators and building websites are all utilized to promote and provide updates on Manulife's initiatives and to offer ongoing reinforcement and continual education. Success is measured by improvements to footprint year over year. In 2017, Real Estate rolled out its Sustainable Building Standards which promote tenant engagement and provide properties with resources to support their engagement activities.

C12.1c

(C12.1c) Give details of your climate-related engagement strategy with other partners in the value chain.

Manulife considers other partners in the value chain to be employees, regulators, civil society and industry peers. The purpose of our climate-related engagement activities is to build our own capacity/knowledge on climate issues, help capacity build in our sector, and ensure our value chain is aligned on the management of climate-related issues.

In 2017, Manulife collaborated on the following climate-related engagement strategies:

- Manulife’s Chief Financial Officer signed the Accounting for Sustainability (A4S) letter supporting the recommendations of the Financial Stability Board’s Task Force on Climate-related Financial Disclosures.
- Manulife Asset Management (MAM), Manulife’s global third-party asset management arm, was one of the founding members of the Climate Action 100+, a five-year collaborative engagement initiative involving more than 200 institutional investors. Through this initiative, MAM will engage with investee companies to better understand their climate risk plans and disclosures, and advocate for better practices where necessary.
- Manulife Asset Management is participating in the UNEP FI investor pilot of the TCFD recommendations.
- Hancock Natural Resources Group (HNRG) sponsored the Massachusetts Institute of Technology’s Joint Program on the Science and Policy of Global Change, providing HNRG with cutting-edge, authoritative, peer-reviewed science related to climate change, drawing upon a range of academic disciplines from oceanography to economics.
- Manulife partnered with the Intact Centre for Climate Adaptation at the University of Waterloo to launch a foundational study of the impact of climate change on health.
- Manulife Real Estate trained more than 200 of its employees on applying sustainability fundamentals in their roles.
- Manulife Real Estate established a cross-company renewable energy working group to explore future low-carbon and carbon-free investment opportunities.
- Manulife Real Estate developed a network of more than 125 green champions, each of whom acts as the sustainability point person and role model at their respective properties.

C12.3

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

- Direct engagement with policy makers
- Trade associations
- Funding research organizations
- Other

C12.3a

(C12.3a) On what issues have you been engaging directly with policy makers?

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Other, please specify (U.S. Climate Policy)	Neutral	National Alliance of Forest Owners (NAFO) and by extension HNRG is attempting to clarify the treatment of carbon emissions from forest biomass as carbon beneficial	Amendment to the Clean Air Act.

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

Yes

C12.3c

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

Trade association

Canadian Association of Petroleum Producers

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

CAPP's position on climate change policy is that it should deliver economic growth, environmental protection and a secure and reliable energy supply. It should be designed to be efficient, predictable and stable, and promote investment in technology that allows Canadian industry to maintain competitive with other foreign jurisdictions.

How have you, or are you attempting to, influence the position?

NAL is actively engaged with the CAPP Board of Governors as well as in several CAPP committees and executive policy groups. Through NAL's participation in CAPP governance, the company is in a position to influence policy positions related to climate change.

Trade association

National Alliance of Forest Owners (NAFO)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

This industry group is actively engaged in US policy discussions surrounding EPA GHG reporting for biomass combustion for energy generation.

How have you, or are you attempting to, influence the position?

Member of National Alliance of Forest Owners.

Trade association

Australian Forest Products Association (AFPA)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

AFPA is lobbying the Australian government to influence climate policy development. The AFPA is supportive of a carbon price, and forest carbon offsets, as long as these policies/programs don't impact the competitiveness of Australia's forest products industry.

How have you, or are you attempting to, influence the position?

Member of Australian Forest Products Association.

Trade association

U.S. Industrial Pellet Association (USIPA)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

USIPA is actively engaged in US and European policy discussions related to renewable energy directives and sustainability of biomass supply criteria.

How have you, or are you attempting to, influence the position?

Member of U.S. Industrial Pellet Association.

Trade association

Geneva Association

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The Geneva Association put out a Climate Risk Statement in support of adaptation measures and other policy changes: <https://www.genevaassociation.org/research-topics/extreme-events-and-climate-risk/climate-risk-statement-geneva-association>.

How have you, or are you attempting to, influence the position?

Manulife is a member.

Trade association

REALpac

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

From the REALpac website "REALpac recognizes the significant environmental, social, and economic impact of Canada's commercial real property sector, the need for an industrial driven approach toward supporting national and provincial strategies on greenhouse gas reduction, the importance of reasoned discourse with political and policy officials and the value of persuasive arguments for sustainable economic growth. The Association also recognizes the need for industry-wide "green" benchmarking data and shared best practices, and is working with its constituents and its national and international counterparts to help to responsibly ensure the sector is well positioned for a sustainable future".

How have you, or are you attempting to, influence the position?

A Manulife employee sits on the REALpac ESG committee and provides contributions for Ontario's future declaration and reporting requirements.

Trade association

The Canadian Green Building Council (CaGBC)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The CaGBC provided recommendations on how to help meet Canada's GHG reduction goals in a 2016 report. The report outlines four key recommendations aimed at meeting Canada's climate change targets while fueling the growth of Canada's sustainable building industry. The four recommendations include new data proving the effectiveness of these measures, if taken immediately: 1. Meet Canada's climate change targets by investing in and providing incentives for energy efficiency improvements (such as recommissioning, deep retrofits, solar and renewable onsite energy systems, and switching of fuel systems) in existing buildings commercial, institutional and high-rise residential buildings over 25,000 sq.ft., to reach high-performance energy efficiency. 2. Strengthen building performance by advancing building energy benchmarking, reporting and disclosure initiatives 3. Invest in net zero buildings 4. Reduce the Government's GHG Emissions

How have you, or are you attempting to, influence the position?

A Real Estate employee sits on the Board of the CaGBC and has recently been elected as the chair of the Board. The Board member will provide his experience in property and asset management and contribute to the overall governance of the organization.

Trade association

A Better City

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

A Better City is a diverse group of business leaders united around a common goal — to enhance Boston and the region's economic health, competitiveness, vibrancy, sustainability and quality of life. A Better City develops solutions and influences policy in three critical areas central to the Boston region's economic competitiveness and growth — transportation and infrastructure, land use and development, and environment and energy. Under environment and energy, A Better City has three focus areas, including reducing carbon emissions and building climate resiliency. A better City has developed several resources and undertaken multiple initiatives to advance these areas.

How have you, or are you attempting to, influence the position?

Member

Trade association

Association of Power Producers of Ontario (AAPRO)

Is your position on climate change consistent with theirs?

Mixed

Please explain the trade association's position

APPRO exists to ensure that the market for electrical production is competitive, efficient, open to new entrants, and as fair as possible and its primary focus is advocacy for generators. APPRO has supported GHG reduction initiatives with a focus on a market

based solution.

How have you, or are you attempting to, influence the position?

An employee is on the board of directors of the Association of Power Producers of Ontario. We have participated directly with this association to lobby for new generation programs and have assisted in drafting or commenting on new procurement initiatives.

Trade association

Ontario Waterpower Association (OWA)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

From the OWA website, "OWA is a not-for profit, member based organization promoting the sustainable development of waterpower resources in Ontario." OWA is a strong advocate of climate change initiatives.

How have you, or are you attempting to, influence the position?

An employee is a founding member of OWA. We have participated directly with this association to lobby for new generation programs and have assisted in drafting or commenting on new procurement initiatives.

Trade association

Clean Energy BC

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

From the Clean Energy BC website, "Clean Energy BC has been the voice of British Columbia's Clean Energy industry for the past 25 years. The purpose of the association is to: - Promote BC's clean energy industry - Assist the growth of manufacturing supply, and service industry in BC serving clean energy production in BC and around the world. - Build relationships with all levels of government, BC Hydro, First Nations, environmental organizations and the public to improve the sector's social licence. - Ensure the business and regulatory climate is reasonable and efficient for operating assets. - Improve the regulatory and economic environments for clean energy production in BC - Work with environmental organizations to develop science based clean energy development models.

How have you, or are you attempting to, influence the position?

An employee is a founding member of Clean Energy BC. We have participated directly with this association to lobby for new generation programs and have assisted in drafting or commenting on new procurement initiatives.

C12.3d

(C12.3d) Do you publicly disclose a list of all research organizations that you fund?

No

C12.3e

(C12.3e) Provide details of the other engagement activities that you undertake.

HNRG is a member of the Climate Smart Land Network (CSLN). CSLN is an alliance of forest landowners and land managers that are working together to respond to the challenges posed by climate change. The program is structured to assist Network members in identifying and implementing pragmatic on-the-ground solutions that both meet their management goals and increase natural system resiliency to climate change.

The Global Real Estate Sustainability Benchmark (GRESB) – Manulife Real Estate employees participated in GRESB industry events in Canada, including a panel on transitioning to a low carbon in real estate. Real Estate aspires to join GRESB as an investor member in 2017.

NAL has recently engaged Saskatchewan Research Council (SRC). This organization has developed a technical handbook identifying climate issues with potential technologies, equipment, process and solutions to implement to effectively reduce, capture and re-use emissions.

NAL is actively engaged on several committees with the Petroleum Technology Alliance of Canada (PTAC). This funding organization is in a position to test new technologies providing feedback to regulatory bodies and industry on solutions to address the climate change landscape.;

Regional Power is a member of the Canadian Wind Energy Association and Canadian Solar Energy Association. During 2016, we advanced the development of the 90WM Irma Wind project which involved extensive environmental reviews and stakeholder engagement.

Manulife Asset Management became a signatory to the CDP in January 2018.

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

We have a number of sustainability practitioners that liaise informally with each other and our Regulatory and Public Affairs group to ensure consistency. We are in the process of formalizing mechanisms for communications to ensure better consistency.

C12.4

(C12.4) Have you published information about your organization’s response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication

In mainstream reports

Status

Complete

Attach the document

Content elements

Risks & opportunities

Publication

In voluntary sustainability report

Status

Complete

Attach the document

Content elements

Governance

Strategy

Risks & opportunities

Emissions figures

Other metrics

C14. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

C14.1

(C14.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	CFO, Manulife	Chief Financial Officer (CFO)

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	58323000000

SC0.2

(SC0.2) Do you have an ISIN for your company that you would be willing to share with CDP?

Yes

SC0.2a

(SC0.2a) Please use the table below to share your ISIN.

	ISIN country code (2 letters)	ISIN numeric identifier and single check digit (10 numbers overall)
Row 1	CA	56501R1064

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Requesting member

Accenture

Scope of emissions

Scope 1

Emissions in metric tonnes of CO₂e

109

Uncertainty (±%)

20

Major sources of emissions

Stationary combustion

Verified

No

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Corporate level GHG emissions data was used to produce this allocation estimate. The market value of services purchased by Accenture was divided by the total market value of services delivered by Manulife in 2017. We used this proportion to allocate Manulife's corporate level Scope 1 emissions data to Accenture. There are significant limitations to this process, namely that the delivery of insurance services is not directly linked to the GHG emitting activities of the firm which are located within Manulife's asset management division.

Requesting member

Accenture

Scope of emissions

Scope 2

Emissions in metric tonnes of CO2e

71

Uncertainty (±%)

20

Major sources of emissions

Purchased electricity, district heating and cooling

Verified

No

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Corporate level GHG emissions data was used to produce this allocation estimate. The market value of services purchased by Accenture was divided by the total market value of services delivered by Manulife in 2017. We used this proportion to allocate Manulife's corporate level scope 2 GHG emissions data to Accenture. There are significant limitations to this process, namely that the delivery of insurance services is not directly linked to the GHG emitting activities of the firm which are located within Manulife's asset management division.

Requesting member

TD Bank Group

Scope of emissions

Scope 1

Emissions in metric tonnes of CO2e

1734

Uncertainty (±%)

20

Major sources of emissions

Stationary combustion

Verified

No

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Corporate level GHG emissions data was used to produce this allocation estimate. The market value of services purchased by TD Bank Group was divided by the total market value of services delivered by Manulife in 2017. We used this proportion to allocate Manulife's corporate level Scope 1 emissions data to Accenture. There are significant limitations to this process, namely that the delivery of insurance services is not directly linked to the GHG emitting activities of the firm which are located within Manulife's asset management division.

Requesting member

TD Bank Group

Scope of emissions

Scope 2

Emissions in metric tonnes of CO2e

1137

Uncertainty (±%)

20

Major sources of emissions

Purchased electricity, district heating and cooling

Verified

No

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Corporate level GHG emissions data was used to produce this allocation estimate. The market value of services purchased by TD Bank Group was divided by the total market value of services delivered by Manulife in 2017. We used this proportion to allocate Manulife's corporate level scope 2 GHG emissions data to Accenture. There are significant limitations to this process, namely that the delivery of insurance services is not directly linked to the GHG emitting activities of the firm which are located within Manulife's asset management division.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

We do not use published information to allocate emissions in SM1.1. We use primary data based on our calculated GHG Inventory and our revenue. Since we are a financial services firm, we use the economic allocation approach. This is consistent with the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard. We have allocated scope 1 and 2 emissions based on each customer's contribution to our annual revenue for the 2016 reporting year.

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
Customer base is too large and diverse to accurately track emissions to the customer level	The following would help overcome these challenges: more demand from customers to provide these emissions allocations; a methodology to provide greater certainty that the allocation of emissions is consistent by all respondents.

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

No

SC1.4b

(SC1.4b) Explain why you do not plan to develop capabilities to allocate emissions to your customers.

The current 'allocation based on the market value of products purchased' is the most appropriate method to allocate emissions to our customers.

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

No

SC3.1

(SC3.1) Do you want to enroll in the 2018-2019 CDP Action Exchange initiative?

No

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2017-2018 Action Exchange initiative?

No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services, if so, what functionality will you be using?

No, I am not providing data

SC4.2d

(SC4.2d) Have any of the initiatives described in SC4.2c been driven by requesting CDP Supply Chain members?

No

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	Public or Non-Public Submission	I am submitting to	Are you ready to submit the additional Supply Chain Questions?
I am submitting my response	Public	Investors Customers	Yes, submit Supply Chain Questions now

Please confirm below

I have read and accept the applicable Terms