CLIMATE RISK SCENARIO ANALYSIS:
An Executive Primer

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Climate change poses foreseeable physical and transition risks, but uncertainty remains in the magnitude of impact, timing, and policy pathways that will actually come to pass. As part of the climate risk assessment process, scenario analysis enables firms to investigate how potential future developments may translate into business risks and opportunities. While scenario analysis is a well-established tool used to test plausible economic or financial outcomes, the application to climate risk is a relatively new innovation. In this short primer, we look at why climate scenarios are a useful tool, how policy is evolving, and the challenges and benefits that financial firms are experiencing as they undertake these assessments.

1. OVERVIEW OF CLIMATE RISK

Climate-related risks were ranked both the most likely and impactful in the *Global Risks Report 2020* by the World Economic Forum, which helped to bring international recognition to the urgency of this long-term issue (See Figure 1). The irreversible nature of climate-induced damage, together with its far-reaching impact and magnitude, compels both political and economic actions. Correspondingly, more than 120 global governments thus far have committed to a net-zero carbon emissions target by 2050 in alignment with the Paris Agreement[1]. These commitments include major economies such as the European Union, China, and the United States. In alignment with these targets, investor-led initiatives such as Climate Action 100+* and many others are demanding tangible actions from public companies to align with net zero targets and drive the clean energy transition.

Figure 1: Global Risk Report 2020 — Long-Term Risk Outlook

Source: World Economic Forum

Climate risk has been recognized as posing unique challenges to Canada's financial stability[2]. The federal government has tabled Bill C-12 *Canadian Net-Zero Emissions Accountability Act* which, if passed, would legislate net zero carbon emissions by 2050 and steer the evolution and development of our economy in the coming decades. This is no easy task for Canada — a top 10 global emitter with major elements of the economy driven by high emitting sectors. Therefore, pathways to net zero are needed that do not have severe economic and social repercussions, yet position Canada as a leader in a low carbon world. With the dominant global economies driving net zero emissions, our failure to anticipate and make timely adjustments for these market changes will impact companies' financial performance and creditworthiness as we hit up against divestment, carbon pricing, and trade barriers.

* Climate Action 100+ is a global initiative led by investors to ensure the corporate greenhouse gas emitters take necessary action on climate change, drive the clean energy transition, and help achieve the Paris Agreement goals. More information can be found at https://www.climateaction100.org/

In this complex and fast changing competitive landscape, Canadian financial institutions face complex risks arising from both the physical impacts of climate change, and a range of risks arising from the transition to a low carbon economy. These changes are foreseeable, but uncertainty remains in magnitude of impact, timing, as well as the actual pathways that will be taken. To effectively manage and respond to climate change, financial institutions are urged to examine a series of plausible potential scenarios and understand the financial implications across different pathways to 2050.

2. SUPPORT FOR THE USE OF CLIMATE SCENARIOS

To help companies and investors appropriately assess and price climate-related risks and opportunities, the Financial Stability Board (FSB) formed the Task Force on Climate-related Financial Disclosures (TCFD) which provided widely accepted recommendations in 2017.

A cornerstone of the TCFD recommendations was the use of scenario-based assessments to model potential future pathways and gain insights for business strategy planning. The adoption has since grown in prominence; a recent official TCFD status report highlighted that 56 per cent of firms disclosing in alignment with their recommendations reported using climate scenarios in 2019, including 24 financial firms in Canada.[3]

In parallel, central banks and supervisors across eight countries established the Network for Greening the Financial System (NGFS) to enhance the development of environmental risk management practices. Since its founding in 2017, the coalition has grown to more than 70 members, including Canada. The NGFS recognizes scenario analysis as an essential tool to understand climate risk and is leading the development of a harmonized set of scenarios for central banks and regulators to leverage. In May 2020, the Bank of Canada published a first-of-its-kind discussion paper using scenario analysis to assess the potential risks of climate change to financial system stability. The Bank has announced they are following up with a set of Canada-specific reference scenarios for use by firms.

In terms of encouraging use among financial firms specifically, the Bank of England's Prudential Regulation Authority (PRA) was the first regulatory body that requested insurers to consider how their businesses would be impacted under different physical and transition scenarios[4] and have since announced that the 2021 Biennial Exploratory Scenarios will be on climate risk and undertaken by all banks and insurance companies. In late 2020, Bank of Canada and the Office of the Superintendent of Financial Institutions (OSFI) announced their plans for a pilot project that uses climate scenarios to better understand the financial system risks related to a low-carbon economic transition. Six Canadian financial institutions, including Intact Financial, Manulife, Royal Bank of Canada, Sun Life Financial, TD Bank Group, and Co-operators Group Limited, have all agreed to participate voluntarily in the project.

Several international organizations have supported financial firms to pioneer approaches to climate scenarios as a novel exercise over the last few years. For example, in 2018, 20 institutional investors, including Canadian asset managers, partnered with the UN Environment Programme Finance Initiative (UNEP FI) to co-develop scenario-based assessments and test the impact of climate change on their portfolios[5]. In 2019, 17 international banks road-tested the Paris Agreement Capital Transition Assessment (PACTA) to align their lending portfolios with climate scenarios. In 2020, the Investor Leadership Network (ILN) released a report[6] with detailed guidance for global investors on climate-related disclosures, including a structured approach for investors to assess, evaluate, and reflect climate scenario analysis in firm disclosures. Participants of these projects have consistently reflected that scenario analysis is critical for market participants to develop informed strategies, direct attention to key risk metrics, and build resiliency in their portfolios.

Although climate-related financial disclosures are not yet mandatory in Canada, corporations operating under Canadian securities regulations have a responsibility to disclose any material risks that may impact shareholders' investment decisions. Furthermore, the Canadian Securities Administrators (CSA) urges issuers to disclose any climate-related risks that are material to their business[7]. This has focused investor scrutiny on firms to include climate risk

information and scenario analysis in disclosures where climate has been determined material.

3. CLIMATE SCENARIOS – WHAT THEY ARE AND HOW THEY INFORM BUSINESS STRATEGY

As part of the risk assessment process, scenario analysis enables firms to understand how potential future developments may translate into business risks and opportunities. While scenario analysis is a well-established tool to stress-test unfavourable economic or financial outcomes, the application to climate risk is a relatively new innovation.

Unlike traditional risk modelling that can leverage historical trends, past data has limited predictive value in climate risk assessment. This forward-looking risk is dependent on the occurrence of unique extreme weather events, widespread systemic change in behaviour, or policy change internationally and domestically. Hence, it requires new ways of thinking to understand and quantify the impact of climate risk.

The focus for scenario modelling is on two types of climate risk: physical and transition.

Physical scenarios investigate the effects extreme weather events have on assets, communities, and ecosystems; such as damage to infrastructure, production losses, and disruption of business operations. These can consequently lead to financial losses.

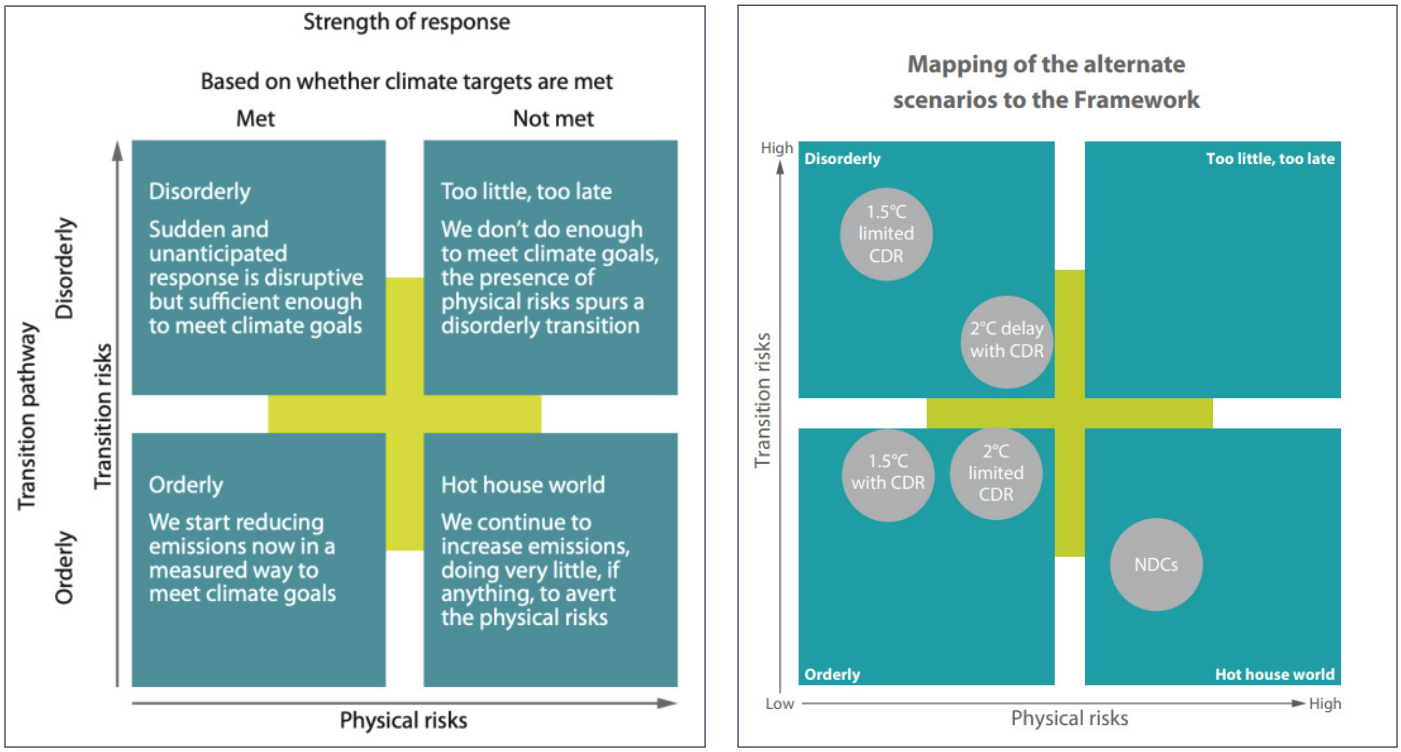
Physical Scenario Example Use Case: For instance, the lender of a real estate portfolio can assess a range of disastrous weather events and evaluate their impacts on property value. The results can then be applied to adjust the calculation of loan-to-value ratio and the borrower's probability of default.

Transition scenarios model the economic shocks that will materialize as the society moves toward a lower-carbon economy. These can include unanticipated changes in consumer and investor preferences, government policies, litigation, and technological innovations that would consequently impact the financial health of a company. Transition scenarios can highlight both risks and opportunities for investors, lenders, and insurers.

Transition Risk Example Use Case: For instance, a lender can model different potential carbon emissions price pathways to test their impacts on the borrowing company's cash flow. Once the financial projections are scenario-adjusted, they will be reflected on the lender's credit risk assessment to calculate its scenario-implied probability of default.

While the two scenario types address different concerns, they are not mutually exclusive. The challenge is to test and understand the complex interplay between physical and transition scenarios in assessing climate-related risks and opportunities. For instance, an orderly transition with early regulation and firm-level actions will alleviate the physical risk exposure of climate change. Conversely, a drastic increase in temperature may lead to more disruptive transition policies that firms may not be prepared to adequately respond. The NGFS delivered a set of harmonized pathways that integrate transition and physical risks in its suite of models (See Figure 2).

Figure 2: NGFS Climate Scenarios Framework — Integration of Physical and Transition Scenarios

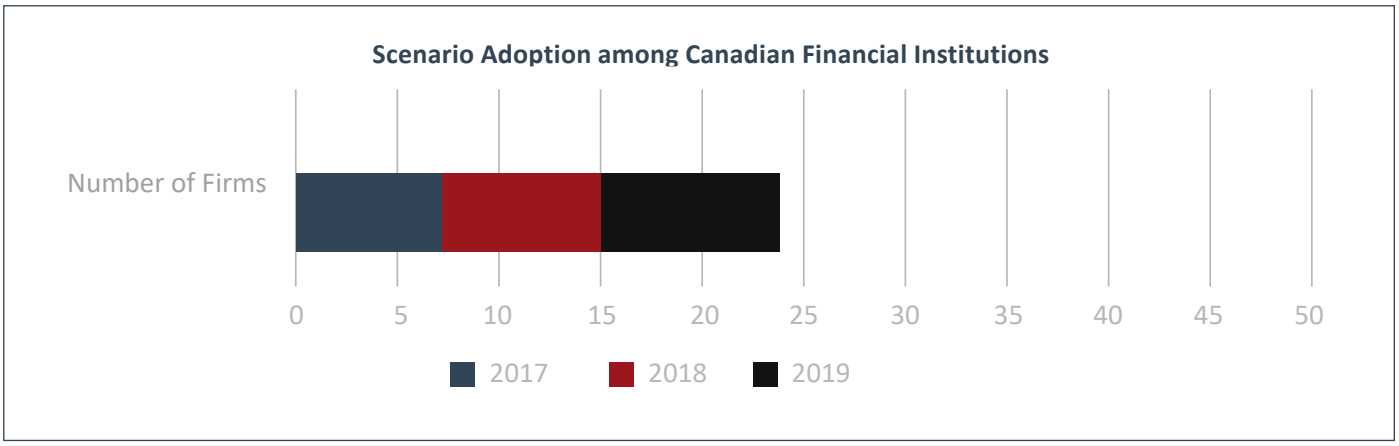


Source: Central Banks and Supervisors Network for Greening the Financial System

4. CURRENT IMPLEMENTATIONS IN FINANCIAL INSTITUTIONS

In the past three years, there has been significant progress made regarding climate risk assessment using scenarios. The Global Risk Institute in Financial Services (GRI) tracked a sample of 58 Canadian financial institutions' uptake of the TCFD recommendations[8]. It was found that 41 per cent reported using scenario analysis to inform business strategy (See Figure 3). Ontario Teachers' Pension Plan (OTPP) first implemented climate scenarios as early as 2016, followed by TD, RBC, OPTrust, and others in 2017, for a total of 24 firms utilizing scenarios by 2019. There are many different ways to construct climate scenario analysis, with methods and objectives varying across firms. While it may be appropriate for certain institutions to take a technically complex approach to inform asset allocation decisions, other firms with limited capacity may find it helpful to start with a narrative-based approach to provoke discussions on strategies and opportunities. Whilst climate scenario development is still in its nascency, the pace of advancement is accelerating year over year as the risk is better understood, and practice evolves toward a more standardized set of variables and approaches.

Figure 3: Scenario Adoption among Canadian Financial Institutions



Source: GRI, Climate-related Financial Disclosure in the Canadian Financial Sector: a Three-Year Progress Report

By implementing climate scenarios, financial institutions have reported a number of benefits:

Improved risk resilience. Understanding the implications of climate risk has supported financial institutions as they aim to evolve their risk mitigation strategies and limit potential losses related to both physical and transitional risks. Furthermore, it helps companies prepare for foreseeable regulatory mandates, such as climate stress testing and scenario disclosures.

Stronger stakeholder engagement. Being transparent about scenario design and results shows investors and stakeholders how the company is taking its interests and concerns about climate risk into account. This can lead to improvements in the company's public sentiment and reputation.

New growth opportunities. By assessing the different transition pathways, financial institutions have identified market opportunities for sustainable financial product offerings. These include new lending and investing markets, financial product innovations, and expanded advisory services that support clients in their sustainability engagement.

Development of climate risk culture. Engaging with experts across different functions to construct climate scenarios has contributed to elevated climate risk awareness and internal buy-in. This strengthens the risk culture within the organization.

Meanwhile, financial institutions have also faced a number of challenges integrating climate scenarios into decision making. The top three reported challenges are:

Materiality. The process of scenario construction starts with a materiality assessment of climate-related risks. This defines the scope and objective of scenario analysis, which are fundamental in determining the subsequent data and methodology selection. With climate risk being a relatively new practice, guidance is needed to help institutions properly understand the many facets of the financial materiality of climate risk and the urgency to act.

Data. The most frequently reported hinderance in constructing climate scenarios is the lack of quality climate risk data appropriate for financial use. As scenario adopters seek access to verifiable, comparable, and decision-useful data to feed into their models, they are faced with three

major gaps. First, although credible data on physical risks are available in the scientific field, they are not tailored to financial institutions and cannot be easily applied as scenario inputs[9]. Therefore, firms find it difficult to properly translate that data into relevant financial insights. Second, established market data sources were often designed for policymakers rather than investors. They reflect the optimistic transition pathway that governments want to achieve on climate change, not the most realistic path that economies will take. Finally, for financial institutions seeking to perform scenario analysis at the firm-level, they need to collect data from each portfolio company. However, the number of companies providing climate-related disclosures is insufficient to support that level of granularity. Lenders and investors are now calling for companies to provide relevant reporting to stakeholders[10].

Methodology. Scenario analysis methodologies have become widely available, varying in scale, scope, time horizon, and complexity. Few methodologies consider both physical and transition risks in an integrated manner. And even if they do, complexity makes it more difficult to implement. Institutions face a trade-off between comprehensiveness and practicality. For example, new adopters with limited capacity often start with simpler models as they are more feasible to operationalize, and build their practice and skillset over time. Companies would benefit from guidance on effective methodologies for various purposes.

5. INSIGHTS AND OUTLOOK

While scientists and policymakers continue to seek to understand the full picture of the physical, macroeconomic, and sectoral-level impacts of climate change, this should not deter financial institutions from starting to understand its firm-level implications. By leveraging scenario analysis, organizations can begin to model the financial and operational impacts of climate change on their businesses. With constructing scenarios being an iterative process, starting early allows companies to learn as they progress to strengthen their risk management practices. Although climate change has a long-term time horizon, implementing the proper risk management systems is a multi-year journey. It requires continuous support from management and the board to fully integrate climate risk into an organization's business practice and strategy. With international policy, climate science, and investor expectations evolving at a lightning pace, organizations need to act now to stay agile and adaptive to future changes.

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