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Strategies for integrating the Canadian financial sector into financing the transition to a low-carbon economy

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CIGI Papers No. 217 – June 2019

Strategies for Integrating the Canadian Financial Sector into Financing the Transition to a Low-carbon Economy

Olaf Weber, Truzaar Dordi and Vasundhara Saravade



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About the Authors

Olaf Weber joined CIGI as a senior fellow in March 2015. His research with CIGI focuses on sustainability and the banking sector, including sustainability guidelines and regulations for central banks and regulatory bodies. He is currently associate professor and program director of the master's program in sustainability management as well as a professor in the School of Environment, Enterprise and Development (SEED) at the University of Waterloo. Since 2010, Olaf has held the Export Development Canada Chair in Environmental Finance.

Olaf's background is in the areas of environmental and sustainable finance, with emphasis on sustainable credit risk management, socially responsible investment, social banking and the link between sustainability and financial performance of enterprises. His current research interests include financial risk and opportunities caused by climate change and environmental regulations. Previously, Olaf was managing partner at GOE in Zurich, Switzerland, developing credit risk management and sustainability rating systems, and was head of the sustainable finance group at the Swiss Federal Institute of Technology, Zurich. He earned his Ph.D. from the Technical Faculty, University of Bielefeld, Germany, and his M.A. from the Department of Psychology, University of Mannheim, Germany.

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Vasundhara Saravade completed her master of environmental science in the SEED at the University of Waterloo. Her research interest is based on the low-carbon economy transition and the growth of climate finance. Her master's research specifically looked at the role of regulators in the growth of the green bond markets in emerging economies, such as India and China. She graduated from Carleton University in 2016 with a B.A. (Hons) in environmental studies and a minor in economics.

Vasundhara has worked on policy issues related to climate change adaptation and governance with organizations spanning India, Indonesia and Canada. In addition to her academic career, she likes to write on various topics related to climate change and has been published in *The Conversation Canada*, *Huffington Post India*, *Fair Observer* and the *Times of India*.

About the Global Economy Program

Addressing limitations in the ways nations tackle shared economic challenges, the Global Economy Program at CIGI strives to inform and guide policy debates through world-leading research and sustained stakeholder engagement.

With experts from academia, national agencies, international institutions and the private sector, the Global Economy Program supports research in the following areas: management of severe sovereign debt crises; central banking and international financial regulation; China's role in the global economy; governance and policies of the Bretton Woods institutions; the Group of Twenty; global, plurilateral and regional trade agreements; and financing sustainable development. Each year, the Global Economy Program hosts, co-hosts and participates in many events worldwide, working with trusted international partners, which allows the program to disseminate policy recommendations to an international audience of policy makers.

Through its research, collaboration and publications, the Global Economy Program informs decision makers, fosters dialogue and debate on policy-relevant ideas and strengthens multilateral responses to the most pressing international governance issues.

Executive Summary

This paper presents policy alternatives that could incentivize the Canadian financial sector to invest in the transition to a low-carbon economy. The results and recommendations are based on an inductive analysis, which summarized the existing regulatory landscape on climate finance, and a practitioner survey, which ranked a collection of regulatory strategies based on their feasibility in the Canadian context.

Canada's expert panel on sustainable finance attests that climate change is a significant risk for financial sector stability and that Canada's financial sector could benefit from more effective and consistent regulation on climate-related financial issues. The results of the study suggest that practitioners from the Canadian financial industry do perceive all 13 regulatory measures as feasible and favourable. Public guarantee funds are perceived to be the most favourable, followed by enhanced fiduciary duty requirements in asset management, green bond issuance, standardized reporting and enabling incentive mechanisms. There is some evidence that practitioners are less in favour of top-down regulatory policies or working with public institutions through shared climate funds or partnerships. This suggests that financiers prefer to maintain autonomy in finding and utilizing business opportunities, yet value regulation that reduces their own risk.

Introduction

As the threat of climate change materializes, countries are beginning to recognize the adverse consequences of climate effects on the economy and society. There is a growing understanding of the significance environmental policy will have for securing the future of the planet. This undoubtedly affects the financial sector as well. On the one hand, inaction on climate change leads to significant economic damages and increased financial risk. On the other hand, the transition to a low-carbon economy will also cause widespread systematic changes in the economic landscape that might cause financial risks. Investments in high-carbon development may

face premature devaluation or default resulting in an increased climate-related financial risk in the case of a transition to a low-carbon economy. Moreover, the low-carbon transition may bring new business opportunities for climate-conscious financiers. Financing the transition to a low-carbon economy, however, will require a strong regulatory climate for low-carbon investing.

The connection between climate change and the financial industry has been addressed in recent years not only by environmentally concerned organizations but also by financial sector regulators and industry representatives. In 2015, Mark Carney, the governor of the Bank of England, warned that climate change might create systemic risks for financial sector stability if the industry does not stop its short-term thinking (Carney 2015). Consequently, the Group of Twenty (G20) established a Task Force on Climate-related Financial Disclosure (TCFD) that recently published recommendations for the financial industry to address climate-related risks (TCFD 2018). The recommendations included standardized disclosure of governance around climate-related risks and opportunities, climate-related impacts on business strategies, risk-management and climate-related metrics and targets.

Compared to many other countries and legislations, such as China and the European Union, Canada started late in addressing the connection between climate change and financial industry risks. The Expert Panel on Sustainable Finance was established by the Canadian government in 2017 and published its first report in 2018. The main points in this report are that climate affects have significant impacts on the economy, that Canada must invest in the low-carbon economy and the transition to get there and that the financial services industry has a key role to play (Government of Canada 2018). Although these findings are not new, the report makes clear that policies have to be implemented to enable the financial industry to play a positive role with regard to climate finance.

To transfer the international and domestic recommendations into the financial industry's business, regulations, guidelines, frameworks and partnerships are needed. The transition to a low-carbon economy cannot be conducted without significant investment, including private investment. Policies are needed that enable the financial industry to participate in financing

the transition to a low-carbon economy. Hence, it is valuable to gain inspiration from policies that have been successfully established in other countries and regions. Since Canada is a follower rather than a leader in this field, the wheel does not have to be re-invented, but existing policies could be applied if they are found useful.

Countries around the world have begun to discuss the role of the financial sector in the low-carbon transition, encouraging private and public entities to align their investments with the low-carbon economy. Financial institutions can foster the transition to a low-carbon economy through improved environmental and social risk management and preferential loan orientation toward low-carbon initiatives using the necessary policy frameworks, financial incentives and risk mitigation processes. Without clear policies, the financial uncertainty with regard to investments in the low-carbon economy is too high and financial institutions will refrain from investing. In an empirical study, the authors found 24 countries that have established financial-sector-related climate regulations to guide strategic pathways (Weber, Saravade and Dordi 2018).

This paper conducts a comprehensive review of these existing national and international frameworks, presenting a vast net of strategic pathways for climate finance in Canada and elsewhere. The paper also presents the results of a survey across Canadian financial practitioners on the feasibility of strategic policy recommendations regarding financing the transition to a low-carbon economy in the Canadian context.

Background

The following sections describe the current knowledge about climate effects on the economy and the connection between climate change and financial sector stability.

Climate and the Economy

As the effects of climate change continue to materialize, economic systems are increasingly susceptible to adverse physical and systematic risk. While the scientific evidence on potential risks is overwhelming (Intergovernmental Panel on Climate

Change [IPCC] 2018) and the economic costs of inaction are substantial (Stern 2007), these risks are poorly understood and regularly mispriced in our economic and financial systems (Caldecott, Tilbury and Carey 2014). Environmental disasters, changing resource landscapes, governmental regulations, technological innovation, evolving social norms, the transition to a low-carbon economy and litigation from changing statutes can profoundly alter asset values and credit risks across all sectors of the economy. One example is the automobile industry, which has been, and will increasingly continue to be, affected by the growing number of electric vehicles and changes in social norms that value automobiles as less desirable than they were before.

Canada's mid-century long-term low-greenhouse gas reduction development strategy (Environment and Climate Change Canada 2016), for instance, proposes to reduce greenhouse gas emissions by 80 percent by 2050. This reduction can only happen with non-emitting electrification of transport, building and industrial processes. Furthermore, a change in energy use within the most emitting industries, such as mining, pulp and paper, iron and steel, cement, smelting and refining, which consume about 75 percent of the energy in Canada, is needed. Finally, the infrastructure has to be upgraded to become more sustainable. The investments needed just for infrastructure are about US\$186 billion (ibid.). However, the transition to a low-carbon economy in the other sectors listed above needs considerable investments on the one hand and exposes the financial industry to material financial risks on the other hand.

Globally, climate change has had a considerable effect on the global economy. Solomon Hsiang et al. (2017) estimate the negative impact of a 1°C increase in temperature on GDP at 1.2 percent. According to these analysts, global damage could be between two and 20 percent of GDP, with poorer countries affected more than richer countries. On the positive side, investments in climate change mitigation and adaptation of about US\$400 billion per year have been made since the 2015 United Nations Climate Change Conference providing economic opportunities (Buchner et al. 2017).

These risks and opportunities might be addressed through effective regulatory mechanisms that involve the scaling up of low-carbon development, carbon pricing and sustainable finance (Bak 2017). Moreover, climate action could yield new opportunities for the economy and the

financial sector to focus on the sustainability case (Weber and Feltham 2016) if financial risks can be mitigated. Thus, climate change will pose adverse risks but also bring new business opportunities for the economy.

Climate and Financial Stability

Discourse around environmental regulations is increasingly prevalent, although climate-related financial policies are in their infancy. Pragmatically, environmental consequences are still not a deciding factor in risk models by commercial banks (Zeidan, Boechar and Fleury 2015). Inaction on climate change, however, will threaten financial stability and longer-term prosperity (Carney 2015). The systematic risk of climate change will affect all sectors of the economy. While some investment sectors are more sensitive to climate change (Stenek, Amado and Connell 2011), the interdependence among sectors, especially on high-carbon or energy-intensive sources of energy, can lead to indirect and unanticipated risks across various sectors (Battiston et al. 2017). Financial consequences may be asymmetrically distributed between and within sectors, depending on the intensity and dependency of carbon materials and energy (Busch and Hoffmann 2009). However, carbon risks are not only material to high-emitting industries, such as the fossil fuel industry, but also for other sectors that might be affected by the transition to a low-carbon economy or by direct physical risks caused by extreme weather events. But most financial institutions are unaware of how the complex interactions between sectors will contribute to positive or negative feedbacks across the economy (Battiston et al. 2016). The financial system can be affected due to its exposure to firms in the form of equity shares, bonds holdings and loans.

Climate change impacts could be direct, destroying or depreciating capital assets, or indirect, reducing output and returns on capital assets (Dietz et al. 2016). Physical consequences of climate change can be acute in the context of extreme weather events or chronic, such as shifts in productivity (Lutz, Stadelmann and Horster 2017), which may lead to lower productivity, downgraded creditworthiness or insolvency (Carreño, Cardona and Barbat 2007). Transitional impacts are the consequence of rapid decarbonization of the economy that will be required to mitigate emissions. The most recent IPCC report, for instance, states that there are about

12 years left to retain a certain likelihood to stay inside a 1.5°C temperature increase (IPCC 2018).

Another type of climate-related risk the financial sector might be exposed to are stranded assets (Ansar, Caldecott and Tilbury 2014). Stranded assets occur after a rapid devaluation of assets because they lose their financial value. Accordingly, investments in these assets lose their value and might lead to negative impacts on financial portfolios. To limit global warming to 2°C, up to 225 gigatons of carbon dioxide equivalents (CO₂e) can be emitted (van der Ploeg 2018; Carbontracker 2013). The current reserves that are in the books of publicly traded fossil fuel companies represent 762 gigatons of CO₂e. This surplus of carbon reserves compared to the carbon that can be burned to stay inside the 2°C goal is called a carbon bubble because the value of the resources is overrated.

Consequently, if the resources could not be exploited, sold and burned, investment in companies holding the resources would decrease in value. This decrease in financial values is called stranded assets. Hence, investments and loans could be exposed to the risk of being stranded. Carbontracker, an environmental non-governmental organization, estimates the value of these potentially stranded assets as US\$2 trillion, an amount that would have a significant impact on the financial industry.

Carbon footprints of investment portfolios have attempted to quantify risks, such as stranded assets and transition risks (Andersson, Bolton and Samama 2016), and found that companies with lower carbon emissions have seen improved financial performance (Busch and Lewandowski 2018). Finally, liability impacts refer to the compensation required to offset financial losses. Discourse on stranded assets and fossil fuel divestment dominate this form of risk. Thus, investors must be cognizant of the climate impact of the companies in their portfolios to hedge against climate losses (Andersson, Bolton and Samama 2016).

Impact of the Financial Sector on Climate Change

Not only is the financial sector affected by climate change, the reverse is true as well: the relationship between climate change and finance is bidirectional. Climate change does affect financial stability, and the activities of financial institutions

exert a dominant influence on the economy, society and sustainable development (Weber 2014). While the direct impact of the financial sector on climate change is arguably limited, both positive and negative indirect impacts are significant (van Gelder et al. 2008). These indirect impacts are caused by loans and investments in industries connected to climate change.

Negative impacts of finance come from investments in high-emitting industries. Although investors are not held responsible for the emissions of their clients, they can mitigate to prevent these emissions through their investment and lending policies. Furthermore, the financial sector has had positive impacts on climate change through financing low-carbon projects, services and industries (Weber and Feltmate 2016).

The financial sector is ambivalent and reactive, contributing to both the causes of sustainability problems as well as solutions (Wiek and Weber 2014). Consequently, public policies can intervene and incentivize financial institutions to pursue sustainability solutions and curtail unsustainable investments.

Climate Finance Regulation

Some countries around the world have prepared recommendations to align their financial sector with climate finance. These countries have pursued regulatory measures to reduce the adverse risk of climate change on financial stability and encourage new business opportunities for sustainable investments that are profitable under a low-carbon transition. For example, China's green credit guidelines have mandatory reporting and environmental risk assessments in loan applications and environmental and social ratings in investment decisions. These have been recognized for successfully promoting a regulatory atmosphere that restricts loans in highly polluting industries and redirects loans toward emissions reductions (Zadek and Chenghui 2014). The guidelines even help to reduce credit risks (Cui et al. 2018).

Bangladesh has similarly mandated standardized guidelines to integrate environmental, social and sustainability criteria in commercial credit risk assessment processes (Weber, Hoque and Islam 2015). However, there may be an aversion to the top-down, centralized mandate in countries that desire more autonomy. Conversely, other

countries opt for taxation mechanisms. Through a voluntary framework, for instance, Columbia has amended its tax code to offer tax exemptions for investments in environmental programs. Financial incentives may be a more efficient means to encourage proactive behaviour (Weber 2005).

Global Approaches to Integrate the Financial Industry into Climate Finance

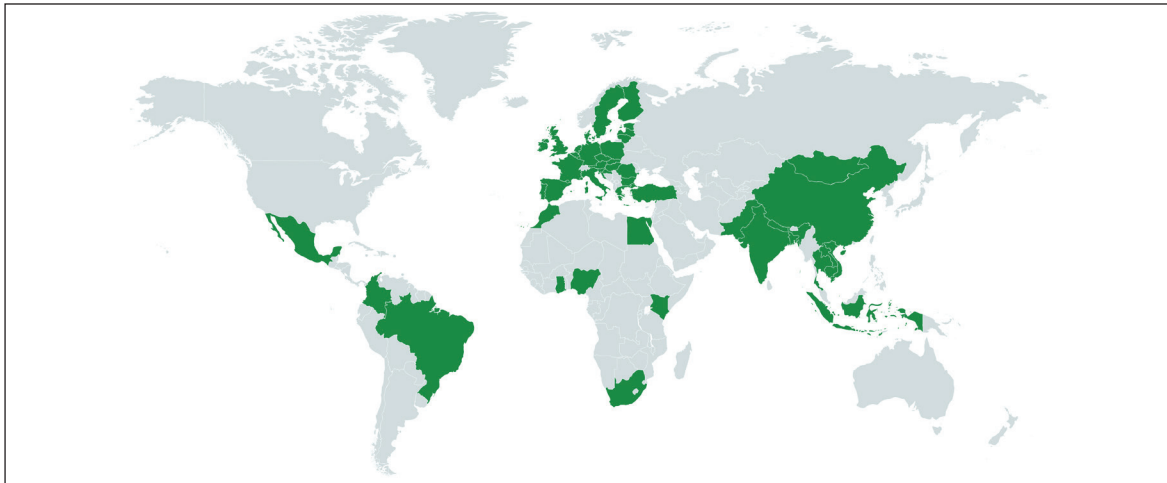
The following section presents some global strategies to integrate the financial industry into climate finance. A total of 26 policies from countries and regions around the world (see Figure 1) were analyzed, and recurrent discourse around purpose, characteristics and products and services were aggregated. Many reports present climate finance as a risk mitigation strategy or a new business opportunity.

The policies highly recommend collaboration between public and private sectors, standardization in reporting and regulative mechanisms, such as taxes, public incentives and, more recently, the adoption of climate modelling tools. Several reports target specific actors (such as stock exchanges and asset managers) and recommend specific products (such as green bonds) as a means to encourage the financial sector to finance low-carbon developments. A detailed review of these reports is presented below. The list of policies is presented in Table 1.

Many climate finance strategies aim to either manage climate risk or identify new business opportunities.

Eighteen reports frame climate finance strategies as an opportunity for the financial sector. Reports from the European Union and UNEP FI most favour business opportunities and performance, whereas the report from Kenya most perceives climate finance as a sustainability opportunity. The climate strategies attest that favourable policy can deliver multiple benefits, addressing pressures related to increased resource use and

Figure 1: Countries with Policies to Integrate the Financial Industry into Climate Finance



Source: Authors.

Table 1: List of Policies Analyzed

Issuing Entity	Guideline
Bangladesh	<p>Title: Environmental Risk Management Guidelines</p> <p>Affiliation: Bangladesh Bank</p> <p>Mandate: Internalize the risk that a deteriorating environment poses on the interests of the financial institution.</p>
Brazil	<p>Title: Green Protocol</p> <p>Affiliation: Central Bank of Brazil</p> <p>Mandate: Combined voluntary and mandatory, industry-specific approaches to sustainable banking driven by the need for stronger efforts in environmental conservation and to foster sustainable development.</p>
Cambodia	<p>Title: Sustainable Financing Principles</p> <p>Affiliation: Association of Banks in Cambodia</p> <p>Mandate: Voluntary best practices to educate members of environmental and social standards.</p>
China	<p>Title: Green Credit Guidelines</p> <p>Affiliation: China Banking Regulatory Commission</p> <p>Mandate: Policy-based approach to sustainable banking to help tackle profound environmental problems and support the transition to a green, inclusive and resilient sustainable growth path.</p>
Colombia	<p>Title: Green Protocol</p> <p>Affiliation: Colombian Banking Association, Asobancaria</p> <p>Mandate: Combined voluntary and mandatory, industry-specific approaches to sustainable banking driven by the need for stronger efforts in environmental conservation and to foster sustainable development.</p>
Egypt	<p>Title: Access to Finance and Economic Growth in Egypt</p> <p>Affiliation: The World Bank</p> <p>Mandate: Promote public-private partnership to generate good practice and environmental and social risk management.</p>

Issuing Entity	Guideline
European Union	<p>Title: Financing a Sustainable European Economy</p> <p>Affiliation: High-level Expert Group on Sustainable Finance (European Commission)</p> <p>Mandate: By reorienting public and private financial flows toward green and sustainable efforts, the risks posed by climate change can be mitigated, creating new jobs and sustainable economic growth in the process.</p>
Ghana	<p>Title: Climate Change Finance in Ghana</p> <p>Affiliation: Overseas Development Institute</p> <p>Mandate: At present, there is little awareness of what the national climate change policy is, what it requires of subnational government and the likely level of spending necessary.</p>
India	<p>Title: Delivering a Sustainable Financial System in India</p> <p>Affiliation: Federation of Indian Chambers of Commerce and Industry</p> <p>Mandate: This report captures the sustainable financing momentum that is slowly building and how it needs to be accelerated.</p>
Indonesia	<p>Title: Roadmap for Sustainable Finance in Indonesia</p> <p>Affiliation: Indonesia Financial Services Authority</p> <p>Mandate: Financial institutions to expand investment in green and inclusive industries, which will create a larger market and wider activities for financial institutions. This includes the development of green financing products, schemes and lending guidelines.</p>
Ireland	<p>Title: A Strategy for Ireland's International Financial Services Sector 2015–2020</p> <p>Affiliation: Government of Ireland</p> <p>Mandate: To promote Ireland as a location for international financial services and world-class innovative products and services.</p>
Kenya	<p>Title: Sustainable Finance Initiative Guiding Principles</p> <p>Affiliation: Kenya Bankers Association</p> <p>Mandate: To work with banks to provide capacity and resources through an e-learning platform.</p>
Laos	<p>Title: Developing a Sustainable Investment Framework in Laos</p> <p>Affiliation: International Institute for Sustainable Development</p> <p>Mandate: If Laos' PDR is to capitalize on this positive climate, policy makers and donors need to address obstacles to sustainable development.</p>
Mexico	<p>Title: Sustainability Protocol</p> <p>Affiliation: Mexican Banking Association</p> <p>Mandate: Voluntary and market-based approach to mobilize private capital, in particular from institutional investors, for inclusive green investments in emerging markets.</p>
Mongolia	<p>Title: Mongolian Sustainable Finance Principles</p> <p>Affiliation: Mongolian Bankers Association</p> <p>Mandate: All banks to develop internal environmental and social policy by industry.</p>
Morocco	<p>Title: Roadmap for Aligning the Moroccan Financial Sector with Sustainable Development</p> <p>Affiliation: Public-private sector partnerships</p> <p>Mandate: Extend environmental and social risk, instruments, financial inclusion, capacity building and transparency.</p>
Nepal	<p>Title: Infrastructure Financing Strategies for Sustainable Development in Nepal</p> <p>Affiliation: United Nations Economic and Social Commission for Asia and the Pacific</p> <p>Mandate: Infrastructure gaps present a significant challenge for Nepal's short and longer-term development goals.</p>
Nigeria	<p>Title: Nigerian Sustainable Banking Principles</p> <p>Affiliation: The Central Bank of Nigeria</p> <p>Mandate: Banks to provide reports on policy, data collection and biannual principal report</p>

Issuing Entity	Guideline
Pakistan	<p>Title: Climate Change Financing Framework</p> <p>Affiliation: Government of Pakistan</p> <p>Mandate: Phased approach to formulate policy and procedure to level the playing field.</p>
South Africa	<p>Title: Principles for Managing Environmental and Social Risks</p> <p>Affiliation: The Banking Association South Africa</p> <p>Mandate: Voluntary principles to protection, promotion and fulfillment of environmental, social and governance (ESG) rights.</p>
TCFD	<p>Title: Recommendations of the TCFD</p> <p>Affiliation: Financial Stability Board</p> <p>Mandate: Recommendations for disclosing clear, comparable and consistent information about the risks and opportunities presented by climate change.</p>
Thailand	<p>Title: Climate Public Expenditure and Institutional Review</p> <p>Affiliation: Overseas Development Institute</p> <p>Mandate: A first attempt to map the government's response to climate change, which is becoming a major theme for public policy.</p>
Turkey	<p>Title: Sustainability Guidelines for the Banking Sector</p> <p>Affiliation: The Banks Association of Turkey</p> <p>Mandate: Market-led initiative to consider social benefits and respect the environment in all their operations.</p>
United Kingdom	<p>Title: Green Finance Task Force</p> <p>Affiliation: UK Government</p> <p>Mandate: The Task Force will look at measures to make the UK's planned investments in infrastructure, for instance on energy and transport, more environmentally sustainable.</p>
United Nations Environment Programme Finance Initiative (UNEP FI)	<p>Title: Guide to Banking and Sustainability</p> <p>Affiliation: United Nations</p> <p>Mandate: "What does a sustainable bank look like?" By opting for a hands-on, practitioner-oriented format, the UNEP FI has sought to prioritize action over theory.</p>
Vietnam	<p>Title: Circular No. 39/2016/TT-NHNN</p> <p>Affiliation: State Bank of Vietnam</p> <p>Mandate: New principle that customers and transactions must comply with environmental law.</p>

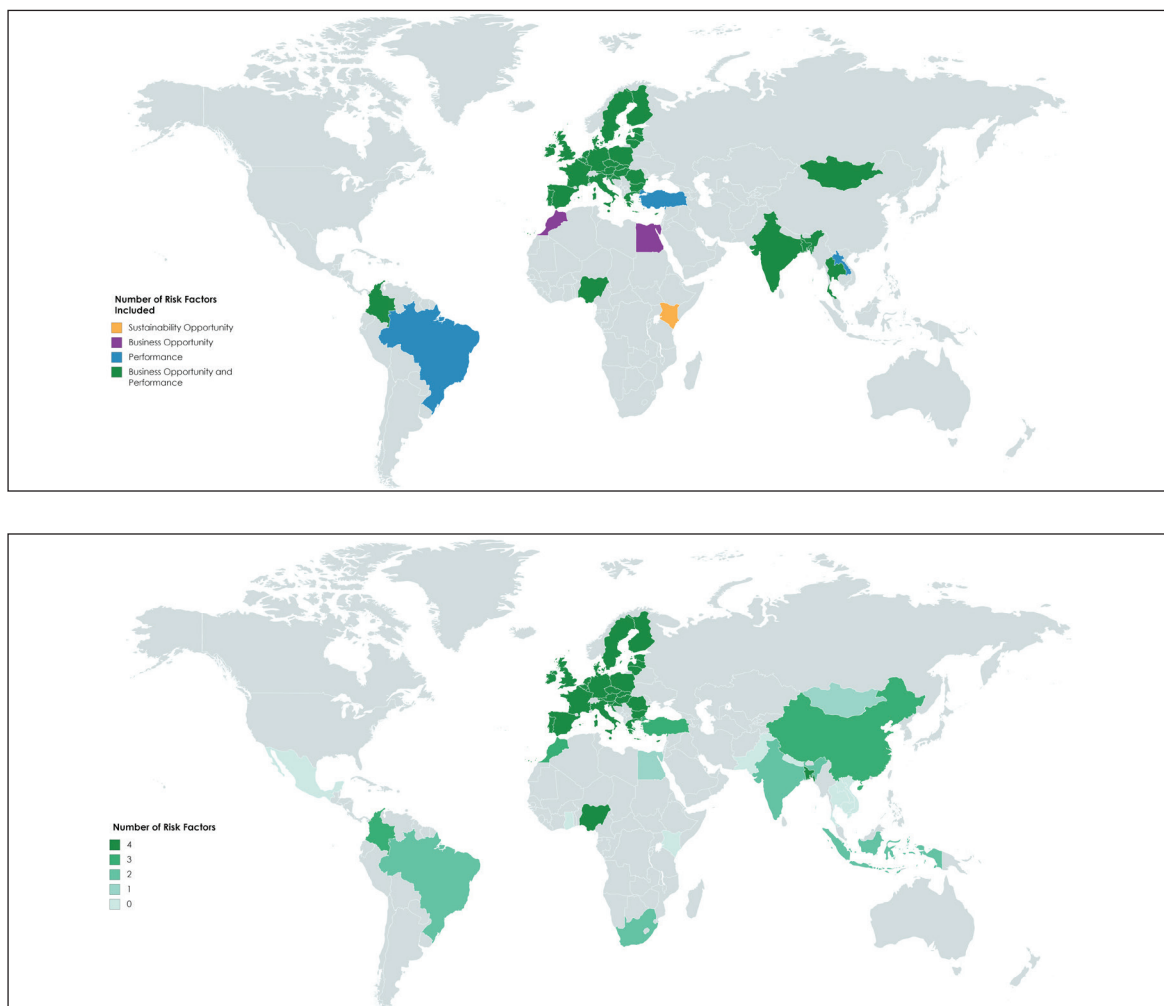
Source: Authors.

other constraints on development. Internally, the ability to connect short-term targets with long-term goals can strengthen the business case and increase financial performance. Inaction may result in missed opportunities costs, as a failure to adapt to changing markets may lead to missed low-carbon developments. Harnessing these opportunities requires recruitment of sustainability talent, who can direct long-term visions and thereby increase market participation, strengthen reputation and entice new investments.

Sixteen reports included some aspect of risk in their climate finance strategy. Reports from

Bangladesh, China, the European Union, Nigeria and UNEP FI most engage with discussions around risk. Financial institutions may favour clear or standardized guidelines to integrate environmental and social risk into existing credit risk management. Standardized risk assessment guidelines may hold clients accountable for reporting on their environmental and social risk and may request clients with major potential risk to develop and implement risk mitigation measures to receive financing. Major risks could give banks the authority to hold or terminate disbursement of funds.

Figure 2: Policies Addressing Climate Change-related Financial Risks and Opportunities for the Financial Industry



Source: Authors.

Characteristics of the Policies

The following section refers to Figure 3. The analysis suggest that 18 reports highlight the benefits of collaboration between global, regional, public and private actors. Collaboration is perceived as a form of value sharing and may be realized through multi- or inter-agency partnerships. For instance, consulting firms and credit rating agencies can provide expertise in preparing financial reports. As another example, Colombia's stock exchange in collaboration with investors, regulators and companies, enhances requirements for corporate transparency. Public-private syndicate loans between the German government-owned KfW development and private banks have also been able to secure attractive loans toward sustainable

development through low-interest funding from the public part of the loan. External stakeholders, such as customers, shareholders, research institutions, suppliers and governing bodies, play just as important a role in a collaboration between internal financial and sustainability departments. Seventeen of the 26 reports address public-private partnerships alone. A shared climate fund can also help create an enabling environment to attract private sector investments. Domestic investments by the government can spur private investments to follow. A comparable approach has been adopted by the Asian Development Bank (ADB).

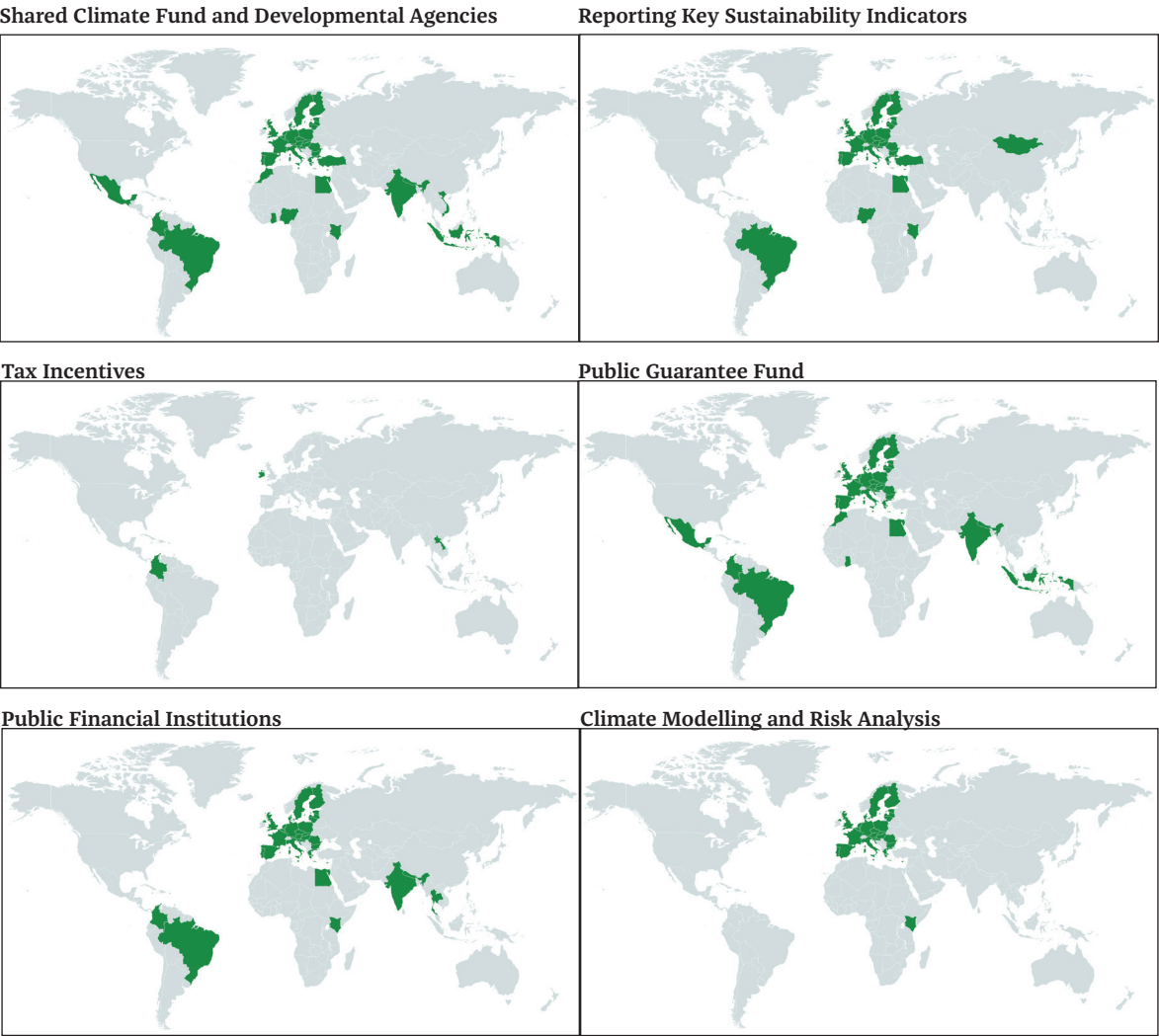
Twenty-two reports speak to the importance of standardized measurement, monitoring,

transparency and disclosure in reporting. Financial institutions can choose to adopt their indicators or opt for a shared system to ensure consistency. There are a variety of international and national agencies that provide frameworks (for example, greenhouse gas protocol, Carbon Disclosure Project) that guide corporate environmental and social management systems (for example, the UNEP). These standards formalize definitions, eligibility criteria and certification frameworks, thus reducing due diligence by investors as well as work required by issuers and approved verifiers (for example, the European Union). The TCFD identified several disclosure frameworks that have emerged to meet the growing demand for such information. The task force also noted the need for

a standardized framework to promote alignment across existing regimes and G20 jurisdictions and to provide a common framework for climate-related financial disclosures. The European Union has decided to adopt the International Financial Reporting Standards (IFRS) developed by the International Accounting Standards Board for mandatory use by listed firms.

Eight reports encourage the use of tax mechanisms. Environmental taxes can raise the cost of negative activities or lower the cost of alternative actions. Colombia, for instance, has developed specific tax-related incentives for environmental control systems, environmental monitoring systems and environmental programs in the context of the tax

Figure 3: Characteristics of the Policies



Source: Authors.

code. Italian legislation offers tax exemptions to banks that meet certain requirements investing in social enterprises. Alternatively, strategies from Columbia and Thailand suggest that taxes collected by central governments (for example, value added tax) can be returned to local administrations based on the contribution by the local administration in their collection.

Seventeen reports encourage incentive mechanisms, such as guarantees and compensations. The report from Columbia attests that financial institutions could be compensated for the increased risk exposure of green projects, due to higher initial investments, longer payback periods or the implementation of new technologies with unproven results. In Nigeria, employees may be compensated for desirable behaviour, rewarding both short- and long-term performance objectives as well as innovative thinking on integrating sustainability issues. A first-loss guarantee fund may be issued as a form of insurance, to enhance the issuer's credit profile, signal reliability of the fund and attract more conservative investors. A climate subsidy on interest rates, as recommended by the Thailand report, may also be effective to encourage low-carbon investments.

More recently, countries have turned to mandated stress tests and scenario analyses to model the effects of climate change over the medium to longer term. Five reports, primarily from developed countries and international frameworks, encourage the use of modelling long-term uncertainty. The uncertainty of timing and magnitude of financial risks presents challenges for organizations in understanding the potential effects of climate change on their businesses, strategies and financial performance. Stress tests are an important tool of ESG risk assessment, as a means of modelling the vulnerability of loan portfolios to environmental shock scenarios. Stress testing assesses how certain factors or changes might affect the financial performance of an asset or company. Stress factors could include air pollution, climate change, a new policy such as a carbon tax, inequality, natural hazards, new technology, soil erosion and water stress, availability of energy and natural resources. A similar approach is a scenario and sensitivity analysis, which models how various combinations of climate-related risks may affect its businesses, strategies and financial performance over time. This leads to better management of business decisions based on a comprehensive

and forward-looking scenario analysis. Scenario analysis could be encouraged in sectors directly affected by the energy transition, such as fossil fuels, utilities, extractives, energy-intensive industries and transport. The TCFD explicitly details the frameworks for a robust scenario analysis.

Products and Services

Finally, several products and services that could incentivize financing low-carbon development were identified during this research. The countries that have implemented such products and services are discussed below and presented in Figure 4.

Ten reports encourage partnerships with green and development banks to provide sustainable lending products and services. For example, Germany's KfW Bankengruppe, a public financial institution, offers energy efficiency loans for new buildings with interest rates linked to energy savings. The ADB offers partial guarantees for credit enhancement (75 percent of principal and interest on the bond). Bancóldex in Colombia offers two specific green credit lines: one related to sustainable development and the second mainly focused on energy efficiency. Many other examples, such as the Council of Europe Development Bank and the Dutch bank NBW, provide guidelines for social and development banking.

Six reports highlight the role of asset managers, who are uniquely placed to help guide capital flow toward more sustainable investments by embedding sustainability into stewardship codes and management agreements. Asset owners and managers in parts of the European Union and Morocco, for example, may be required to clarify expectations at the appointment, provide a footprint assessment process for managed funds, disclose their ESG strategy, vote on the pertinence of ESG issues and strengthen the ownership chain. Policy makers can assist by providing model contracts.

Three reports promote sustainable stock exchanges, which could support the growth of sustainable markets by encouraging the development and application of robust standards for investments. Several indices in the European Union now align with sustainable development through eligibility criteria and classification systems. The London Stock Exchange's FTSE Environmental Markets Classification System and the Nordic Investment Bank provide some

guidelines. South Africa's stock exchange is a global leader in requiring listed companies to report on their sustainability performance.

Seven reports attest that green investments that include ESG measurements prove to be material to financial performance. Green investments may be targeted toward infrastructure development, human resources and processes of production and consumption to reduce the risk of climate vulnerability.

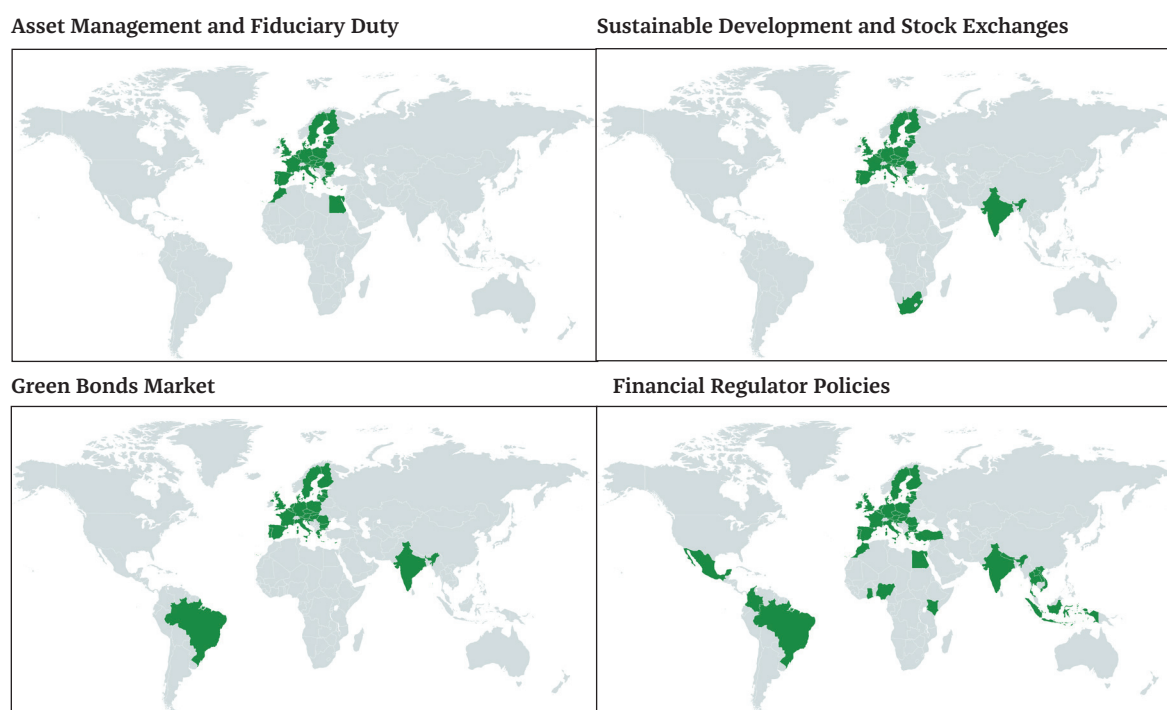
Five reports encourage the adoption of green bonds. Financial institutions play a distinctive role in the green bond market since they can act as issuers, underwriters or investors. Green climate bonds can be used across many sectors and projects. Some examples include transport and logistics (Brazil, India), sanitation and sewage treatment (Brazil) and energy (Brazil, India). It should be noted that the sectors that cause significant environmental impact (such as oil, gas and mining) may not be excluded from green bonds if they reduce the impact of environmentally damaging activities (Brazil) using the finance provided by the green bond.

Finally, green credit policies, such as those in China, can promote concepts related to

resource efficiency, environmental protection and sustainable development. Priority sectors for green credit investments can be identified in accordance with national environmental laws and regulations or sector-specific guidelines. Colombia's development bank, Bancóldex, has implemented two specific green credit lines: one is related to sustainable development and the second is mainly focused on energy efficiency. Effective evaluation, incentive and penalty systems ensure that green credit measures are in place and effectively implemented. China's green credit policy specifically mandates banks to strengthen their capacity by benchmarking and self-evaluating credit performance, conducting comprehensive evaluations at least twice a year and enhancing green credit training and recruitment of specialized staff.

The analysis suggests that some interesting policies are implemented in countries and regions that support the financial industry to engage in climate finance. To assess the feasibility of a policy recommendation in the Canadian context, the authors asked Canadian financial sector representatives to evaluate the policies with regard to their usability, likelihood of increasing the involvement of the financial

Figure 4: Products and Services Enabling the Financial Industry to Engage in Climate Finance



Source: Authors.

sector in low-carbon finance, impact on corporate reputation and ability to manage risk or create new business opportunities. These five attributes and related questions are defined as follows:

- usability: the general usefulness of the strategy to help integrate the financial institution into low-carbon economy financing;
- involvement: the ability to increase the involvement of the financial institution in low-carbon economy financing;
- business opportunity: the ability of the strategy to create business opportunities for the financial institution in low-carbon economy financing;
- risk management: the ability of the strategy to decrease financial risks for the financial institution with regard to low-carbon economy financing; and

- reputation impact: the ability of the strategy to increase the reputation of the institution with regard to low-carbon economy financing.

Using text analysis software, the authors categorized the policies described above into 13 strategies to assess their feasibility among Canadian institutions. Participants of the survey were from seven financial sub-industries: commercial banking, credit unions and cooperatives, insurance, institutional investing, asset management, pension funds and other (industry associations, grown corporations, etc.). The strategies were evaluated on a five-point Likert scale with regard to the evaluation criteria presented above. The strategies are presented in Table 2.

Overall, all 13 strategies have been evaluated as feasible. The lowest average rating across the five attributes is 3.2 (Strategy 4, Shared Climate Fund). The highest average rating across the five

Table 2: Strategies to Integrate the Financial Sector into Climate Finance

Strategy	Description
S1: Systematic Climate Risk	Managing systematic risks in relation to climate change can include assessments, risk ratings and measuring risk exposure of financial projects. By mandating the assessments of these risks, some countries hope to create a set of guidelines and industry best practices for improving overall risk from climate change. This strategy recommends implementing a standardized set of guidelines and best practices that mandate systematic risk assessments of environmental and social risks.
S2: Business Opportunities	To create short- and long-term business opportunities, there is a need for the right mix of policy alignment and financial incentives. Certain countries have recognized this and restructured their policies to enable specific investments. For example, policy tools can be used to ensure measured investment in infrastructure. Some of these investments can also be geared toward specific sectors, such as energy efficiency and low-carbon transport. This strategy recommends policies that incentivize business opportunities, such as financing new environmental projects or improving financial performance for similar projects.
S3: Public-Private Partnerships	For better risk management and improved collaboration in a low-carbon economy, some countries recommend using a private-public partnership framework. This allows for spreading the risk in new projects as well as increasing inter- and intra-agency collaboration between financial and sustainability departments. This strategy recommends policies that would strengthen the public-private partnership framework for a multi-agency collaboration setting.
S4: Shared Climate Fund	Collaboration with multilateral development institutions is instrumental in increasing public and private partnerships, as well as helping the private sector in boosting local economies, improving market competitiveness and increasing economic diversification. This strategy recommends policies that combine multilateral funds from public and developmental agencies to attract private sector investments.
S5: Reporting Key Performance Indicators	With internationally accepted standards such as the IFRS and the TCFD already in existence, financial institutions can ensure consistency and transparency across green investments. Furthermore, having a standardized set of key indicators promotes alignment across various jurisdictions. This strategy recommends policies that mandate compliance with internationally accepted standards of key sustainability indicators to help in ensuring consistency and transparency across green investments.

Strategy	Description
S6: Tax Incentives	To ensure that regulations are effective in the context of a low-carbon economy, a few countries have configured their tax codes to some extent. Some countries have included a tax-related incentive for instituting environmental control systems, management systems and programs. Similarly, others have allowed tax exemptions to banks investing in social enterprises or providing a climate subsidy on interest rates related to low-carbon investments. This strategy recommends the provision of tax incentive policies that lower the cost of low-carbon investments and initiatives, in the form of tax exemptions to institutions that meet certain requirements, tax returns based on the institutions' environmental or social contribution or subsidies on interest rates for climate-related projects.
S7: Public Guarantee Fund	For the low-carbon economy to succeed, there needs to be adequate environmental projects available that offer the right balance of risk and returns. In some countries, green projects that have high risk exposure are provided guarantees by the government. Having such guarantees can lead to improved ratings and greater reliability of the investment. This strategy recommends the provision of a public guarantee fund to compensate financial institutions for the increased risk exposure of green projects.
S8: Public Financial Institutions	Historically, this model of funding has been common among multilateral development agencies as well as national development agencies. With the emerging prominence of clean technology as well as commercial competitiveness among emerging markets, Canadian Crown corporations, such as the Business Development Bank of Canada (BDC) and Export Development Canada (EDC), are now leading the Canadian transition to a low-carbon economy. This strategy recommends policies that require public financial institutions (BDC on the domestic front and EDC on the international front) to provide expertise on establishing services such as green lending or green credit lines.
S9: Climate Modelling and Risk Analysis	The TCFD recommends the use of tools such as scenario and sensitivity analysis to predict combinations of climate-related risks. By using climate modelling and stress tests, financial institutions have been able to prepare for environmental shocks to their loan portfolios and investments. This strategy recommends policies to enforce climate modelling tools through enhanced stress testing, scenario and sensitivity analysis.
S10: Asset Management and Fiduciary Duty	For certain financial institutions, asset management plays a big role in helping capital flow toward investments that provide long-term returns as well as fulfill fiduciary duty and management agreements. More recently, due to increasing awareness about climate change and a greater focus on fiduciary duty, asset managers are starting to manage funds using an ESG lens. Overall, this approach can allow for better representation of long-term risks as well as increase transparency in financial management. This strategy recommends policies that hold asset managers accountable for their investments by embedding sustainability into stewardship codes and management agreements.
S11: Sustainable Development Stock Exchanges	A stock exchange is a good indicator of market confidence in the institution. With an increasing focus on low-carbon financial transition, sustainability indices are helping to align sustainable development with the financial system. They are doing so by using a unique eligibility criteria and classification system. This shift has been followed by various major international stock exchanges around the world. This strategy recommends policies that mandate sustainability into the stock exchange through eligibility criteria and classification systems or by requiring listed companies to report on their sustainability performance.
S12: Green Bonds Market	With the green bond emerging as a major climate finance tool, various financial institutions have started to play an important role in this market. Furthermore, financial institutions, such as banks, tend to hold a variety of different roles in this market, such as being issuers, investors or underwriters. This strategy recommends policies that favour clear guidelines for green bonds to define issuance standards and exclusions.
S13: Financial Regulatory Policies	Some financial sector regulators encourage financial institutions to shift their lending portfolios in a greener direction by creating cost incentives for green industry borrowers as well as increasing interest rates for borrowers with high carbon emissions. Additionally, lenders report on key indicators for the ratio of green loans and loans to high-emitting industries in their portfolios. This strategy recommends mandating regulatory policies on low-carbon credit guidelines and disclosures.

Source: Authors.

attributes is 4.2 (Strategy 7, Public Guarantee Fund). The standard deviation ranges between 0.86 and 1.18 for each strategy. The highest ratings have been given for Strategy 7 (Public Guarantee Fund), Strategy 10 (Asset Management and Fiduciary Duty), Strategy 12 (Green Bonds), Strategy 5 (Reporting Key Sustainability Indicators) and Strategy 2 (Climate-related Business Opportunities). The lowest, but still positive, responses were for Strategy 4 (Shared Climate Fund), Strategy 13 (Financial Regulatory Policies) and Strategy 8 (working with Public [Crown] Financial Institutions).

Although the difference in the evaluation of the strategies is not big, there is some variance in the evaluation. Figure 5 presents the box plots of the strategies. The grey part of the box represents the lower 50 percent of the responses and the yellow part represents the upper half of the responses. The end of the lines represent the highest and lowest ratings.

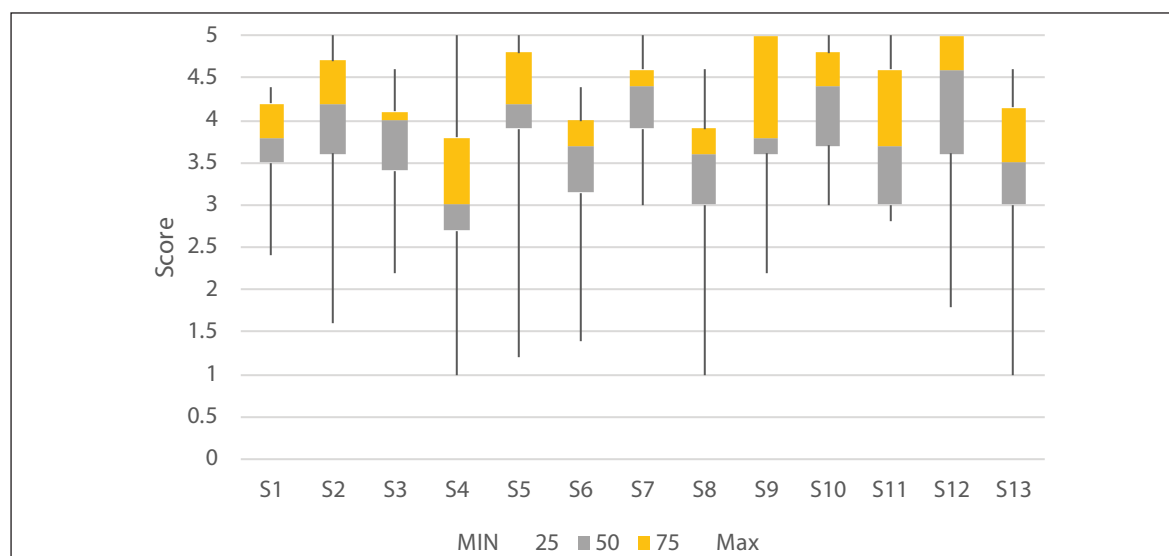
Figure 5 suggests that the highest variance is for Strategy 9 (Climate Modelling and Risk Analysis) and Strategy 11 (Sustainable Development Stock Exchanges). Furthermore, Strategy 11 and Strategy 4 (Shared Climate Fund) are rather unevenly distributed. Strategy 9 has very high values. Although Strategy 4 has been rated rather low, there are still respondents that evaluated Strategy 11 (Sustainable Stock Exchanges) relatively

high. Strategy 7 (Public Guarantee Fund) has been rated with the highest values and also has relatively low variance. It seems that the Public Guarantee Fund is seen as a useful strategy by nearly all the respondents. Strategy 7 has been evaluated significantly higher than Strategy 4 (Shared Climate Fund) and Strategy 8 (Public Financial Institutions). The differences between the other strategies are not statistically different.

Strategy Ratings by Attribute

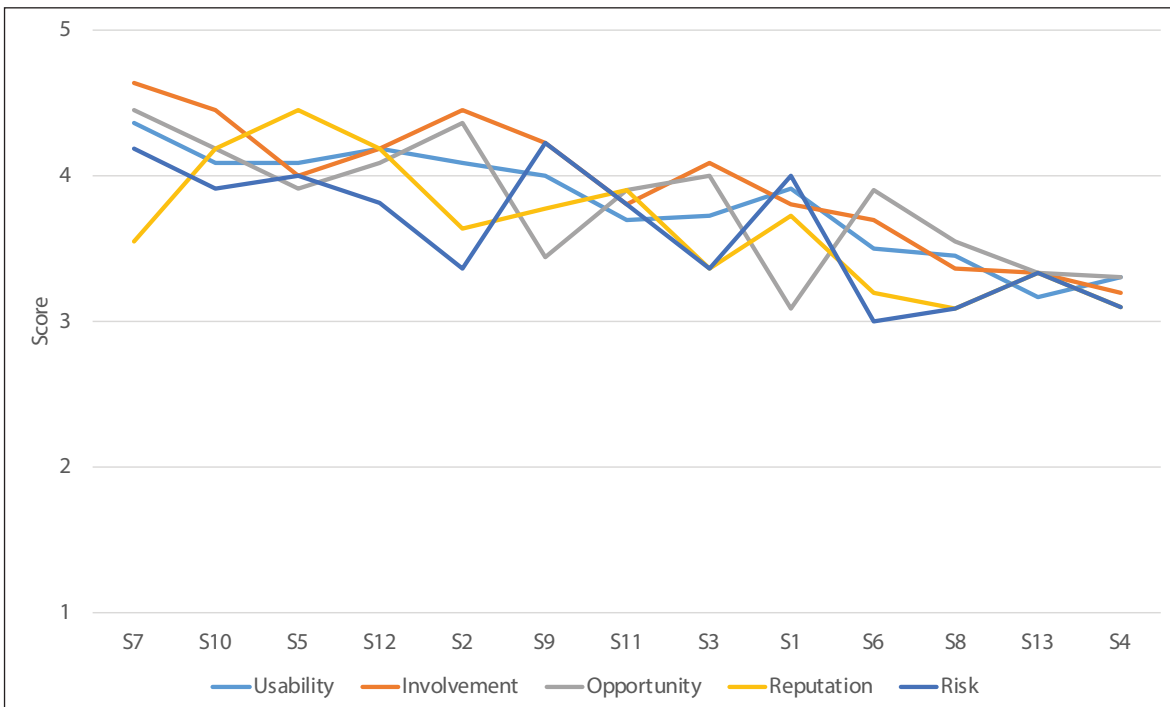
As illustrated in Figure 6, in terms of usability, the highest rating was for the Public Guarantee Fund (S7), whereas the lowest rating was Financial Regulatory Policies (S13). Regarding involvement, the highest response was for Public Guarantee Fund (S7), whereas the lowest response was Shared Climate Fund (S4). Regarding opportunity, the highest response was for Public Guarantee Fund (S7), whereas the lowest response was Systematic Climate Risk Assessments (S1). Regarding reputation, the highest response was for Reporting Key Performance Indicators (S5), whereas the lowest response was for working with Public Financial Institutions (S8). Regarding risk, the highest response was for Climate Modelling and Risk Analysis (S9), whereas the lowest response was Tax Incentives (S6).

Figure 5: Box Plot of Recommended Strategies



Source: Authors.

Figure 6: Strategies Sorted by Attributes



Source: Authors.

Policy Recommendations

Based on the analysis of international policies to engage the financial industry in climate finance and on a survey conducted with representatives of the Canadian financial sector, the authors have developed policy recommendations for the financial sector, for regulators, as well as for federal and provincial governments.

Financial Sector

The financial sector prefers enacting policies that create climate-related business opportunities. This includes new opportunities for asset management as well as the development of a green bonds market. Favourable policies can encourage institutions to offer innovative low-carbon products and services and diversify their business. Respondents believe that both the green bond market and asset management would create new opportunities for involvement in the low-carbon economy. Institutions also favour incorporating standardized key performance indicators as a risk mitigation strategy. The authors note, however, that the financial sector is more in favour of private action over public

intervention or partnerships. Therefore, this paper recommends that the financial sector engages in developing financial industry codes of conduct addressing climate-related business opportunities and risks. Furthermore, it is recommended that the financial sector proactively engages with public policy makers from the environmental sector to communicate the opportunities and barriers with regard to climate finance.

Regulators

The financial sector also favours several regulatory recommendations, including mandating systematic climate risk assessments, climate modelling and risk analysis, sustainable stock exchanges and regulatory policies such as cost incentives. Systematic risk assessment tools can be integrated into conventional lending and investment risk management models and can require action plans to mitigate for unanticipated risk. Climate modelling is perceived as a means by which a financial institution can manage its risk as well as increase its reputation, inferring that these methods will help improve their business case for sustainability. Finally, regulatory policies, although positive, were rated among the least favourable recommendation, attesting

that financiers prefer to maintain autonomy in addressing sustainability challenges. Therefore, it is recommended that financial regulators develop indicators and guidelines for the financial industry to assess risks and opportunities of climate change. Additionally, the authors recommend that financial regulators, such as the Bank of Canada, introduce mandatory climate risk-related indicators into the annual financial reporting.

Government

The financial sector does favour some government intervention in the form of tax incentives and public guarantee funds; however, government-based regulatory mechanisms, such as shared climate funds, public financial institutions and public-private partnerships, are ranked among the lowest of recommended strategies. Public guarantees and tax incentives could encourage the financial sector to invest in low-carbon developments by mitigating the risks associated with the transition. These mechanisms could be provisioned through a first-loss fund to incentivize private investments. Finally, while public-private partnerships are perceived to increase involvement and business opportunities, public financial institutions and the shared climate fund are consistently ranked low among all attributes. Once again, financial institutions would prefer regulations that foster business opportunities for the financial sector and mitigate risks associated with the low-carbon transition. Therefore, the authors recommend the federal and provincial governments introduce first-loss mitigation mechanisms, such as first-loss guarantees. They would increase the incentive for the financial industry to engage in climate finance without taking high risks. Furthermore, the authors recommend that government financial institutions, such as the EDC, the BDC and Canada's Development Finance Institution, engage in public-private financial collaborations with regard to climate finance.

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