

# INSTITUTIONAL INVESTORS FIND ALPHA IN CLIMATE RISK MATRICES: GLOBAL SURVEY FINDS

SUPPORTED BY:



Natalia Moudrak  
Kathryn Bakos  
Joanna Eyquem  
Hugh O'Reilly  
Ashby Monk  
Soh Young In

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The Intact Centre on Climate Adaptation (Intact Centre) is an applied research centre at the University of Waterloo. The Intact Centre was founded in 2015 with a gift from Intact Financial Corporation, Canada's largest property and casualty insurer. The Intact Centre helps homeowners, communities and businesses to reduce risks associated with climate change and extreme weather events. For additional information, visit: [www.intactcentrecclimateadaptation.ca](http://www.intactcentrecclimateadaptation.ca)

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## **ACKNOWLEDGMENTS**

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## **CITATION**

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For information about this report, contact  
Natalia Moudrak: [nmoudrak@uwaterloo.ca](mailto:nmoudrak@uwaterloo.ca)

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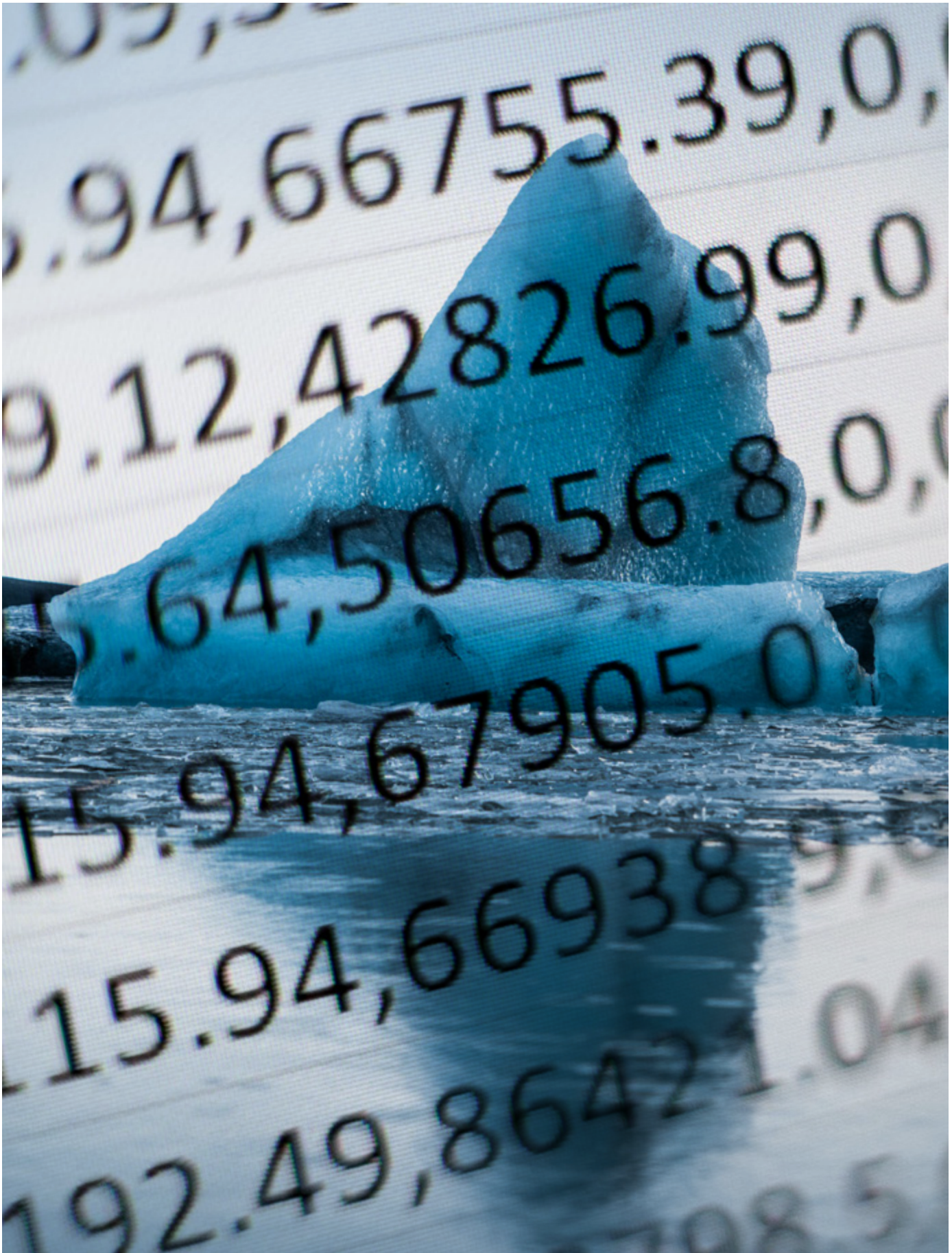
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“Climate change is a risk, not only to our environment but to the long-term stability of our economy and global financial system. Investors need to understand the physical and transition risks climate poses to their portfolio companies.”



**Sonia Baxendale**  
President and CEO, Global Risk Institute



# ABSTRACT

The Task Force on Climate-Related Financial Disclosures advises that climate change and extreme weather risk should factor into institutional portfolio management, founded on studies confirming that (1) climate change and extreme weather risk are effectively irreversible, and (2) the consequent impacts (largely negative) of climate change could potentially extend across all business sectors and geographic domains.



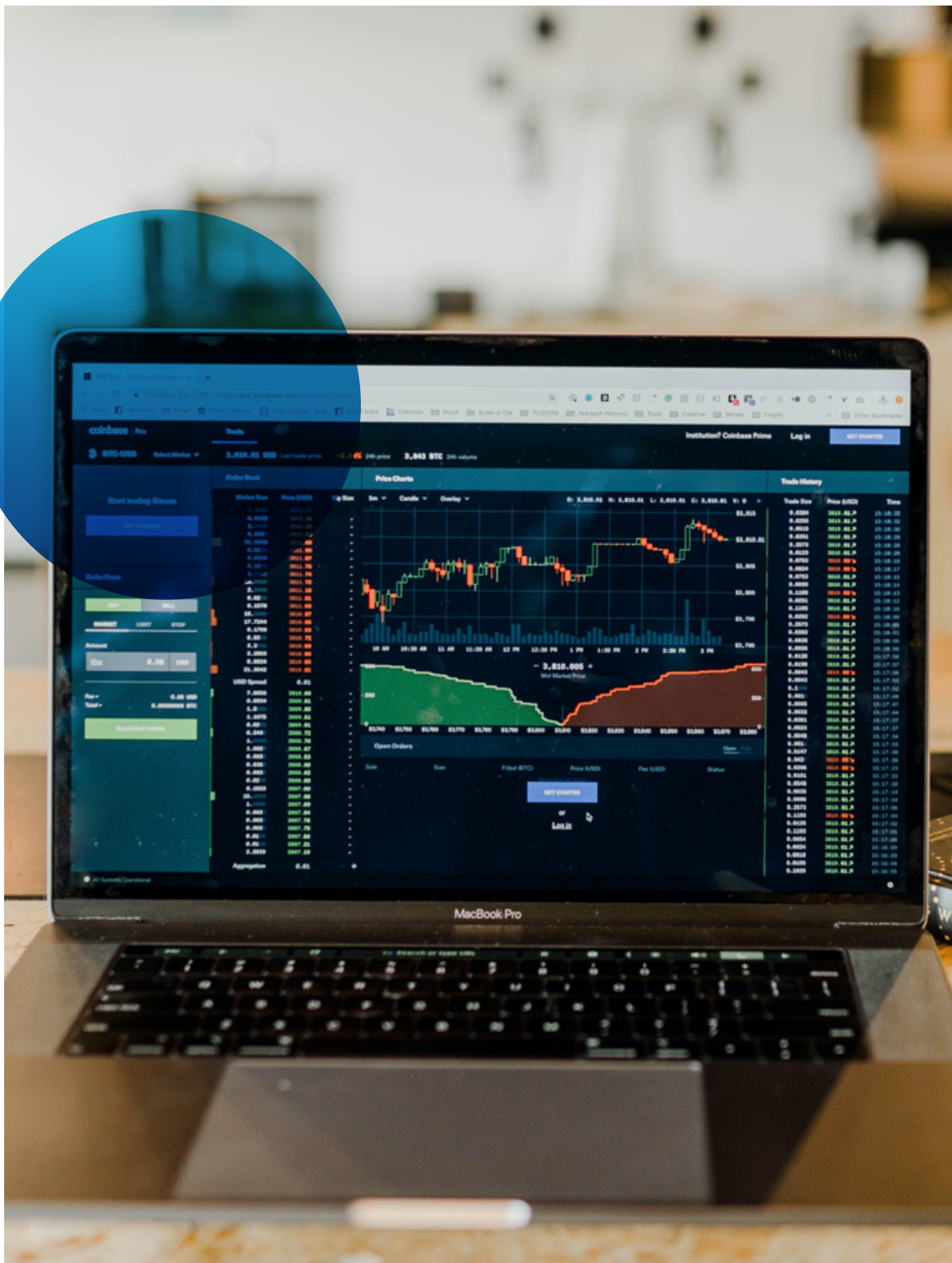
**The need to factor climate risk into portfolio management is clear** – the outstanding challenge is “how?” Unfortunately, there is no standardized guidance regarding means to include physical climate risk into institutional portfolio management.

In response, this paper presents **Climate Risk Matrices** as a practical tool for institutional investors to integrate physical climate risk into portfolio management. In brief, a **Climate Risk Matrix** identifies the top 1-2 means by which extreme weather events (e.g., flood, fire, extreme heat, etc.) may negatively impact a specific industry sector, while identifying actions that a company within that sector could be expected to take to mitigate these risks.

The paper further describes results of an **international survey** focused on understanding the methods

undertaken by portfolio managers to assess physical climate risk, the extent of formal training on physical climate risk received by the Boards of Directors, C-Suite officers and portfolio managers, and the utility of **Climate Risk Matrices** to aid portfolio managers in investment decisions.

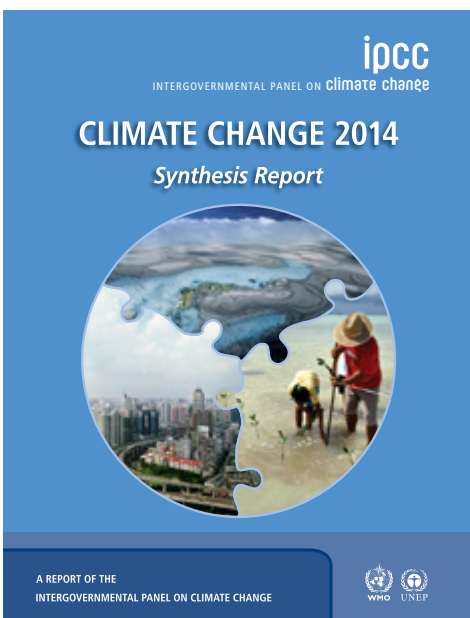
The survey results confirm the need to improve translation of physical climate risk into financial valuations, while highlighting the utility of **Climate Risk Matrices** as a practical tool, consistent with TCFD, for application of climate risk assessment into portfolio management. The survey results also illustrate the need for scaling formal training on climate risk among Boards of Directors, C-Suite officers and portfolio managers.



# INTRODUCTION



The Intergovernmental Panel on Climate Change (IPCC), the United Nations body for assessing climate science, projects that **global warming is effectively irreversible** and that there will be an **increase in the frequency, intensity and duration of extreme weather events**, such as floods, droughts and heat waves, **through the 21st century**.<sup>i, ii</sup>



Due in part to climate change, the cost of “physical climate risk” (i.e., natural disasters and extreme weather events) will continue to rise. Already, **2010-2019 was the costliest decade in the modern history of natural disasters, with total direct economic damages and insured losses tallying \$2.98 trillion USD globally, \$1.1 trillion USD higher than in the previous decade**.<sup>iii</sup> Notably, the insurance protection gap, which is the portion of economic losses not covered by insurance, was 69% in 2019, leaving governments, businesses and individuals “on the hook” to pay for the majority of damages and disaster recovery efforts<sup>iv</sup>. Box 1 illustrates selected climate impacts across direct industry sectors.

## BOX 1. EXAMPLES OF PHYSICAL CLIMATE CHANGE IMPACTS THAT CAN AFFECT ASSET VALUATION AND PORTFOLIO PERFORMANCE

- **Buildings** are increasingly more exposed to damages and/or destruction by floods, forest fires, and other extreme weather events (e.g., between 2005 and 2017, increased tidal flooding caused by sea level rise eroded \$15.9 billion in relative property values for 28.6 million coastal properties in 18 states located in the East and Gulf Coasts of the US).<sup>v</sup>
- **Infrastructure services** are increasingly impacted by climate-related disruptions (e.g., by 2040, much of the continental US is projected to experience warmer summers and tripling of extreme-heat days, leading to a 6 to 18% increase in spending on residential and commercial electricity).<sup>vi</sup>
- **Crop production** is impacted by changes to harvests and production costs, affecting price, quantity and quality of farmed products (e.g., the European Environment Agency projects that climate change will lead to a decrease crop productivity in southern Europe, where yields of non-irrigated crops like wheat, corn and sugar beet are expected to decrease 50% by 2050.).<sup>vii</sup>
- **Fisheries** will be impacted due to changing marine and freshwater conditions, ocean acidification, invasive species, and pests (e.g., cold-water fish habitat in Southern Ontario, Canada is projected to decline 67% by 2025; and arctic char populations could decline by 40% by 2100).<sup>viii</sup>
- **Fixed income investments** can also be impacted by natural disasters and extreme weather events, leading to municipal, state and sovereign credit rating downgrades and plummeting value of debt (e.g., following Hurricane Harvey in 2017, Moody's downgraded Port Arthur in Texas, from A1 to A2 due to its "weak liquidity position that is exposed to additional financial obligations from the recent hurricane damage, that are above and beyond the city's regular scope of operations").<sup>ix</sup>



Recognizing that physical climate risks often translate to material losses, the global financial community emphasizes the need for climate risk disclosures and integration into portfolio management. For example:

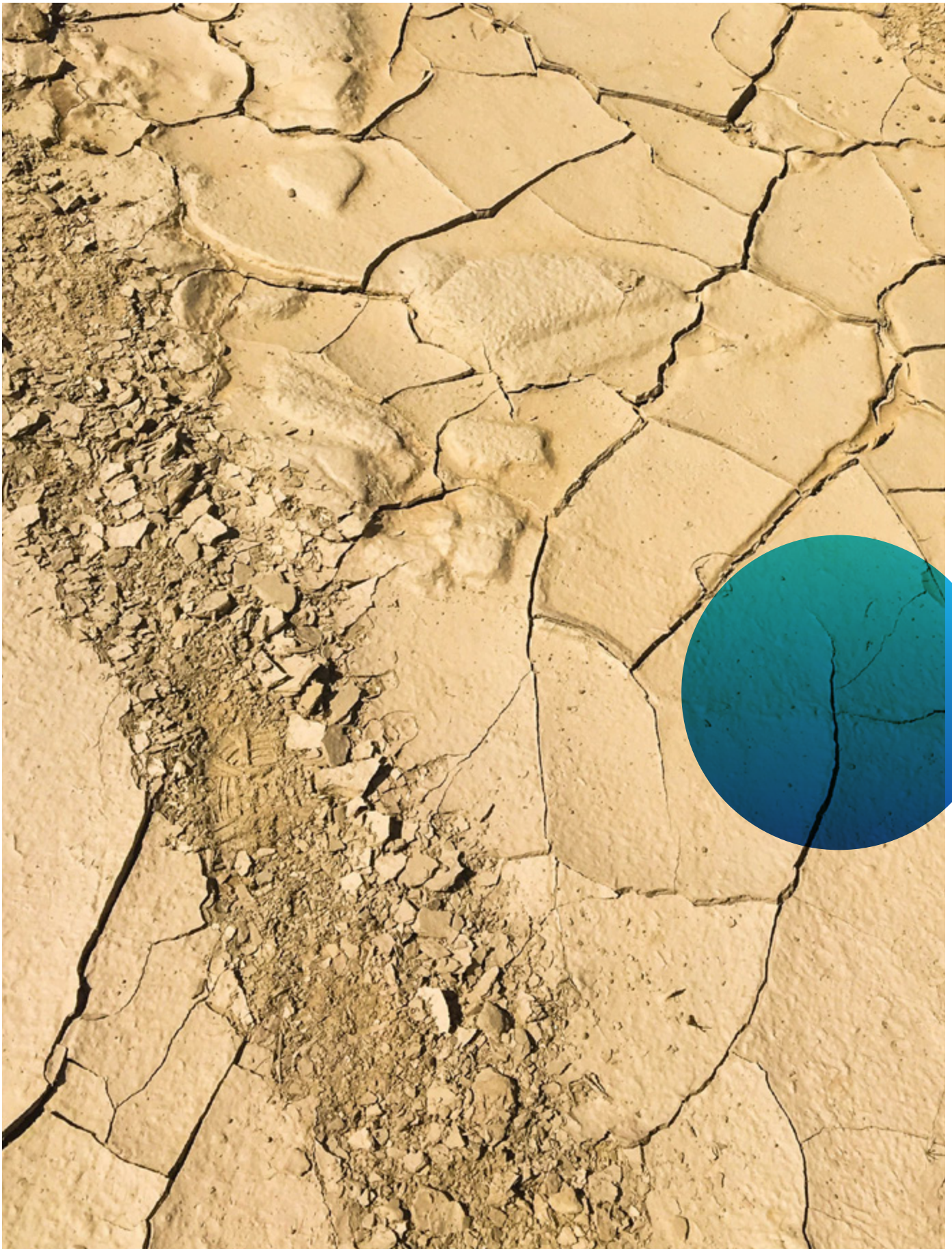
- **The Task Force on Climate-Related Financial Disclosures (TCFD)**, the Sustainability Accounting Standards Board (SASB), and **Canada's Expert Panel on Sustainable Finance (EPSF)** have instructed investors of their fiduciary duty to assess, disclose and incorporate climate risk into portfolio management. <sup>x, xi, xii</sup>
- The **Network of Central Banks and Supervisors for Greening the Financial System (NGFS)** noted that climate risks are a source of financial risk that will affect all agents in the economy (households, businesses, governments) across all industry sectors and all geographies, and called on central banks to integrate climate risk factors into own portfolio management decisions. <sup>xiii</sup>
- The **International Monetary Fund** found that investors are currently falling short on pricing physical climate risk and advocated for better climate risks disclosures and stress testing. <sup>xiv</sup>

- **Security commissions** began to issue guidance relative to material climate change risk disclosures by issuers, pointing to the possibility of mandated disclosures in the near future. <sup>xv, xvi</sup>
- **Judicial systems** have accepted climate change and the risks it presents as self-evident, uncontroversial and beyond reasonable dispute, so it would be nearly impossible for Boards of Directors to dismiss climate change risk - courts require directors to inform themselves about the material facts, while evaluating and seeking advice about the information presented to them. <sup>xvii</sup>

However, characterization of physical climate risk is a process that requires in-depth technical knowledge of potential impacts that vary widely across different geographies and sectors. While there are technical frameworks for assessing climate risks, such as Infrastructure Canada's Climate Lens approach <sup>xviii</sup> and the Public Infrastructure Engineering Vulnerability Committee (PIEVC) Protocol, <sup>xix</sup> climate risk assessments are being undertaken in a piece-meal manner. Furthermore, there is no standardized guidance regarding the practical inclusion of physical climate risk into institutional portfolio management, on an industry-by-industry basis.



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# CLIMATE RISK MATRICES:

## A PRACTICAL APPROACH TO INTEGRATE PHYSICAL CLIMATE RISK INTO PORTFOLIO MANAGEMENT

A concept that has been developed to fill the identified gap in guidance relating to physical climate risk is that of sector-specific **Climate Risk Matrices (CRMs)**.<sup>xx</sup> These matrices identify top **1 to 2 physical climate risks** that portfolio managers should prioritize as most material to affect performance of companies within a given industry sector. These impacts reflect the expert advice of operations officers or similarly **experienced subject matter experts** within industry sectors – based on their collective experience, these practitioners are best positioned to identify a short list of material means by which flood, drought, wildfire, wind or other hazards may convey risk to companies within a specific industry sector. For each physical climate risk impact, a **risk mitigation action** is suggested within a **CRM**. Prioritized physical climate risk impacts and risk mitigation actions presented in **CRMs**, provide a practical format for portfolio managers, as responsible fiduciaries, to recognize physical climate risk.

**CRMs** have been developed for two industry sectors – *Electricity Transmission & Distribution (T&D)* and *Commercial Real Estate (CRE)*.<sup>xxi</sup> The matrices were designed with the following features in mind:



- **user-friendly** (i.e., information in the **matrix** can be easily understood by any portfolio manager);
- **scientifically well-informed** (based on expert advice from subject matter experts);
- **predisposed to frequent updating** (e.g., every five years) to ensure relevancy of guidance, and
- **available for use almost immediately** (i.e., tools that require years to develop will be “too little too late”).

The T&D **CRM** (referenced in the survey described subsequently) is presented in **Table 1**.

**TABLE 1: CLIMATE RISK MATRIX FOR CANADA'S ELECTRICITY TRANSMISSION AND DISTRIBUTION SECTOR**

	<b>FLOOD</b>	<b>FIRE</b>	<b>WIND STORMS</b>	<b>ICE AND SNOW LOADING</b>	<b>THAWING PERMAFROST</b>
<b>Key Climate Risk Impacts</b>	Flood-induced high-water levels result in inadequate electrical clearances below lines that are hazardous to the public	Fire along transmission corridors can cause outages if corridors are not adequately cleared of brush  Vegetation/tree contacts with transmission lines can cause arcing, fires and outages	Vegetation/tree branches can fall onto T&D lines causing outages  T&D lines can be brought down by wind forces	T&D lines and structures can collapse under heavy ice loading	Thawing of permafrost can displace transmission tower foundations, causing structural collapse and outages
<b>Mitigation Measures</b>	Ensure structures are tall enough to ensure safe clearances under foreseeable flood levels, or that lines are installed underground	Conduct patrols (visual inspection of utility equipment and structures) in fire prone areas  Clear vegetation along transmission corridors	Clear vegetation along transmission corridors  Install anti-galloping devices on conductors and ensure structures are designed to withstand winds	Install visual monitors to detect ice loading before ice loads build, boost current to melt ice (i.e., shorting the line)	Modify structures/designs to readily permit adjustment of towers when line patrols identify permafrost thaw displacement



# INTERNATIONAL SURVEY:

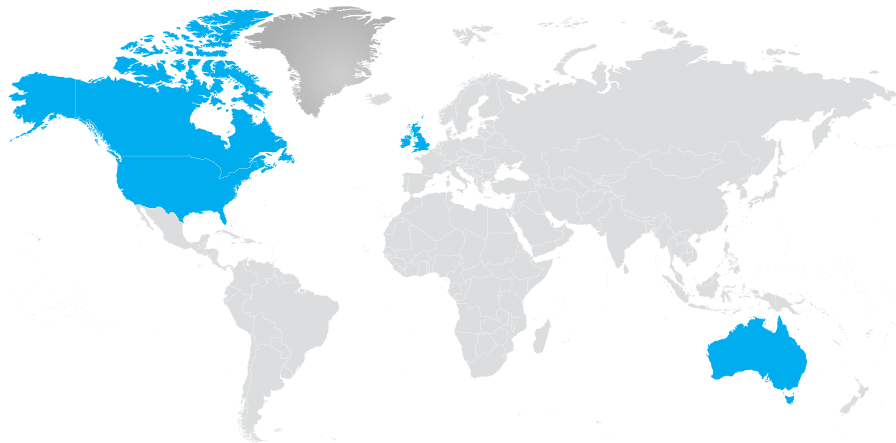
## Integrating Climate Risk into Institutional Portfolio Management

In 2019, the Intact Centre on Climate Adaptation, the Stanford Global Projects Center and the Global Risk Institute administered an international survey, titled “Integrating Climate Risk into Institutional Portfolio Management” to 50 institutional investors. The purpose of the survey was two-fold: first, to assess the degree to which physical climate risk is currently integrated into portfolio management and investment analyses, and second, to test the practical utility of **Climate Risk Matrices** in assisting portfolio managers with integrating physical climate risk into portfolio management.

The survey was undertaken between October 1 and October 31, 2019. Of the 50 invited institutions, 13

participated (**Table 2**), representing just over \$2 trillion USD of assets under management. These institutions collectively met the following criteria:

- Assets under management: range in size from “small”/\$7 billion to “large”/\$500 billion;
- Diversity of fund management organizations/ mandates: pension funds, property & casualty and life & health insurance companies, and university endowment funds; and
- Geographic representation: North America, Australia and Europe



**TABLE 2: “INTEGRATING CLIMATE RISK INTO INSTITUTIONAL PORTFOLIO MANAGEMENT”  
SURVEY, LIST OF PARTICIPATING INSTITUTIONS**

<b>PARTICIPANT</b>	<b>COUNTRY</b>	<b>Assets Under Management (\$ Billion USD)*</b>
AIMCo	Canada	\$90.26 as of December 2019
AllianceBernstein Holding L.P.	USA	\$631 as of September 2020
AustralianSuper	Australia	\$132.86 as of June 2020
BlackRock Asset Management Canada Limited	Canada	\$144.8 as of November 2019
Caisse de dépôt et placement du Québec	Canada	\$253.08 as of June 2020
The Canada Pension Plan Investment Board	Canada	\$330.14 as of June 2020
Intact Investment Management Inc.	Canada	\$16 as of October 2020
Ontario Teachers' Pension Plan	Canada	\$155.57 as of June 2020
RPMI Railpen	UK	\$39.04 (date unspecified)
SLC Management	Canada	\$193 as of June 2020
UK – Environment Agency Pension Fund	UK	\$4.47 as of October 2020
University of California (Regents)	USA	\$130 as of June 2020
University of Toronto Asset Management Corporation	Canada	\$8.63 as of October 2020
<b>Total</b>		<b>\$2.13 Trillion USD</b>

**Exchange Rates Used (as of November 4, 2020)** \$1.00 CAD to \$0.76 USD, £1.00 Pound to \$1.30 USD, \$1.00 AUD to \$0.73 USD.

Survey questions were designed to invite feedback relative to three aspects of analysis:

1. **Existing frameworks for climate risk assessment** used by portfolio managers;
2. The extent of **formal climate risk training** received by Board members, C-Suite officers and portfolio managers; and
3. The **utility of Climate Risk Matrices (CRMs)**

in helping portfolio managers to integrate physical climate risks into their investment conversations and decisions.

Relative to assessing the utility of **CRMs** for enhanced portfolio management, survey participants were asked to share feedback on the **CRM** developed for Canada’s Electricity Transmission and Distribution presented earlier (**Table 1**). The survey questions and summary of responses are presented in **Table 3**.

# ANALYSIS OF INTERNATIONAL SURVEY OUTCOMES

**Key takeaways relating to the three areas of analysis are described below.**

## **4.1 Existing Frameworks for Climate Risk Assessment**

The survey revealed that while the majority of respondents (62%) have not yet translated physical climate change impacts into financial valuation of assets, the majority (54%) indicated that they viewed physical climate risks as a “very high” or “somewhat high” material issue. Qualitative survey responses pointed to two key factors impeding financial valuation of assets from the standpoint of physical climate risk:

1. Lack of decision-friendly climate data disclosure by the issuers; and
2. Lack of standardized best practices for integrating climate risk into portfolio management.

In relation to these two factors, **CRMs** offer an eloquent solution, as they succinctly outline the most material physical climate risks and risk mitigation measures that should be disclosed by companies within specific industry sectors.

## **4.2 Formal Training on Climate Risk**

The survey indicated that there is a general lack of

formal training of Board Members, C-suite officers and portfolio managers relating to climate risk, which may compound the difficulty in integrating physical climate risk into institutional portfolio management:

- 46% of survey respondents indicated that either “none” of their Board Members received formal training on climate risk, or they were not sure about the extent of climate risk training received by the Board Members;
- 23% of survey respondents indicated that their Chief Strategy Officers received no formal training on climate risk, and 31% indicated that they were not sure about the extent of climate risk training received by the Chief Strategy Officers;
- 31% of survey respondents indicated that their Chief Investment Officers received no formal training on climate risk, and 15% indicated that they were not sure about the extent of climate risk training received by the Chief Investment Officers; and
- 46% of survey respondents indicated that either “none” of their portfolio managers received formal training on climate risk, or they were not sure about the extent of climate risk training received by portfolio managers.

There is an evident need to scale training on climate risk among institutional investors to help them meet the directives outlined in the Task Force on Climate-Related Financial Disclosures, the Sustainability Accounting Standards Board, and Canada’s Expert Panel on Sustainable Finance.

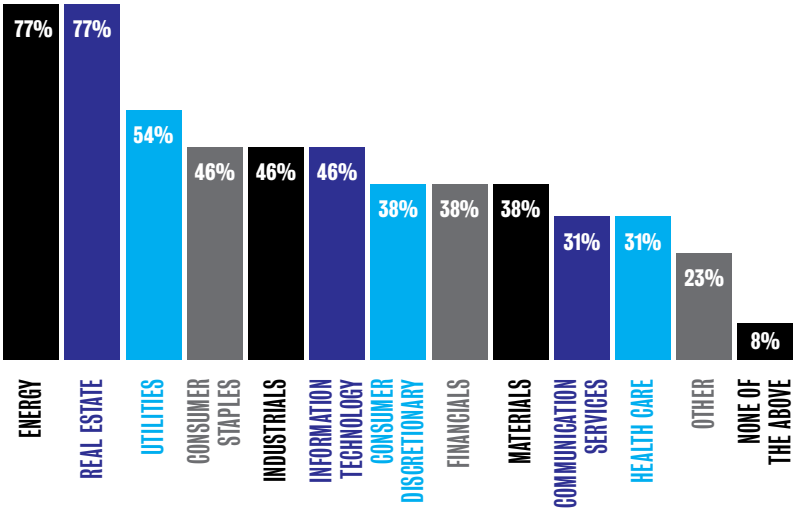
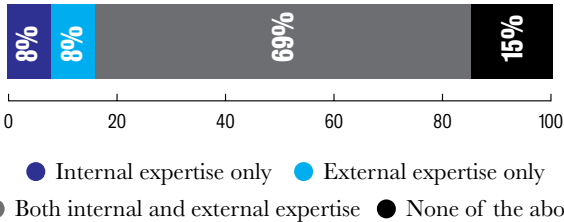
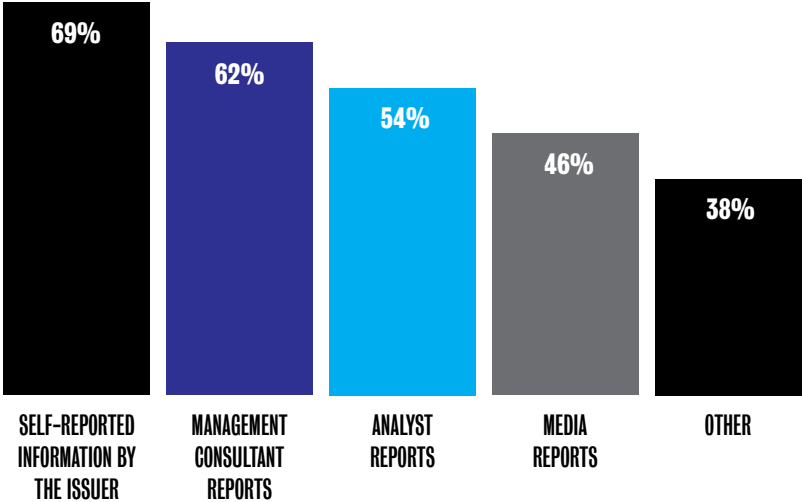
### 4.3 Utility of Climate Risk Matrices


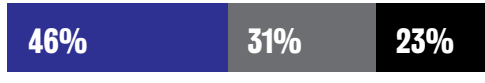

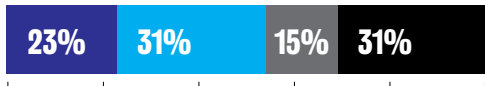

A notable 85% of survey respondents indicated that **CRMs** would be useful in providing portfolio managers

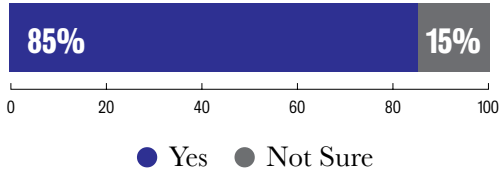
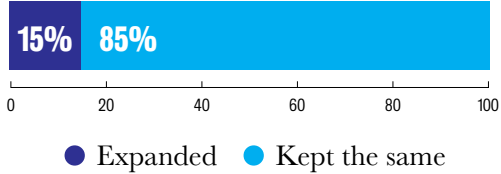
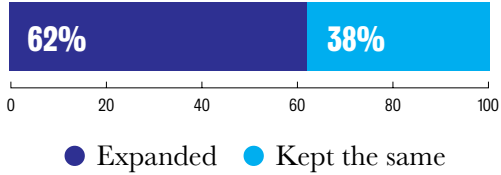
with actionable insights into industry-specific physical climate risks. The same percentage indicated that the level of detail provided relating to the key climate risks was appropriate. However, most respondents (62%) would welcome greater detail regarding mitigation measures.

The survey results indicate that development of a suite of **CRMs** for a broader range of industry sectors and geographies would assist institutional investors in appropriately integrating physical climate risk into their portfolio management.

TABLE 3: “INTEGRATING CLIMATE RISK INTO INSTITUTIONAL PORTFOLIO MANAGEMENT” SURVEY RESULTS, 13 RESPONDENTS																									
SURVEY QUESTIONS	RESPONSES																								
<b>Part 1: Existing Frameworks for Climate Risk Assessment</b>																									
1. Has your organization translated climate risk impacts into financial valuation of assets (e.g., through Ratio Analysis, Discounted Cash Flow Analysis, “Rules of Thumb” valuations, Economic Value Added Analysis, Options Pricing models, etc.)?	<table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>38%</td> </tr> <tr> <td>No</td> <td>62%</td> </tr> </tbody> </table>	Response	Percentage	Yes	38%	No	62%																		
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2. How much weight does your institution attach to the materiality analysis of climate risks applied to portfolio management?	<table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Very High</td> <td>31%</td> </tr> <tr> <td>Somewhat High</td> <td>23%</td> </tr> <tr> <td>Somewhat Low</td> <td>31%</td> </tr> <tr> <td>Very Low</td> <td>15%</td> </tr> </tbody> </table>	Response	Percentage	Very High	31%	Somewhat High	23%	Somewhat Low	31%	Very Low	15%														
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3. Has your organization performed a materiality analysis to determine if any of the following climate risk factors may influence the performance of assets in portfolios?	<table border="1"> <thead> <tr> <th>Climate Risk Factor</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>FLOOD</td> <td>62%</td> </tr> <tr> <td>SEA LEVEL RISE</td> <td>62%</td> </tr> <tr> <td>DROUGHT</td> <td>54%</td> </tr> <tr> <td>WILDFIRE</td> <td>46%</td> </tr> <tr> <td>WINDSTORM</td> <td>46%</td> </tr> <tr> <td>SNOW AND ICE LOAD</td> <td>31%</td> </tr> <tr> <td>EXTREME HEAT</td> <td>23%</td> </tr> <tr> <td>HAIL</td> <td>23%</td> </tr> <tr> <td>PERMAFROST THAW</td> <td>23%</td> </tr> <tr> <td>OTHER</td> <td>23%</td> </tr> <tr> <td>NONE OF THE ABOVE</td> <td>8%</td> </tr> </tbody> </table>	Climate Risk Factor	Percentage	FLOOD	62%	SEA LEVEL RISE	62%	DROUGHT	54%	WILDFIRE	46%	WINDSTORM	46%	SNOW AND ICE LOAD	31%	EXTREME HEAT	23%	HAIL	23%	PERMAFROST THAW	23%	OTHER	23%	NONE OF THE ABOVE	8%
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<p>4. For climate risk factors deemed to be material, please indicate the broad categories of industry sectors to which portfolio managers in your organization apply climate risk assessment.</p>	 <table border="1"> <thead> <tr> <th>Industry Sector</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>ENERGY</td><td>77%</td></tr> <tr><td>REAL ESTATE</td><td>77%</td></tr> <tr><td>UTILITIES</td><td>54%</td></tr> <tr><td>CONSUMER STAPLES</td><td>46%</td></tr> <tr><td>INDUSTRIALS</td><td>46%</td></tr> <tr><td>INFORMATION TECHNOLOGY</td><td>46%</td></tr> <tr><td>CONSUMER DISCRETIONARY</td><td>38%</td></tr> <tr><td>FINANCIALS</td><td>38%</td></tr> <tr><td>MATERIALS</td><td>38%</td></tr> <tr><td>COMMUNICATION SERVICES</td><td>31%</td></tr> <tr><td>HEALTH CARE</td><td>31%</td></tr> <tr><td>OTHER</td><td>23%</td></tr> <tr><td>NONE OF THE ABOVE</td><td>8%</td></tr> </tbody> </table>	Industry Sector	Percentage	ENERGY	77%	REAL ESTATE	77%	UTILITIES	54%	CONSUMER STAPLES	46%	INDUSTRIALS	46%	INFORMATION TECHNOLOGY	46%	CONSUMER DISCRETIONARY	38%	FINANCIALS	38%	MATERIALS	38%	COMMUNICATION SERVICES	31%	HEALTH CARE	31%	OTHER	23%	NONE OF THE ABOVE	8%
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<p>5. If your organization integrates climate risk into portfolio management, what is the source of expertise?</p>	 <table border="1"> <thead> <tr> <th>Source of Expertise</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>Internal expertise only</td><td>8%</td></tr> <tr><td>External expertise only</td><td>8%</td></tr> <tr><td>Both internal and external expertise</td><td>69%</td></tr> <tr><td>None of the above</td><td>15%</td></tr> </tbody> </table>	Source of Expertise	Percentage	Internal expertise only	8%	External expertise only	8%	Both internal and external expertise	69%	None of the above	15%																		
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<p>6. If your organization utilizes internal expertise for integrating climate risk into portfolio management, what inputs do you use (indicate all that apply)?</p>	 <table border="1"> <thead> <tr> <th>Input</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>SELF-REPORTED INFORMATION BY THE ISSUER</td><td>69%</td></tr> <tr><td>MANAGEMENT CONSULTANT REPORTS</td><td>62%</td></tr> <tr><td>ANALYST REPORTS</td><td>54%</td></tr> <tr><td>MEDIA REPORTS</td><td>46%</td></tr> <tr><td>OTHER</td><td>38%</td></tr> </tbody> </table>	Input	Percentage	SELF-REPORTED INFORMATION BY THE ISSUER	69%	MANAGEMENT CONSULTANT REPORTS	62%	ANALYST REPORTS	54%	MEDIA REPORTS	46%	OTHER	38%																
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SURVEY QUESTIONS	RESPONSES										
<b>Part 2: Formal Training on Climate Risk</b>											
<p>7. Please indicate how many Board Members within your organization have received formal training on climate risk.</p>	 <p>0 20 40 60 80 100</p> <p>● All ● Less than Half ● Unsure ● None</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>38%</td> </tr> <tr> <td>Less than Half</td> <td>15%</td> </tr> <tr> <td>Unsure</td> <td>8%</td> </tr> <tr> <td>None</td> <td>38%</td> </tr> </tbody> </table>	Response	Percentage	All	38%	Less than Half	15%	Unsure	8%	None	38%
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<p>8. Please indicate whether Chief Strategy Officer within your organization has received formal training on climate risk.</p>	 <p>0 20 40 60 80 100</p> <p>● Yes ● Not applicable / Not Sure ● No</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>46%</td> </tr> <tr> <td>Not applicable / Not Sure</td> <td>31%</td> </tr> <tr> <td>No</td> <td>23%</td> </tr> </tbody> </table>	Response	Percentage	Yes	46%	Not applicable / Not Sure	31%	No	23%		
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<p>9. Please indicate whether Chief Investment Officer within your organization has received formal training on climate risk.</p>	 <p>0 20 40 60 80 100</p> <p>● Yes ● Not applicable / Not Sure ● No</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>54%</td> </tr> <tr> <td>Not applicable / Not Sure</td> <td>15%</td> </tr> <tr> <td>No</td> <td>31%</td> </tr> </tbody> </table>	Response	Percentage	Yes	54%	Not applicable / Not Sure	15%	No	31%		
Response	Percentage										
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Not applicable / Not Sure	15%										
No	31%										
<p>10. Please indicate how many Portfolio Managers within your organization have received formal training on climate risk.</p>	 <p>0 20 40 60 80 100</p> <p>● All ● More than half ● Less than half ● None / Not Sure</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>23%</td> </tr> <tr> <td>More than half</td> <td>31%</td> </tr> <tr> <td>Less than half</td> <td>15%</td> </tr> <tr> <td>None / Not Sure</td> <td>31%</td> </tr> </tbody> </table>	Response	Percentage	All	23%	More than half	31%	Less than half	15%	None / Not Sure	31%
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<p>11. Does your organization employ an in-house Climate Scientist, who assists portfolio managers?</p>	 <p>0 20 40 60 80 100</p> <p>● Yes ● No</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>8%</td> </tr> <tr> <td>No</td> <td>92%</td> </tr> </tbody> </table>	Response	Percentage	Yes	8%	No	92%				
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Yes	8%										
No	92%										

SURVEY QUESTIONS	RESPONSES						
<b>Part 3: Utility of Climate Risk Matrices</b>							
<p>12. From the perspective of portfolio management, would industry-specific Climate Risk Matrices, such as the one illustrated in Table 1, be useful to portfolio management?</p>	 <p>A horizontal stacked bar chart with a scale from 0 to 100. The bar is divided into two segments: a dark blue segment representing 85% and a dark grey segment representing 15%. Below the bar, a legend shows a dark blue circle for 'Yes' and a dark grey circle for 'Not Sure'.</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>85%</td> </tr> <tr> <td>Not Sure</td> <td>15%</td> </tr> </tbody> </table>	Response	Percentage	Yes	85%	Not Sure	15%
Response	Percentage						
Yes	85%						
Not Sure	15%						
<p>13. Relative to “Key Climate Risk Impacts” outlined in Climate Risk Matrix (first row), please indicate whether the level of detail should be expanded, kept the same, or reduced?</p>	 <p>A horizontal stacked bar chart with a scale from 0 to 100. The bar is divided into two segments: a dark blue segment representing 15% and a light blue segment representing 85%. Below the bar, a legend shows a dark blue circle for 'Expanded' and a light blue circle for 'Kept the same'.</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Expanded</td> <td>15%</td> </tr> <tr> <td>Kept the same</td> <td>85%</td> </tr> </tbody> </table>	Response	Percentage	Expanded	15%	Kept the same	85%
Response	Percentage						
Expanded	15%						
Kept the same	85%						
<p>14. Relative to “Mitigation Measures” outlined in Climate Risk Matrix (second row), please indicate whether the level of detail should be expanded, kept the same, or reduced?</p>	 <p>A horizontal stacked bar chart with a scale from 0 to 100. The bar is divided into two segments: a dark blue segment representing 62% and a light blue segment representing 38%. Below the bar, a legend shows a dark blue circle for 'Expanded' and a light blue circle for 'Kept the same'.</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Expanded</td> <td>62%</td> </tr> <tr> <td>Kept the same</td> <td>38%</td> </tr> </tbody> </table>	Response	Percentage	Expanded	62%	Kept the same	38%
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# CONCLUSION

**As TCFD admonishes, time is not a luxury for institutional investors to integrate physical climate risks into portfolio management. Climate Risk Matrices (CRMs) offer a practical, accessible and user-friendly method to address outstanding challenges.**

The growing magnitude of extreme weather events guarantees to challenge businesses across all industry sectors and geographies, obligating them to mitigate the unrelenting impacts of floods, fires, heat waves, storm surges and other natural disasters.

As the survey highlights, as responsible fiduciaries the need to account for physical climate risk is appreciated by institutional investors. However, incorporating physical climate change impacts into financial valuation of assets is a challenge exacerbated by a lack of decision-friendly climate data disclosure by issuers and lack of standardized practices to integrate climate risk into portfolio management.

**Climate Risk Matrices offer a practical, accessible and user-friendly method to address these outstanding challenges.** By combining the skill sets of investors and subject matter experts (for example,

industry associations and standards-setting intuitions), the scaled production of **Climate Risk Matrices**, across all sectors and geographies, could begin today.

**The expansion of formal climate risk training for Board members, C-suite officers and portfolio managers is required** if physical climate risk is to be incorporated into well-informed investment decisions and conversations with issuers.

These two actions combined will provide a practical way for institutional investors to transform their general appreciation of the importance of climate risk, into climate risk-informed financial valuations and investment decisions, as advised by the Task Force on Climate-Related Financial Disclosures, the Sustainability Accounting Standards Board, and Canada's Expert Panel on Sustainable Finance.

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**“Every company, investor, & bank that screens new & existing investments for climate risk is simply being pragmatic.”**

**Jim Yong Kim**  
President of the World Bank



For further information about the report, please contact:

**Natalia Moudrak**

*Director, Climate Resilience*

Intact Centre on Climate Adaptation,

University of Waterloo

EV3 4334 – 200 University Avenue West

Waterloo, ON, Canada N2L 3G1

E. [nmoudrak@uwaterloo.ca](mailto:nmoudrak@uwaterloo.ca)

T. 226 220 4982



**INTACT CENTRE**  
ON CLIMATE ADAPTATION