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# **Preparedness of Canadian Businesses to Adapt to Climate Change**

**Background Research for NRTEE's Program on the  
*Economic Risks & Opportunities of Climate Change for  
Canada***

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## **FINAL REPORT**

### **Submitted To:**

The National Roundtable on the Environment and Economy

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## Report Objective and Scope

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Climate change presents risks and opportunities to businesses across all sectors. In Canada and elsewhere, businesses are starting to recognize the physical risks of climate change, and implement strategies to manage those risks. “Climate-sensitive” sectors such as insurance, agriculture, and tourism in particular have taken measures to increase their awareness of projected climate impacts and assess their risk exposure. However, anecdotal evidence suggests that many businesses have yet to seriously consider climate change adaptation as a risk management strategy, remaining focused on managing risks from greenhouse gas mitigation policy.

The objective of this report is to explore the perceptions of Canadian businesses to potential risks and opportunities from the *physical* impacts of climate change. To do this, the report utilizes data from the responses of Canadian businesses to an annual survey on business responses to climate change undertaken by the Carbon Disclosure Project (CDP). CDP data is used here to analyze how Canadian businesses:

- perceive potential risks associated with the physical impacts of climate change;
- perceive potential opportunities associated with the physical impacts of climate change; and
- are planning to respond to, and manage, those risks and opportunities.

The findings from this report will inform and support research underway at the National Roundtable on the Environment and Economy (NRTEE) on the *Economic Risks and Opportunities of Climate Change for Canada* (EROCC), which aims to:

- enhance Canadians’ awareness of the risks that a changing climate poses to them, in metrics that they can relate to;
- inform major strategic decisions on mitigation policy, and on the ‘climate file’ generally;
- inform national decisions on strategies and policies for adaptation; and
- inform regional adaptation decisions.

## Overview of the CDP Data

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The Carbon Disclosure Project (CDP) is an international effort to track corporate progress on managing climate change risks. Relying on voluntary responses to an annual survey of open-ended questions posed to large corporations, the CDP has amassed an extensive database of business responses since 2003. Partner organizations to the CDP, such as the Conference Board of Canada, analyze these data and issue targeted summaries. High-level summaries such as the ones provided by the Conference Board of Canada cover all CDP survey questions. Detailed analysis of survey responses pertaining to the physical risks of climate change (and possible opportunities) has the potential to uncover useful information to support action on adaptation in Canada. Additional detail on the CDP survey methodology is presented in Appendix A.

# Business Perceptions of Risks from the Physical Impacts of Climate Change

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CDP data indicates that Canadian businesses have a significant and growing appreciation of the potential risks to their businesses associated with the physical impacts of climate change. Fifty-six percent of all Canadian CDP survey respondents in the last six years expressed a perceived exposure to these physical impacts of climate change. In addition, the awareness of these risks has increased over recent years. In 2003, 16.7% of Canadian businesses responding to the survey identified a perceived vulnerability to these risks. In 2009, the percentage of businesses expressing an exposure to these risks was 58.9%.<sup>1</sup>

## Types of Risk from Physical Impacts of Climate Change

A variety of different types of risks associated with the physical impacts of climate change were analyzed for this study, including sudden and direct impacts of climate change, long-term and gradual impacts, and indirect impacts due to market changes and potential supply chain disruptions.

### *Risks from Direct and Sudden Impacts*

One risk to businesses from climate change is sudden and direct damage to existing infrastructure, facilities, or capital equipment due to abrupt changes in climate or severe weather events. CDP data for Canada indicates that direct, sudden impacts are the risks that Canadian firms are most concerned about - particularly potential impacts from severe weather events. Thirty-eight percent of all Canadian CDP responses reviewed expressed a perceived exposure to these risks, and 37% of respondents identified and discussed risks associated with severe weather, making this the most commonly identified specific risk factor identified by Canadian firms.

Canadian firms were consistent about the ways they described these risks across a wide variety of sectors, and many firms appeared to view these risks as significant threats to their business. There were, however, several countervailing trends within the Canadian responses, including the following:

- **Some firms dispute the link between extreme weather and climate change:** While many companies identified a risk for severe weather to disrupt their business operations, not all were supportive of the notion that these risks could be uniquely attributed to climate change. Some challenged the fact that the CDP survey questions assumed such a connection. (For an example, see the response for Nexen, 2009.)
- **Some firms believe they are already prepared for extreme weather events:** Other Canadian firms noted that, due to the nature of their operations,

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<sup>1</sup> CDP data indicates, however that Canadian businesses continue to perceive greater risks from *regulatory* impacts than from *physical* impacts of climate change. According the Conference Board CDP Canada 2009 report, 83% of Canadian companies that perceive potential business risks from climate change see the greatest risks coming from potential impacts from new regulation.

infrastructure and facilities are already designed to withstand significant ranges in weather and climate, including potentially severe and disruptive storms. This was particularly true of Canadian energy, mining and other raw materials firms who already operate in a range of different physical environments. In these cases, firms indicated that this risk is already being adequately addressed by existing precautions that predate concerns about climate change.

#### **DIRECT AND SUDDEN IMPACTS – CANADIAN FIRMS ALREADY PREPARED FOR EXTREME WEATHER**

**TALISMAN ENERGY, 2009:** *Talisman's assets are designed to withstand probable extreme weather events based on historical data. The Company has not undertaken a comprehensive assessment of physical risks that may be associated with potentially more extreme weather events and related phenomena.*

**NEXEN, 2008:** *With operations in some of the most harsh and unforgiving areas of the world, Nexen has a long history of adapting to the prevailing conditions. We have successful operations in such areas as: the Canadian north, where winter temperatures often drop to -40°C, Yemen, where temperatures can exceed +40°C, and the Gulf of Mexico and North Sea with remote/difficult access and rough seas caused by extreme weather events like hurricanes. ...All Nexen facilities are built to accepted engineering standards which are, by nature, conservative. The 2005 hurricane season in the GOM did disrupt production and exploration operations. Nexen facilities were not seriously affected but our exploration plans were delayed as a result of damage to the drilling equipment that we had planned to use.....*

#### ***Risks from Gradual, Long Term Impacts***

CDP data also indicated that Canadian firms are concerned about the gradual, long-term impacts of climate change, although to a lesser degree. Potential impacts in this area include sea-level rise, changing precipitation patterns, changes in natural ecosystems, impacts on human health, and a range of other potential impacts from a gradually changing climate. Out of all Canadian CDP responses reviewed, 31% identified a perceived exposure to gradual, long term physical impacts from climate change.

- **Changing Precipitation Patterns:** 21% of CDP responses indicated a perceived risk from changing precipitation patterns, making it the most common gradual, long term risk identified by Canadian companies. There were 68 instances where firms identified potential risks from changing precipitation patterns, and the number of firms aware of these risks remained relatively constant over the past six years. While a variety of different Canadian firms speculated on the effect that changes in precipitation on run-off patterns could have, ranging from utilities to agricultural producers, the highest level of concern was expressed by firms in the energy industry with operations in Alberta. A number of these firms described potential water shortages due to decreased precipitation and run-off as the most significant risk from physical impacts of climate change that they face.
- **Sea-Level Rise:** 7.9% of all Canadian CPD responses identified a perceived exposure to sea-level rise. Relatively few Canadian firms believed their

businesses were at substantial risk of sea-level rise. There were 25 instances where companies identified and discussed risks from sea-level rise in their CDP survey responses. Of those, the majority were either in financial services or raw materials and mining, and most were concerned about the effect that it would have on foreign operations and facilities, or potential indirect impacts.

- **Ecosystem Impacts:** Only 4.4% of reviewed CDP responses identified a perceived risk related to ecosystem impacts. Very few Canadian companies indicated perceived risks from ecosystem impacts. Of the fourteen instances where they did, seven were in the Raw Materials and Mining sector, and three of these (AbitibiBowater, Catalyst Paper, and TimberWest Forest) were forest and forest product, familiar with the impact that the Mountain Pine Beetle has had on the forest industries of BC and Alberta in recent years.
- **Human Health Impacts:** It was also rare for Canadian companies to identify or discuss business risks from human health impacts, with only 3.5% of all responses identifying a perceived risk in this area. From all survey years, there were only 11 instances where firms indicated a specific awareness of this type of risk, 9 of which occurred in the Financial Services and Insurance Sector. The most comprehensive responses of this type were in the financial sector, and likely indicate a greater awareness of these risks rather than a greater vulnerability to these risks.

#### **GRADUAL, LONG-TERM IMPACTS – THE RISK OF WATER SHORTAGES**

**TRANSALTA CORPORATION, 2009:** *...The biggest concern is the long-term effects on water supply (rivers) which are used for process cooling, specifically at our coal plants. We have developed expertise operating in low-water environments which could be applied to other operations, if required. However, we still forecast that we will have sufficient water permits to continue to operate all of our current facilities until the end of their life, including the potential implementation of Carbon Capture & Sequestration....*

**SUNCORP ENERGY, INC., 2008:** *...The biggest physical risk to our oil sands development within Western Canada is the availability of water. Suncor is investing in technology development and water recycling to reduce water demand and intensity, and has made substantive gains to date. In 2007, Suncor's oil sands operation used 2.27 m<sup>3</sup> of river water to produce one cubic metre of oil – a 51% reduction in water use intensity since 2002. Our absolute water use fell to 31.7 million cubic metres. In our current expansion plans through to 2012, we expect to make further reductions. In the recently approved Voyageur expansion project, due to improved water management systems and technologies, Suncor did not request additions to our water license....*

#### **...BUT CONCERNS ARE NOT UNIVERSAL - UTS ENERGY, 2009**

*...Future production facilities will require significant amounts of river water. Climate change may reduce summer river flows, however, this is not expected to have an effect on summer period water withdrawal rates from the river. Winter flows in northern Alberta rivers may increase with global warming - providing more water in the critical low flow periods....*

#### **Indirect Risks from Physical Impacts of Climate Change**

Canadian firms also perceive exposure to a variety of indirect risks from the physical impacts of climate change. These kinds of risks include the effects of a changing

climate on supply chains, markets demand and functioning, and other factors which can indirectly impact business viability.

Eighteen percent of all Canadian CDP responses expressed an exposure to indirect physical risks from climate change. Canadian firms described these risks as generally being either related to impacts on markets and market demand, or related to impacts on supply chains and supply chain disruption. As an example of the former, in its 2008 response Gold Corp clearly articulated that its business is dependent on reliable supply of a variety of goods and services. Any disruption of these supplies due to physical impacts in climate change in other locations could negatively impact their business.

The response of the Potash Corporation of Saskatchewan provides an example of the second type, potential impact on markets. In this case, the firm notes that demand for their product depends on agricultural markets which are highly susceptible to changing climate and weather patterns, and that this could impact demand for their product in complex and unpredictable ways.

Another area where indirect impacts are potentially significant is in the financial sector. The financial sector is potentially exposed to indirect physical risks of climate change through the lending and insurance services it provides to clients. These risks include insurance claims risk, credit risks, and market risks, all of which can potentially impact the viability of firms in financial services. The majority of Canadian financial services firms surveyed by the CDP indicated an awareness of their exposure to these risks in their CDP responses.

#### **INDIRECT PHYSICAL IMPACT RISKS**

**SUPPLY CHAINS - GOLD CORP, 2008:** *...our facilities depend on regular supplies of consumables (diesel, tires, reagents, etc.) to operate efficiently. In the event that the effects of climate change cause prolonged disruption to the delivery of essential commodities, then Goldcorp's production efficiency is likely to be reduced....*

**MARKET IMPACTS - POTASH CORPORATION OF SASKATCHEWAN, 2009:** *.... PotashCorp's main product is fertilizer, and fertilizer demand can be directly affected by the impact of climate change on agriculture. Physical risks from climate change that can affect agricultural production and the demand for fertilizer products include changes in temperature and precipitation, drought, floods, increased storm and hurricane activity, and higher incidence of plant disease. For example, drought and heat waves stress local food systems. Changing growing seasons and less rainfall in already dry areas are likely to make growing crops using traditional methods increasingly difficult. While climate change could present a major challenge to agriculture in some regions, it may also have the effect of extending the growing season in some major mid-latitude agricultural regions.*

#### ***Other Physical Impact Risks Identified by Canadian Businesses***

Canadian businesses also identified a range of other risks from climate change impacts in their CDP responses, some of which are unique to the Canadian environment. The most commonly reported other physical impact risks facing Canadian businesses were:

- **Impacts on Foreign Operations:** The Canadian firms surveyed by the CDP are large firms, many of which have operations in many locations around the world. As such, the risks faced by these firms are not limited to their activities in Canada, but may include the entire range of physical impacts faced by diverse climactic zones. Accordingly, Canadian firms are still at risk from changes in weather and precipitation patterns in other countries and regions.
- **Reduced Winter Access:** A number of Canadian firms identified threats to business operations from reduced or limited access to facilities from impacts on winter access roads or routes. Warmer winters may make winter access/ice roads less reliable, limit the period of time these roads are available, or increase the time where access to certain facilities is problematic due to break-up conditions. Potential impacts in this area were discussed by several firms, and some indicated that they had already taken steps to mitigate this type of risk.
- **Changing Conditions in the Arctic:** Rapid changes in the physical environment in the Canadian Arctic pose both opportunities and threats for Canadian businesses. Several Canadian companies identified and discussed risks in these areas, including challenges associated with melting permafrost and sea ice. For example, in its 2009 response Husky noted that an increase in iceberg flows of the coast of Newfoundland could pose threats to their facilities.

#### **REDUCED WINTER ACCESS**

**PENN WEST ENERGY TRUST, 2008:**...*A portion of our assets are in areas that are currently only accessible on frozen surfaces during the winter time. We could see a smaller window of opportunity in our "winter access" areas if length of the winter season is reduced. This could also result in increased costs to work in these areas...*

**PARAMOUNT ENERGY TRUST, 2006:** *A large portion of PET's operations are accessible by vehicle only during winter months, once ice roads have been installed. Drastic changes in weather patterns that may be connected to global warming could hinder the existing window for drilling operations.*

#### **MANAGING WINTER ACCESS RISKS – ENCANA, 2008**

*...One example of weather related risk mitigation is the use of wooden mats. Wooden access mats have enabled EnCana and other producers to drill during the warm weather months in muskeg and wet areas, thanks to the safe and durable base they provide, which distributes the weight of drilling equipment and minimizes environmental disturbance. In any given year EnCana uses approximately 50,000 mats for our operations in Canada...*

## **Business Perception of Opportunities arising from Climate Change**

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Canadian firms still see more risk than opportunity in climate change's physical impact risks, however the CDP data indicates that Canadian business also expect significant

opportunities to be created from these changes. Thirty-seven (117 instances) of the total number of Canadian CDP responses indicated that potential business opportunities might be created by these types of impacts.

## **Types of Potential Opportunities from Climate Change Physical Impacts**

Four types of business opportunities related to physical impacts of climate change were examined in the context of this study: warmer temperatures and lower heating costs, business opportunities related to existing products and markets, business opportunities related to the development of new products and services, and other opportunities or opportunities related to indirect impacts.

- **Warmer Temperatures and Lower Heating Costs:** One of the most common, specific examples of a business opportunity created by climate change relates to possible energy savings and lower heating costs from warmer winters. In a high-latitude country like Canada, these savings could be significant. Seven percent of Canadian firms identified a potential benefit to their businesses in this area,
- **Opportunities Related to Existing Business Lines:** 18% of Canadian CDP responses identified potential benefits related to existing business lines. Opportunities in this area can stem from lower production costs, increased demand for goods or services, or reduced competition. Examples of Canadian companies that identified potential benefits of this type include Canadian Tire (increased demand for home repair and weatherization materials), Bombardier (increased demand for aircraft used in fighting forest fires), and several Canadian telecommunication firms which expect their services to be in greater demand due to climate change impacts. In addition, some firms, such as CN, expect they could benefit from reduced competition.
- **Opportunities Related to New Business Lines:** At 3.5%, relatively few Canadian business identified business opportunities related to new products and services. Most of those that did were either in financial services (relating to new financial products focused on climate change impacts), or energy, mining and materials firms, which tended to focus on possible opportunities emerging due to changing conditions in the Arctic.
- **Indirect and Other Opportunities:** There were also relatively few examples of other/indirect opportunities identified by Canadian firms. Eighteen CDP responses identified this type of opportunity, the majority of which were associated with the financial sector. Financial service firms stand to potentially benefit indirectly from physical impacts of climate change by an increased demand for infrastructure financing and other financial products motivated by a changing climate.



## **ENERGY (AND GHG) SAVINGS FROM WARMER WINTERS**

**BOMBARDIER, 2009:** *Climate change projections have been calling for warmer winters over the next century, which could provide our manufacturing facilities located within northern regions with opportunities to decrease fuel consumption during winter periods, thereby lowering GHG emissions and heating costs.*

**CN, 2009:** *Warmer winters could result in decreased fuel consumption needs for our locomotives during the winter months. In addition, reduced energy needs within our yards and business operations, could also provide reduced heating costs and ultimately fewer GHG emissions. The positive impact of warming trends on fuel and energy consumption is not expected in the immediate short-term. However, we continue to monitor warming trends. Over the past year, our views on warming trends and the impact on energy consumption has remained unchanged.*

**RBC, 2009:** *With a large proportion of our global operations situated in Canada, RBC may benefit from lower heating costs in colder parts of the country, as Canadian winters become warmer in the changed climate. (This may however be offset by hotter summers and increased cooling costs). In fact, the winters of 2006 and 2007 in Canada were two of the warmest years on record according to Environment Canada.*

## **OPPORTUNITIES IN DEMAND FOR EXISTING PRODUCTS**

**CANADIAN TIRE, 2008:**...*[Climate change] may lead to growing demand for weather-related and home-repair products that will help our customers respond to severe weather events. Such products could include water storage devices, home repair kits, electricity generators, tarpaulins, camping stoves and related supplies....*

**BOMBARDIER, 2009:**...*Climate change is expected to result in an increase in forest fires throughout the world. Bombardier's amphibious aircraft has had amazing results at fighting forest fires, and in doing so is playing a critical role in significantly reducing the amount of carbon emissions being released into the environment. In order to tap into these opportunities, we are currently undertaking studies to assess the carbon reduction potentials realized through our amphibious aircraft, and the future potentials of our planes for aiding in a much wider fire fighting global approach. There exists a great deal of potential to increase our market share and application of our amphibious aircraft within new and emerging areas that are especially prone to forest fires...*

## **OPPORTUNITIES IN FINANCE – SCOTIABANK, 2008**

*Certain financial products and services, such as weather derivatives, will become increasingly popular as a means to mitigate climate risk. For example, Scotiabank's Global Energy Solutions (GES) group provides weather risk management services. GES's energy meteorologist provides short and long term weather prediction and insights on the impact of climate change on energy commodities. Scotiabank has taken the proactive step of being the first Canadian bank to add an in-house meteorologist with climate expertise in anticipation of handling increasing client activity because of significant risks to commodities markets and the economy more generally as a result of climate change.*

## Business Responses to Climate Change Risks and Opportunities

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The CDP data reviewed for this study revealed that many businesses are taking steps to manage potential risks and opportunities from the physical impacts of climate change. However, in most cases these steps are integrated into existing risk management activities and business planning. Very few Canadian firms indicated that they were specifically engaged in risk management activity or business planning specifically focused on potential physical impacts of climate change.<sup>2</sup>

- **Responses to Physical Impact Risks:** Severe weather impacts were the most commonly discussed physical impact risk. Many Canadian companies indicated in their CDP responses that they had plans in place to manage to such risks. However, these plans were typically expressed in terms of pre-existing risk-management strategies, not specific to climate change. For example, Canadian companies often referred to their standing corporate '*Business Continuity Plans*' or '*Disaster Management Plans*' as examples of their preparedness for these risks, plans put in place to manage a range of business interruptions, some of which may be caused by natural disasters or severe weather events. Few companies, however, indicated that these plans had been developed or revised specifically to respond to increasing risks associated with a changing climate. A characteristic example of this type of response is provided by the TSX Group in 2009, which describes how its existing plans and protocols provide protection from these risks.

**Geographic Distribution and Risk Mitigation:** Some companies believe that the fact their operations are dispersed over a wide geographic area helps mitigate risks associated with direct, sudden impacts and extreme weather events as these events are unlikely to occur in multiple locations simultaneously. An example of this type of response is given by Yellowpages in 2009, however similar remarks were made by a range of companies.

### **GEOGRAPHIC DISTRIBUTION AS A RISK MANAGEMENT STRATEGY – YELLOW PAGES, 2009**

*The key physical risks associated with climate change include adverse weather conditions that could affect the delivery of our directories. For example, heavy snowfall or flooding could affect our ability to deliver our directories to households and businesses in certain regions. However, the large geographical scope of our operations across Canada makes it unlikely that we would experience such problems in various regions at once, thus keeping the overall impact on our operations quite low.*

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<sup>2</sup> With regards to this section, it should be noted that the CDP questions reviewed here did not specifically ask firms to describe their risk management and business planning activity related to these risks. Consequently, some Canadian firms may have engaged in such activity, but not fully described it in these particular responses.

- **Responses to Potential Opportunities:** Similar findings were found with respect to business responses to new opportunities. While over a third of the total survey responses reviewed indicated that firms perceived potential business opportunities related to climate change, few companies indicated that they were engaged in business planning activities specifically focused on these opportunities, with the possible exception of the financial sector which generally exhibited more focus on business planning related to climate change impacts. One explanation for this stems from the fact that the majority of opportunities Canadian firms discussed related either to bolstered demand or sales of existing products, or energy savings from lower winter heating costs. In either case, firms may believe that these opportunities are already sufficiently incorporated in existing business plans. It is also open to question whether firms would be willing to publicize strategies to take advantage of new, emerging opportunities when this might be detrimental to their competitive advantage.

## **EXAMPLES OF BUSINESS CONTINUITY PLANS AND DISASTER MANAGEMENT PLANS**

**TSX, 2008:** *Severe weather events caused by climate change would be the most likely way that TSX Group would be exposed to physical risks—either by causing power disruptions, damage to premises or making it difficult for employees to make it in to work. In the case of a business disruption from such an event, TSX Group has a plan to mitigate the risk of an interruption to our critical business functions. The plan integrates disaster recovery and business continuity for critical functions. However, we cannot entirely eliminate the risk of a system failure or interruption.*

**Disaster Recovery Plan (DRP):** *A DRP is in place in case of a disaster impacting TSX Group's critical IT operations. The plan is designed to manage, mitigate and minimize the risk of an interruption to TSX Group's critical IT operations. As part of the plan, TSX Group operates multiple data centres in separate locations, allowing for back-up recovery. The plan is fully documented and is tested regularly.*

**Business Continuity Plans (BCP)** *Documented continuity plans address the occurrence of a disaster at TSX Group locations and provide for recovery of essential services within predetermined time frames. The plans encompass crisis management, communication and recovery teams, as well as predetermined recovery locations.*

**SUNCORP ENERGY INC, 2008:** *Suncor uses a risk-management approach to anticipate, prevent and mitigate harm to health, safety or the environment. This risk management approach is applied to emergency planning. Business Units are required to develop and maintain Emergency Response Plans which address all reasonably foreseeable site-specific emergency scenarios. Severe weather is one example. The purpose of an emergency plan is to ensure effective preparation for, prevention of, response to, and recovery from emergencies. Our emergency response plans ensure that information is shared quickly, and resources are effectively deployed to minimize consequences adversely impacting Suncor. Emergency plans are typically reviewed on an annual basis to evaluate their effectiveness in addressing risks.*

**NORTEL, 2008:** *Regardless, Nortel has a comprehensive and effective Business Continuity Plan to mitigate business interruptions and to ensure continued operations in the face of risks such as increased intensity and frequency of extreme weather events, flooding and drought. Business Continuity Plans are tested throughout the year using various business disruption scenarios. to ensure our ability to respond to challenges.*

## Perceptions of Risks and Opportunities by Sector

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In many cases, the CDP data reveals that Canadian business perceptions of risks and opportunities associated with climate change are similar across sectors. Canadian businesses across all sectors tended to describe risks from direct sudden impacts of climate change and severe weather events in similar ways. And opportunities such as reduced energy use and lower heating costs were also significant to a number of different business types. However, there were important differences in these perceptions as well.

The sectors most represented in the CDP data are the Energy sector, the Raw Material and Mining Sector (which includes a range of business types focused on extraction and production of natural resources), and the Financial Services and Insurance Sector. Combined, these three sectors comprise 65% of the total sample of Canadian CDP survey responses. Other sectors that had significant representation include technology, media and communications; transportation; utilities; and manufacturing and capital goods.

### Perception of Risk Exposure by Sector

Overall, firms in the manufacturing and capital goods sector were the most likely to express a general exposure to risks associated with climate change. Eighty-two percent of all CDP responses for firms in this sector expressed a perceived exposure to these risks. Not far behind was the utility sector (80% of responding firms expressing exposure), and financial services (68%). Technology, media and communications firms were the least likely to report a vulnerability these risks (38%), followed by firms in the energy sector (43%).

- **Risks from Direct, Sudden Impacts and Severe Weather:** Manufacturing and capital goods firms were most likely to express vulnerability to severe weather events, with 73% perceiving such risks. In contrast the energy sector was least likely to report such risks (with 25% of firms identifying such risks).
- **Risks from Indirect Impacts:** Firms in the financial sector were the most likely to indicate an exposure to risks from indirect impacts from climate change, with 45% of financial firms expressing a perceived exposure of this type in their CDP responses. Primarily, these perceptions were rooted in concerns about credit risks and potential impacts on clients and markets. Energy sector firm were again those least likely to perceive a vulnerability to these risks, with only 3% of energy firms survey responses indicating any exposure of this type.
- **Risk of Changes in Precipitation:** The utility sector was by far most likely to report a vulnerability to changes in precipitation patterns, motivated primarily by potential impacts on hydropower generation. Next were firms in the raw materials and mining sector, many of which also expressed potential vulnerabilities to water shortages (sometimes in the context of foreign operations).

- **Other Risks:** Reported vulnerabilities to other risks from physical impacts of climate change were generally low across all sectors. Very few firms expressed vulnerability to ecosystem impacts, but those that did were mainly in the raw materials, transportation, or financial services sector. Human health impacts were only seriously mentioned by firms in the financial sector; the only other instances of this were 1 firm in manufacturing and capital goods, and one firm in technology, media and communications.

## Perception of Opportunities by Sector

Firms in the financial sector were most likely to perceive opportunities related to the physical impacts of climate change. Sixty percent of financial sector respondents identified potential opportunities, followed by manufacturing and capital goods (55%), raw materials and mining (42%) and utilities (40%). The energy sector was the least likely to identify potential benefits of this kind, with only 18% of firms identifying potential opportunities from these impacts.

- **Opportunities from Warmer Temperatures and Reduced Heating Costs:** Firms in a variety of sectors identified potential benefits of this type, including the financial sector, the manufacturing and capital goods sector, raw material and mining, transportation and utilities. Between 9 and 13% of firms in all of these sectors pointed to potential cost savings in these areas. The only sectors that did not identify benefits of this kind were the energy sector and the technology, media and communications sector.
- **Opportunities Related to Existing Business Lines:** Again, the distribution of businesses that identified potential benefits to existing business lines was diverse. The highest percentage of these responses came from the manufacturing and capital goods sector (55%), followed by the financial services sector. However between 10 and 30% of responses in most sectors reported this kind of opportunity, with the overall average across sectors being 18%.
- **Opportunities Related to New Business Lines:** The only sectors in which firms expressed possible new business opportunities related to physical impacts of climate change were financial services, raw materials and mining, and the energy sector. However, even in these sectors, there few examples of this; the percentage of firms identifying these opportunities was less than 10% for all three of these sectors.
- **Opportunities Related to Indirect and/or Other Impacts:** A variety of firms identified potential opportunities from indirect impacts on supply chains or markets, or other types of new opportunities. As with indirect risks, firms in the financial sector were most likely to report this type of opportunity, primarily due to potential benefits to client businesses and therefore a secondary increase in demand for financing services.

## Comparison of Response Trends in Major Sectors

While Canadian CDP responses revealed a high-degree of consistency in the way that businesses perceive and describe potential risks and opportunities from climate change, the major sectors represented in Canada did reveal distinct sets of concerns. The three most represented sectors in the Canadian CDP responses were the energy sector, the financial services sector, and the raw materials and mining sector.

- **The Energy Sector:** For all CDP survey years, firms in the energy sector were the least likely to report vulnerability to risks or a perception of new opportunities. These firms generally indicated less concern about potential physical impacts, and less sense that physical impacts of climate change might provide them with new opportunities. Often, the responses of firms in this sector tended to downplay physical climate change risks and opportunities, sometimes in the context of challenging assumptions that these impacts were likely to pose significant challenges for Canadian businesses.
- **Financial Services and Insurance:** In contrast, responses from the financial sector tended to be by far the most comprehensive responses. Banks and financial service firms tended to report both high levels of perceived risk (including types of risk rarely mentioned by other sectors) and high levels of perceived opportunity. The financial sector was distinctive in that, in 2008 and 2009, more financial service firms reported potential opportunities relating to physical climate change than risks associated with physical climate change. For those years, over 80% of the responses from this sector reported potential opportunities from these kinds of climate change effects.<sup>3</sup>
- **Raw Materials and Manufacturing:** The responses of firms in the raw materials and mining sector tended to lie somewhere in between. Out of all survey years, 62% of these firms identified exposure to this kind of climate change risk, while 42% identified potential business opportunities. Many of these firms did identify concerns about these impacts, as well as identify potential opportunities; however, they tended to frame their concerns in more moderate terms. In addition, these firms were more likely to express a set of distinctive concerns, such as impacts on international supply chains or impacts on foreign operations, and potential opportunities in the arctic.

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<sup>3</sup> As indicated here, CDP responses from the financial sector tended to be more comprehensive than responses from other sectors, and more thorough in identifying and discussing all types of risks and impacts, and describing their implications. This high level of attention may be rooted in a unique sectoral vulnerability, due to the financial sector's exposure to many types of indirect impacts on the economy. However, it may also merely reflect that these large institutions have allocated more resources and time to studying the issue and potential impacts, and took additional steps to ensure their CDP responses were fully comprehensive.

## Trends in Canadian CDP Responses over Time

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The discussion of the Canadian CDP response data above has mostly focused on an aggregated analysis for all survey years. Aggregating the survey years and using all the response data for recent years provides a larger sample of responses, reduces the variance and volatility associated with small numbers of responses, and allows for a general comparison across sectors and variables. The CDP data can be used to compare trends in Canadian responses to these issues over time as well. However, caution is needed when interpreting these trends, as the format of the CDP survey has changed considerably over time.<sup>4</sup> In addition, the low numbers of Canadian survey responses for years before 2006 could mean that these responses are not necessarily indicative of overall perceptions of businesses at that time.

### Trends in Canadian Businesses' Perception of Risks

Overall, CDP data for Canada shows a general increase in the perception of risks associated with physical impacts from climate change between 2003 and 2006. In 2003, one out of the six available responses, or 16.7%, expressed a perceived exposure to the physical risks from climate change. In 2006, that percentage increased to 58.6% and remained in the range of 50-65% for next four years, peaking in 2007 at 65.2%.

In terms of specific types of risk, the percentage of companies reporting an exposure to direct, sudden impacts of climate change rose steadily over the past six years, reaching 47.9 %, with perceptions related to exposure to severe weather following a similar patterns. However, the percentage of firms reporting an exposure to gradual, long-term impacts of climate change actually peaked in 2007, and declined after that (with perceptions about risks from changes precipitation patterns being strongly correlated). Perceptions of indirect and other risks factors followed a similar pattern, peaking in 2007 and declining somewhat thereafter.

### Trends in Canadian Businesses' Perception of Opportunities

The number of businesses reporting opportunities from physical impacts of climate change has also risen over the past six years. None of the available responses for 2003 identified any of this kind of opportunity, while by 2009 over half (53%) of Canadian CDP responses indicated that they thought physical impacts from climate change posed potential opportunities for their companies. Prior to 2008, however, the CDP did not ask a specific question about opportunities related to the physical impacts of climate change. The introduction of that question in 2008 therefore is a significant part of the explanation for the large increase in firms reporting these opportunities between 2007 and 2008.

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<sup>4</sup> See Appendices A and B for a discussion of this limitation, and the exact phrasing of the CDP questions analyzed in this study.

Responses identifying opportunities due to warmer temperatures and reduced heating costs were highest in 2006 and 2009 (10 and 11% respectively) however otherwise remained around 5%. The number of Canadian businesses reporting potential opportunities related to existing business lines and services rose steadily throughout the period, from 0% of respondents for the first three years, to 32% of respondents in 2009. It should also be noted that the only clear examples where Canadian companies reported opportunities related to new business lines came from recent years, with 8% of respondents identifying these opportunity types in 2008 and 6% in 2009.

***See Appendices D and E for additional tables and charts related to CDP data trends over time.***



## Other Canadian CDP Survey Response Examples

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The following section contains excerpts of other illustrative examples of the way Canadian businesses perceive risks and opportunities related to the physical impacts of climate change.

### **EARLIEST EXAMPLE OF PERCEIVED RISKS AND OPPORTUNITIES - RBC 2003**

*RBC Financial Group (RBC) believes that climate change, if it occurs, will present both risks and opportunities.*

*Risks include adverse effects on market sectors we finance, including natural resource based industries and tourism. We may also be affected by the altered risk profiles of our clients and by government policy on mitigation and adaptation to climate change. We also see potential risks in the property casualty insurance sector and in reinsurance. RBC Insurance, a member of RBC that offers property and casualty insurance products could be among those insurers affected by increased property damage claims resulting from an increase in adverse weather events. RBC Centura, also a member of RBC, has branches located in North Carolina, South Carolina and Virginia, which could be affected by flooding and wind damage from severe weather events (such as hurricanes). These events are projected to increase in frequency and severity according to some climate change commentators.*

*Opportunities include providing financial services to those of our clients affected by government policy initiatives on GHGs to support their mitigation and adaptation activities. For example, RBC has a \$50 million (Cdn) Alternative Energy and Power Technology Fund, which provides venture capital to early-stage alternative energy technology firms. RBC could also conceivably become involved in facilitating GHG Emissions Trading if we believed there was a sufficient market demand for such a service by our clients.*

### **CHALLENGING THE LINK BETWEEN EXTREME WEATHER AND CLIMATE CHANGE – NEXEN, 2008**

*...In the context of this questionnaire, this question assumes that the physical phenomena listed above are all in some way associated with climate change/global warming. We would note that the link with extreme weather events has certainly been challenged since the 2005 hurricane season in the US Gulf of Mexico (GOM)....*

### **RISKS TO EMPLOYEE HEALTH FROM CLIMATE CHANGE – CIBC, 2009**

*As an office-based organization primarily located in Canada with operations in other parts of the world, we are cognizant of our potential exposure to the physical risks arising from climate change. Examples of such risks may include business interruption, physical damage to assets, adverse employee health effects, and greater operating costs for cooling. We also anticipate some employees' health may be adversely impacted by increased numbers of smog and high-pollen days in Canada's major cities, as a result of hotter summers....Over the next 50 years Ontario, Canada's most populous province, and where most of our employees live and work, will experience more frequent, intense and longer heat waves. This is expected to increase heat-stress-related health effects such as asthma attacks. It will also increase airborne pollen and smog, which are associated with respiratory problems in some people. Warmer weather may also make conditions more favourable for the northward migration of diseases such as malaria, West Nile virus, Lyme disease, and Eastern and Western Equine Encephalitis. We have not studied the extent to which these potential health effects might impact employee absenteeism....*

### **INDIRECT FINANCIAL SYSTEM RISK - RBC, 2008**

**Insurance Claims Risk:** *With the unpredictability of weather patterns associated with climate change, there is a risk of loss when assumptions made in insurance product design and pricing activities differ from actual experience. However, at RBC, the risk associated with property and catastrophe reinsurance has been largely mitigated by our strategic exit from the property reinsurance business in 2006.*

**Credit Risk:** *Climate change will affect some of our clients, giving rise to credit risk. In 2002, RBC conducted a research study entitled: "The Effects of Climate Change on Industry Sectors & North American Regions". The risks of climate change for RBC's clients can be divided into two main areas: one, the direct effects on natural resource-based industries; and two, the direct effects on the inputs of manufacturing and production-based industries. The former will be affected by how climate change alters the conditions of the region in which they are located and whether this change will be beneficial, detrimental, and/or require adaptation. The latter will be affected by how much climate change increases the price (and availability) of water, energy and transportation and whether they can successfully adapt to this increase. In addition, the physical impacts of climate change to industries in different regions will vary.*

**Market Risk:** *The extreme and volatile weather events resulting from the impacts of climate change are affecting commodity-based sectors such as agriculture and natural resources, among others. This can result in a series of market risks including equity and commodity risk which may affect securities and derivative portfolios.*

### **ECOSYSTEM IMPACT RISKS – ABITBIBOWATER, 2006**

*While a warmer climate generally leads to a faster growth rate of trees, there is also an increased risk of fire and insect damage in the forests we manage and harvest to produce lumber and paper. In terms of the creation of carbon markets and legislated greenhouse gas reduction, this represents a commercial opportunity to sell greenhouse gas credits, since we have reduced our global GHG emissions well beyond the Kyoto commitments.*

### **ICEBERGS – HUSKY, 2009**

*Icebergs off the coast of Newfoundland may threaten offshore oil production facilities. Husky's East Coast Operations unit has a robust ice management program which uses a range of resources including a dedicated ice surveillance aircraft, as well as synergistic relationships with government agencies including Environment Canada, the Coast Guard and Canadian Ice Service. Regular ice surveillance flights commence in February, and continue until the threat has abated.*

### **INCREASED DEMAND FOR TELECOMMUNICATION SERVICES**

**NORTEL, 2009:** *Our products can enable people to use mobility technology to communicate more effectively. With a hyperconnected network, it is possible for our customers to remove themselves from some of the physical risks of climate change as needed, while continuing to communicate with their family, colleagues and friends.*

**TELUS, 2009:** *Our team sees an increased need for services such as telehealth technology, video and teleconferencing, increased information hosting within our networks. Our telehealth enables improved service delivery, improved administration of health care information. The physical challenges and landscape changes from climate change will mean an increased need in these services, in our opinion.*

### **IMPACT ON DEMAND FOR EXISTING PRODUCTS – MOLSON CANADA, 2006**

*On the demand side, the beverage business is impacted by weather. While warmer weather may increase demand, storms could significantly reduce demand. Consumer preferences may be increasingly affected by perceptions of a manufacturer's environmental performance.*

### **NEW OPPORTUNITIES RELATED TO WATER – RBC, 2009**

*Climate change is exacerbating water quality and availability issues all over the world. This unfortunate reality gives rise to community investment opportunities for large corporations to help address the problems. In 2008, RBC convened the RBC Blue Water Project Advisory Panel to help develop focus areas and advise RBC on water issues. In the first nine months of the RBC Blue Water Project alone, we committed \$11.8 million to 39 organizations working in the areas of watershed protection and access to clean drinking water. By year end, we had committed a total of \$13.2 million to 64 organizations worldwide.*

## **NEW OPPORTUNITIES IN THE NORTH – TECK COMINCO, 2009**

*For mining and exploration companies, global warming may create opportunities in terms of opening areas in the north that were not previously accessible or amenable to exploration and mining. And while such climatic changes are not generally desirable, it is possible in some cases that the opportunities it creates can be developed more efficiently than other current options, i.e. very high grade mineral deposits may be identified which can be mined with inherently greater energy efficiency. In other cases, northern sea channels may be ice-free for longer periods, enabling longer and more efficient shipping seasons.*

## Appendix A: CDP Survey Methodology

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The research presented in this report relied on the direct analysis of the responses of Canadian businesses to the annual CDP survey on business perceptions and responses to climate change.

The CDP gathers data on firm responses to climate change by distributing an annual survey and collecting and analyzing the responses to that survey. The survey contains questions on perceptions about business risks and opportunities related to climate change as well as questions about GHG emissions and steps businesses may be taking to reduce those emissions. Survey questions on risks and opportunities from the physical impacts of climate change are generally open-ended; in responding, firms provide a written description of their perception of a particular climate change issue.<sup>5</sup>

The initial CDP survey targeted the world's 500 largest firms (the CDP Global 500 for 2003) by market capitalization. However the organization now collects and publishes results for a variety of individual countries and regions, including Canada. Prior to 2006, survey responses from Canadian firms were limited to Canadian firms targeted as part of the CDP global sample. As a result, the survey was only distributed to a small number of Canada's largest firms (15-25 firms), and thus Canadian response data for those years is limited. Since 2006, CDP has collected and published survey data on Canada specifically, based on annual distribution of the survey to the largest 200 Canadian firms by market capitalization.

### Limitations of CDP Data<sup>6</sup>

While the CDP data is a valuable source of insight on how Canadian businesses perceive, and are responding to, issues related to climate change, the data does have certain limitations. In particular, challenges arise from:

- **Sample Size:** In general, the CDP sample size for Canada is limited in its ability to provide statistically significant generalizations applicable to *all* Canadian businesses due to its small sample size. Prior to 2006, the survey was distributed to less than 25 firms, and less than 10 provided public responses in 2003 and 2004. Even when the sample size was increased to 200 firms in 2006, the resulting statistical accuracy of the survey, relative to the whole population of Canadian businesses, is limited.<sup>7</sup>

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<sup>5</sup> Note that the survey methodology discussed here refers to the '*Investor CDP*' and the questionnaires used for that program; the CDP now maintains separate programs focuses specifically on Supply Chains, Public Procurement, and Water Disclosure. For more detail on CDP survey methodologies, see [www.cdproject.net](http://www.cdproject.net).

<sup>6</sup> Note that the analysis of CDP data in this study is based only on *publicly available* CDP responses. Some companies designate their survey responses as private, preventing the CDP from disseminating their responses. For example, in 2009, the CDP reports that 97 Canadian companies responded to the survey; however public response data for the survey is only available for 73 of these companies.

<sup>7</sup> According to Industry Canada's *July 2009 Key Small Business Statistics*, there are approximately 2.3 million business establishments in Canada. Based on this population size, the 97 Canadian CDP responses in 2009 (which includes both

- **Representativeness:** The CDP survey sample is not designed to be representative of the entire population of Canadian business establishments. Rather, the survey is targeted to the largest firms in Canada by market capitalization. As a result, it may not be an accurate depiction the perceptions and responses of small and average size businesses in Canada to risks and opportunities from climate change. In addition, due to the focus on large firms, the CDP survey likely oversamples some sectors, such as energy industries and financial services, relative to other sectors that are more likely to be comprised of smaller firms (e.g. the service sector and retail businesses).
- **Survey Format Changes and Time Trends:** Another challenge associated with the CDP data is that the format of the survey has evolved over time, making it challenging to accurately monitor response trends across different survey years. Due to changes in the wording and emphasis of these questions, survey responses from different years may not be strictly comparable (*see Appendix B for a comparison of the questions from each survey year analyzed here.*)

## Canadian CDP Response Rates and Data

The following table provides an overview of Canadian CDP survey response data, including sample size and number of Canadian public responses for each survey year. Only 'public' Canadian CDP responses are included in this study. Canadian response rates have varied over time, however generally stayed within the range of 30-40%.<sup>8</sup> A breakdown of responses and response data by sector can be found in Appendix E.

### Canadian CDP Survey Response Data by Year

	2003	2004	2005	2006	2007	2008	2009	Totals
<i># of Canadian Companies CDP Survey Distributed To</i>	16	21	20	200	200	200	200	<b>857</b>
<i># of Public Canadian Responses</i>	6	8	15	58	69	88	73	<b>317</b>
<i>Response Rate (Public)</i>	37.5%	38.1%	75.0%	29.0%	34.5%	44.0%	36.5%	<b>37.0%</b>

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public and private responses), would translate to a statistical accuracy of plus or minus 10% within the 95% confidence interval. However, that does not take into account the fact that the sample is skewed towards large businesses.

<sup>8</sup> The only outlier is the 75% response rate in 2005. However, the small sample sizes before 2006 tend to exaggerate the volatility in both overall response rates, and responses to specific questions. As result, this report places a significant emphasis on absolute response numbers, as well as percentage response rates in describing findings.

## Appendix B: CDP Survey Questions Analyzed

The specific CDP survey questions that were analyzed for each year for this report are reprinted below. Differences in the phrasing of the questions are important to consider when evaluating the evolution of response trends. Due to changes in the wording and format of the questions, CDP survey responses are not strictly comparable over time.

<b>CDP 2003</b>
1. <i>Do you believe climate change, the policy responses to climate change and/or adaptation to climate change represent commercial risks and/or opportunities to your company? Please provide information to explain your answer.</i>
<b>CDP 2004</b>
1. <i>Do you believe climate change, the policy responses to climate change and/or adaptation to climate change represent commercial risks and/or opportunities to your company? Please provide information to explain your answer.</i>
<b>CDP 2005</b>
1. <i>Do you believe climate change, the policy responses to climate change and/or adaptation to climate change represent commercial risks and/or opportunities to your company? Please provide information to explain your answer.</i>
3. <i>What technologies, products, processes or services has your company developed, or is developing, in response to climate change?</i>
<b>CDP 2006</b>
1. <i>Do you believe climate change, the policy responses to climate change and/or adaptation to climate change represent commercial risks and/or opportunities to your company? Please provide information to explain your answer.</i>
3. <i>How are your operations affected by extreme weather events, changes in weather patterns, rising temperatures, sea level rise and other related phenomena both now and in the future? What actions are you taking to adapt to these risks, and what are the associated financial implications?</i>
4. <i>What technologies, products, processes or services has your company developed, or is developing, in response to climate change?</i>
<b>CDP 2007</b>
1(a)(ii) <i>What commercial risks does climate change present to your company including physical risks to your business operations from scenarios identified by the Intergovernmental Panel on climate Change or other expert bodies, such as sea level rise, extreme weather events and resource shortages?</i>
1(b) <i>What commercial opportunities does climate change present to your company for both existing and new products and services?</i>
<b>CDP 2008</b>
1(a)(ii) <i>How is your company exposed to physical risks from climate change?</i>
1 (b)(ii) <i>How do current or anticipated physical changes resulting from climate change present</i>

*opportunities for your company?*

**CDP 2009**

*2.1 Is your company exposed to physical risks from climate change?*

*5.1 Do physical changes resulting from climate change present opportunities for your company?*



## Appendix C: Variable Descriptions

<b>RISK-EXPOS</b>	<i>CDP response indicated a perceived exposure to risks associated with physical impacts from climate change.</i>
<b>RISK-DIRSUD</b>	<i>CDP response indicated a perceived exposure to risks associated with direct and sudden physical impacts to climate change (e.g. damage to physical assets as a result of patterns of weather extremes).</i>
<b>RISK-GRAD</b>	<i>CDP response indicated a perceived exposure to risks associated with gradual, long-term physical impacts of climate change (e.g. changing precipitation patterns, gradual warming, water shortages, ecosystem effects, human health effects, etc.).</i>
<b>RISK-INDRCT</b>	<i>CDP response indicated a perceived indirect exposure to physical impacts from climate change (e.g. supply chain disruptions, increased commodity prices, changing demand for goods and services).</i>
<b>RISK-WTHR</b>	<i>CDP response indicated a perceived exposure to risks associated with severe weather events associated with climate change (e.g. hurricanes, tornadoes, cyclones, storm surges, extreme flooding, etc.).</i>
<b>RISK-SEA</b>	<i>CDP response indicated a perceived exposure to risks associated with potential sea level rise from climate change.</i>
<b>RISK-PRECIIP</b>	<i>CDP response indicated a perceived exposure to risks associated with changing precipitation patterns from climate change (e.g. drought, water shortages, reduced snowpack and runoff, etc.).</i>
<b>RISK-ECO</b>	<i>CDP response indicated a perceived exposure to risks associated with ecosystem impacts from climate change (e.g. biodiversity loss, invasive species, ecosystem changes, etc.).</i>
<b>RISK-HEALTH</b>	<i>CDP response indicated a perceived exposure to risks associated with potential human health impacts from climate change (e.g. change disease vectors, health impacts from heat waves, etc.).</i>
<b>RISK-OTHR</b>	<i>CDP response indicated a perceived exposure to risks associated with other physical impacts of climate change (e.g. increased incidence of forest fires, melting permafrost, impacts on ice roads and winter transportation, melting arctic icepack, etc.).</i>
<b>OPP-EXPOS</b>	<i>CDP response indicated one or more perceived business opportunities related to the potential physical impacts of climate change.</i>
<b>OPP-TEMP</b>	<i>CDP response indicated a perceived opportunity related to warming air temperatures and reduced heating costs.</i>
<b>OPP-OTHR</b>	<i>CDP response indicated a perceived opportunity related to indirect physical impacts of climate change (e.g. changes in market conditions, improvements/new efficiencies in supply chains, etc.), or other physical impacts</i>
<b>OPP-EXIST</b>	<i>CDP response indicated a perceived opportunity for enhanced profitability or sales of existing business lines stemming from physical impacts of climate change (e.g. increased sales of existing products and services, and increased profitability of sales of existing products or services due to lower production costs or less competition).</i>
<b>OPP-NEW</b>	<i>CDP response indicated a perceived opportunity for the development of new products, services, and technologies stemming from physical impacts of climate change.</i>

## Appendix D: Summary Findings

### Summary Findings – Absolute Counts

Year	CDP Survey Sample Size	# of Public Canadian CDP Responses	RISK-EXPOS	RISK-DIRSUD	RISK-GRAD	RISK-INDRCT	RISK-WTHR	RISK-SEA	RISK-PRECIP	RISK-ECO	RISK-HEALTH	RISK-OTHR	OPP-EXPOS	OPP-TEMP	OPP-OTHR	OPP-EXIST	OPP-NEW
2003	16	6	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0
2004	21	8	3	1	1	3	1	0	0	0	0	0	1	0	1	0	0
2005	20	15	6	1	2	5	1	0	1	0	0	0	2	0	2	0	0
2006	200	58	34	22	20	11	20	5	16	5	2	10	17	6	5	9	0
2007	200	69	45	31	31	18	31	9	19	6	3	17	15	3	6	8	0
2008	200	88	46	30	22	9	30	5	16	3	3	7	43	5	1	18	7
2009	200	73	43	35	21	11	34	6	16	0	3	15	39	8	3	23	4
<b>Totals</b>	<b>857</b>	<b>317</b>	<b>178</b>	<b>121</b>	<b>97</b>	<b>58</b>	<b>118</b>	<b>25</b>	<b>68</b>	<b>14</b>	<b>11</b>	<b>49</b>	<b>117</b>	<b>22</b>	<b>18</b>	<b>58</b>	<b>11</b>

**Summary Findings – Expressed as % of Canadian Public CDP Responses for a Given Year**

Year	CDP Survey Sample Size	# of Public Canadian CDP Responses	RISK-EXPOS	RISK-DIRSUD	RISK-GRAD	RISK-INDRCT	RISK-WTHR	RISK-SEA	RISK-PRECIPI	RISK-ECO	RISK-HEALTH	RISK-OTHR	OPP-EXPOS	OPP-TEMP	OPP-OTHR	OPP-EXIST	OPP-NEW
2003	16	6	16.7%	16.7%	0.0%	16.7%	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2004	21	8	37.5%	12.5%	12.5%	37.5%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%	0.0%	12.5%	0.0%	0.0%
2005	20	15	40.0%	6.7%	13.3%	33.3%	6.7%	0.0%	6.7%	0.0%	0.0%	0.0%	13.3%	0.0%	13.3%	0.0%	0.0%
2006	200	58	58.6%	37.9%	34.5%	19.0%	34.5%	8.6%	27.6%	8.6%	3.4%	17.2%	29.3%	10.3%	8.6%	15.5%	0.0%
2007	200	69	65.2%	44.9%	44.9%	26.1%	44.9%	13.0%	27.5%	8.7%	4.3%	24.6%	21.7%	4.3%	8.7%	11.6%	0.0%
2008	200	88	52.3%	34.1%	25.0%	10.2%	34.1%	5.7%	18.2%	3.4%	3.4%	8.0%	48.9%	5.7%	1.1%	20.5%	8.0%
2009	200	73	58.9%	47.9%	28.8%	15.1%	46.6%	8.2%	21.9%	0.0%	4.1%	20.5%	53.4%	11.0%	4.1%	31.5%	5.5%
<b>Totals</b>	<b>857</b>	<b>317</b>	<b>56.0%</b>	<b>38.2%</b>	<b>30.5%</b>	<b>18.2%</b>	<b>37.1%</b>	<b>7.9%</b>	<b>21.4%</b>	<b>4.4%</b>	<b>3.5%</b>	<b>15.4%</b>	<b>36.8%</b>	<b>6.9%</b>	<b>5.7%</b>	<b>18.2%</b>	<b>3.5%</b>

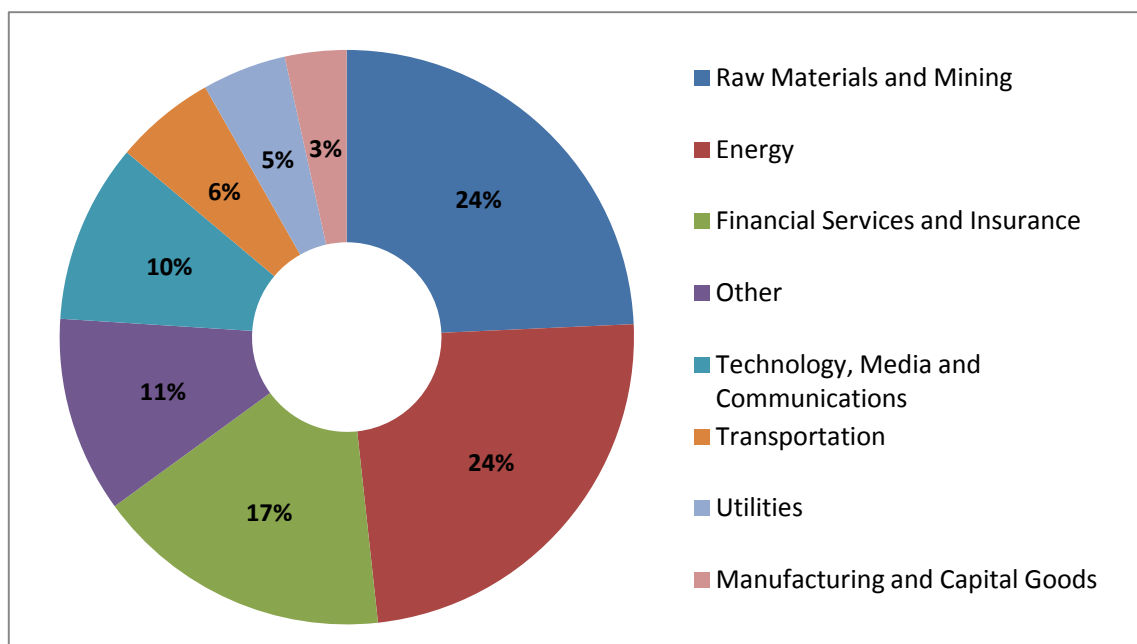
## Appendix E: Other Data Tables and Figures

### Canadian Public CDP Responses by Sector and Year

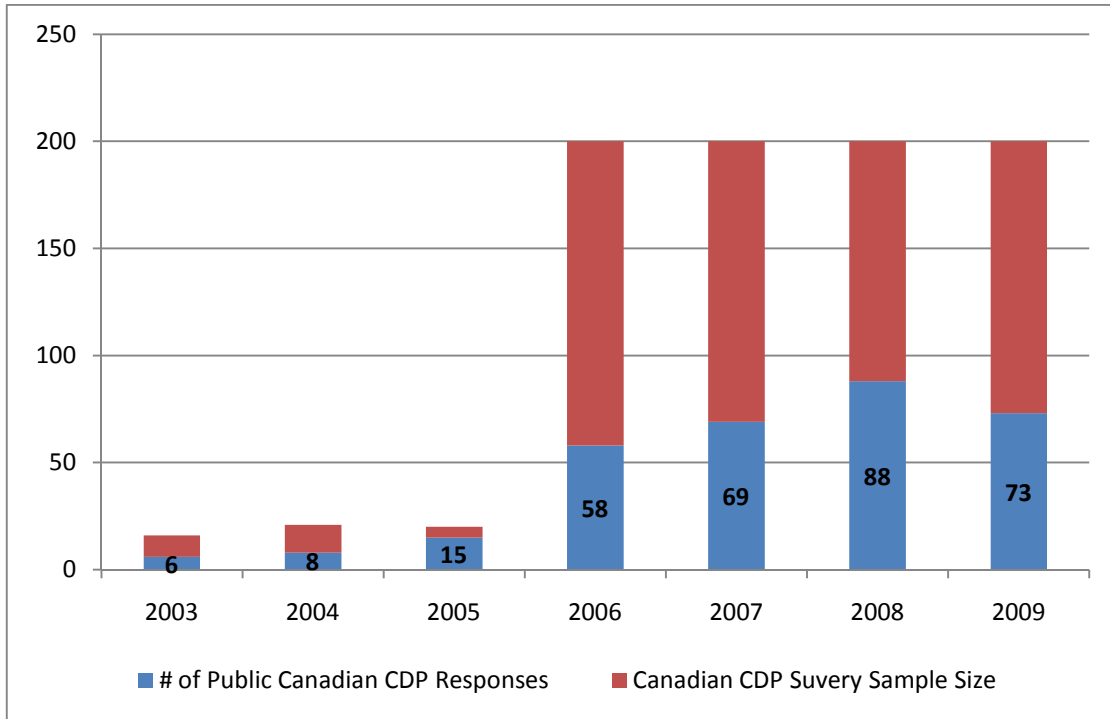
Sector	2003	2004	2005	2006	2007	2008	2009	Grand Total
Energy		2	4	12	19	21	18	76
Financial Services and Insurance	2	4	6	9	10	11	11	53
Manufacturing and Capital Goods				2	2	3	4	11
Raw Materials and Mining	1		2	18	19	22	15	77
Technology, Media and Communications	3	2	3	6	5	6	7	32
Transportation				2	3	8	5	18
Utilities				3	2	5	5	15
Other*				6	9	12	8	35
<b>Grand Total</b>	<b>6</b>	<b>8</b>	<b>15</b>	<b>58</b>	<b>69</b>	<b>88</b>	<b>73</b>	<b>317</b>

\*Other includes: commercial services and supplies; consumer services; food and staples retailing; food, beverage and tobacco, retailing; real estate; and pharmaceuticals, biotechnology and the life sciences.

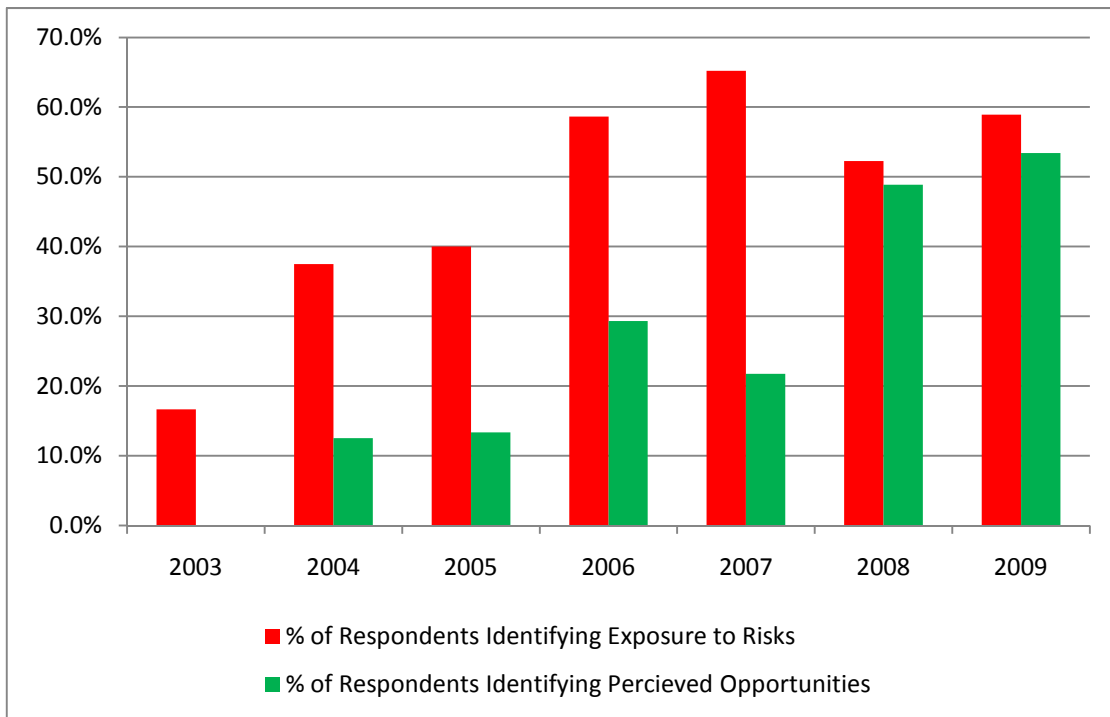
### Breakdown of Canadian CDP Survey Responses by Sector (All Survey Years)



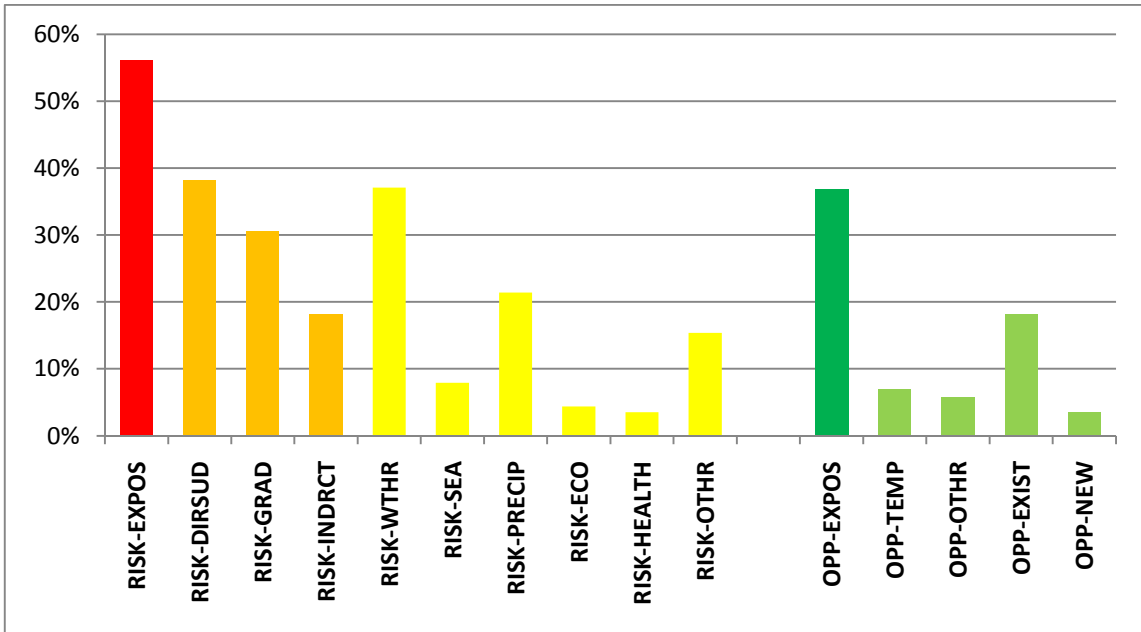
### Canadian CDP Sample Size and Public Responses



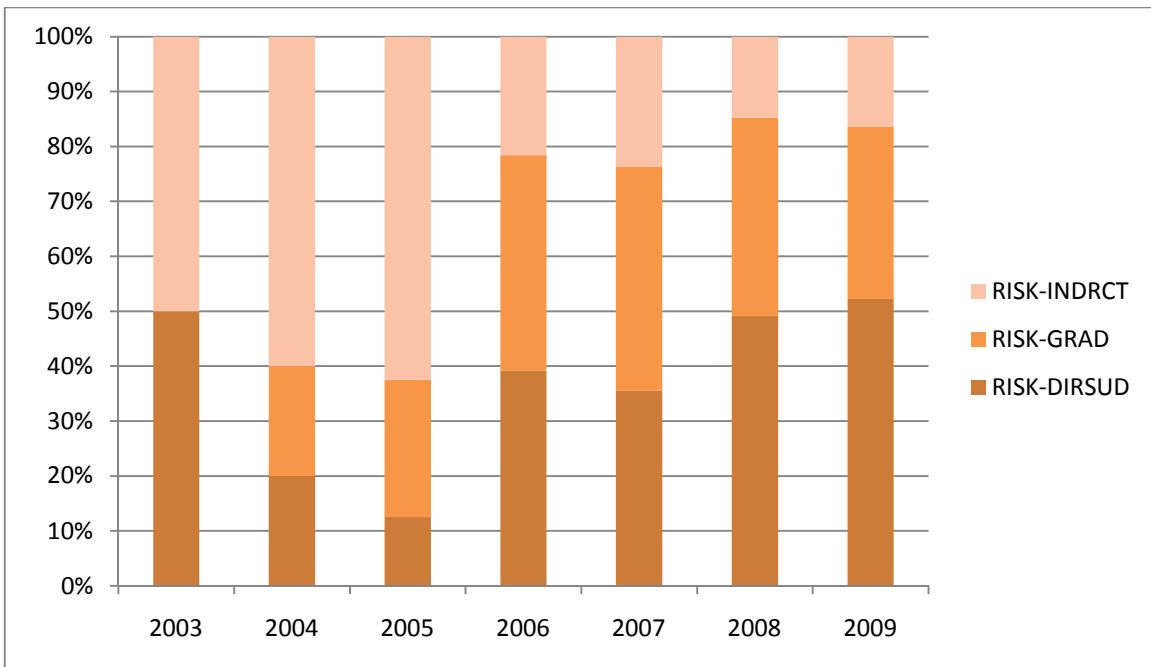
### Percentages of Respondents Identifying Exposure to Risks and Opportunities from the Physical Impacts of Climate Change



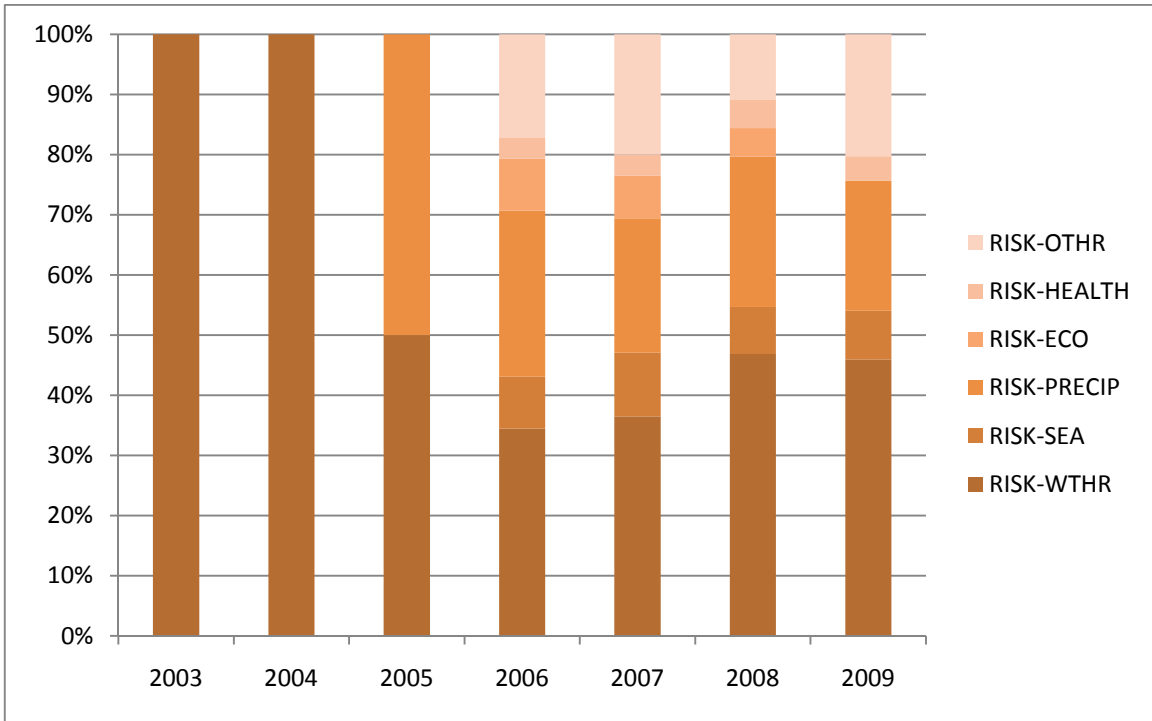
**Percentage of All Responses for Each Variable, All Years**



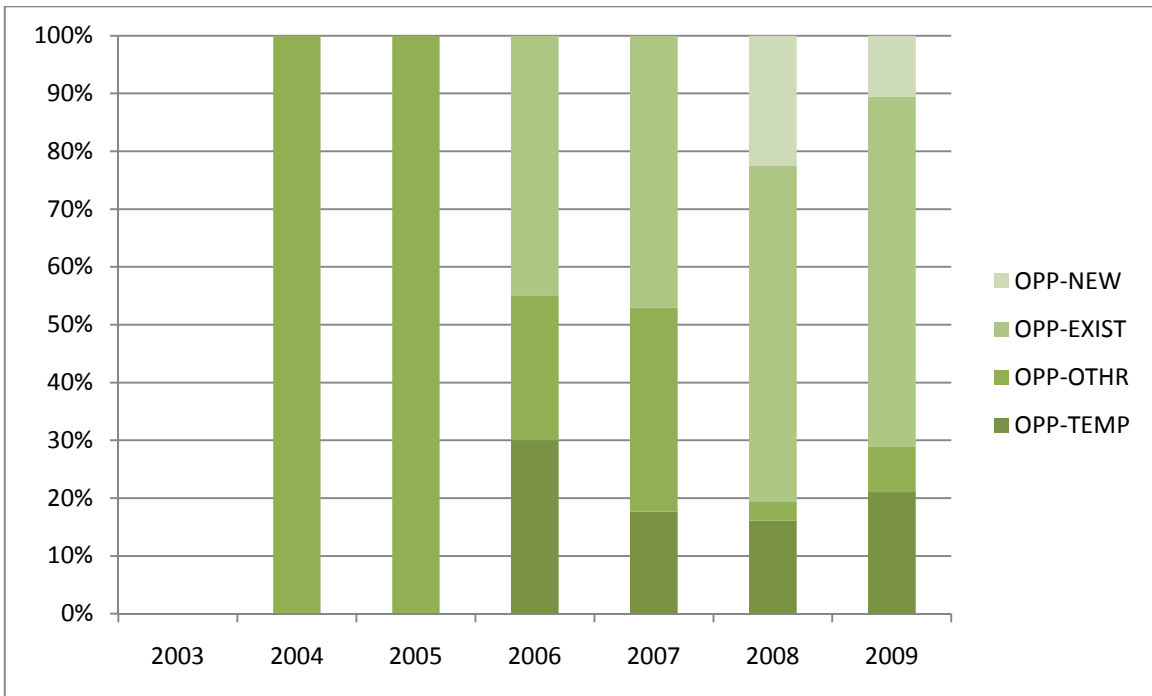
**Breakdown of Perceived Risks by High Level Category and Year**



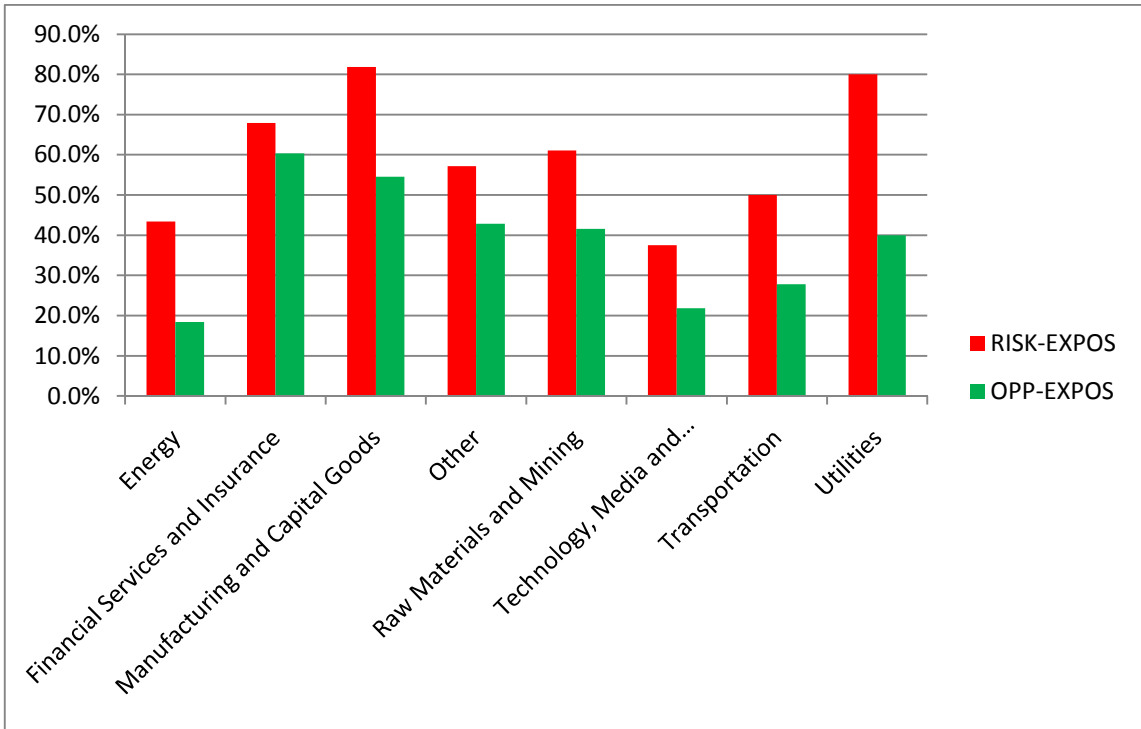
**Breakdown of Perceived Risks by Specific Risks and Year**



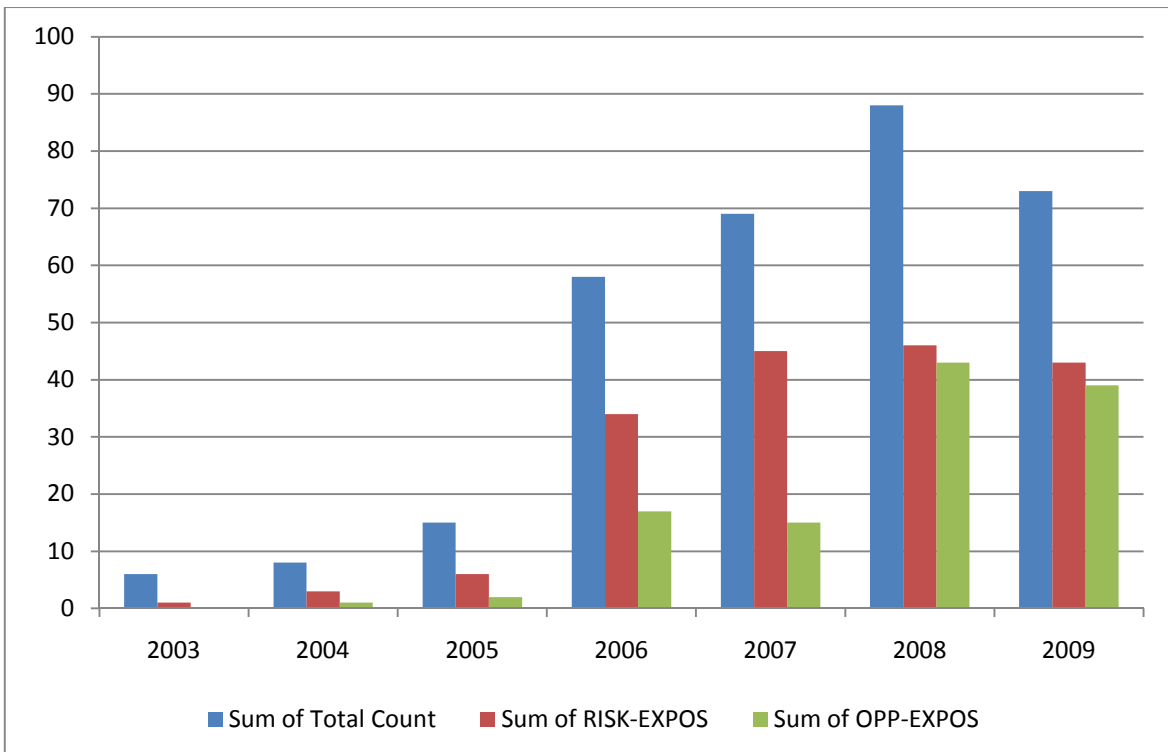
**Breakdown of Perceived Opportunities by Type and Year**



**% of Respondents Reporting RISK-EXPOS and OPP-EXPOS by Sector, all years**

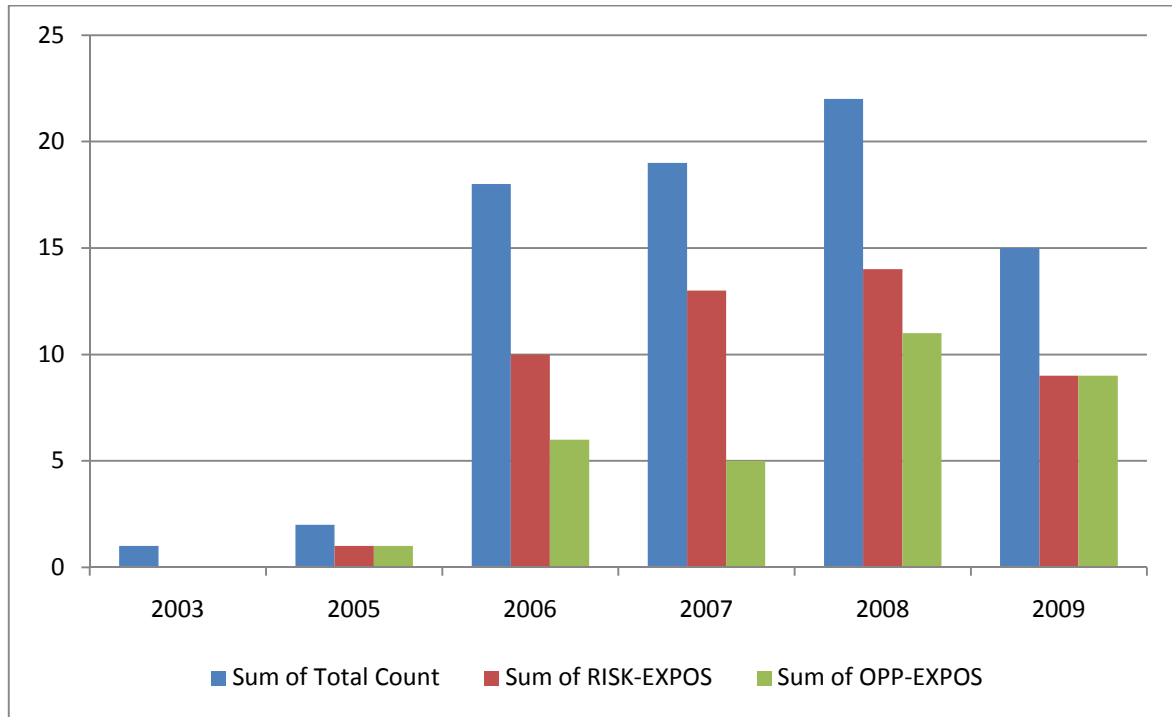


**Total Counts by Year – All Sectors**

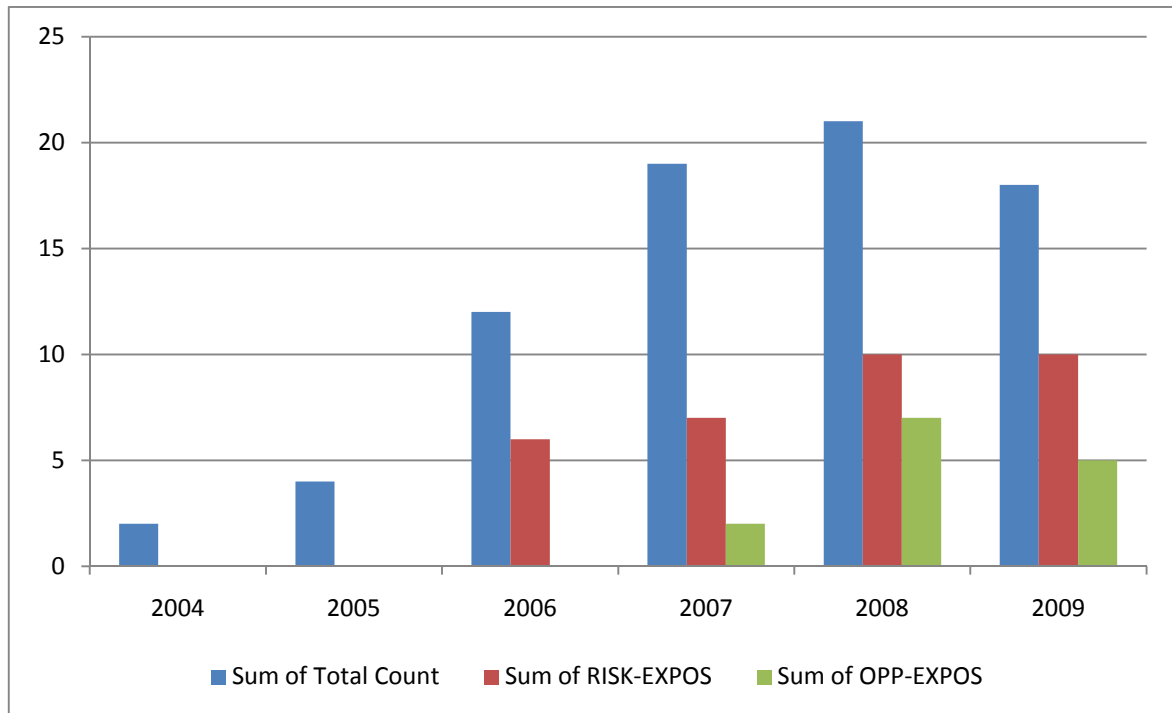




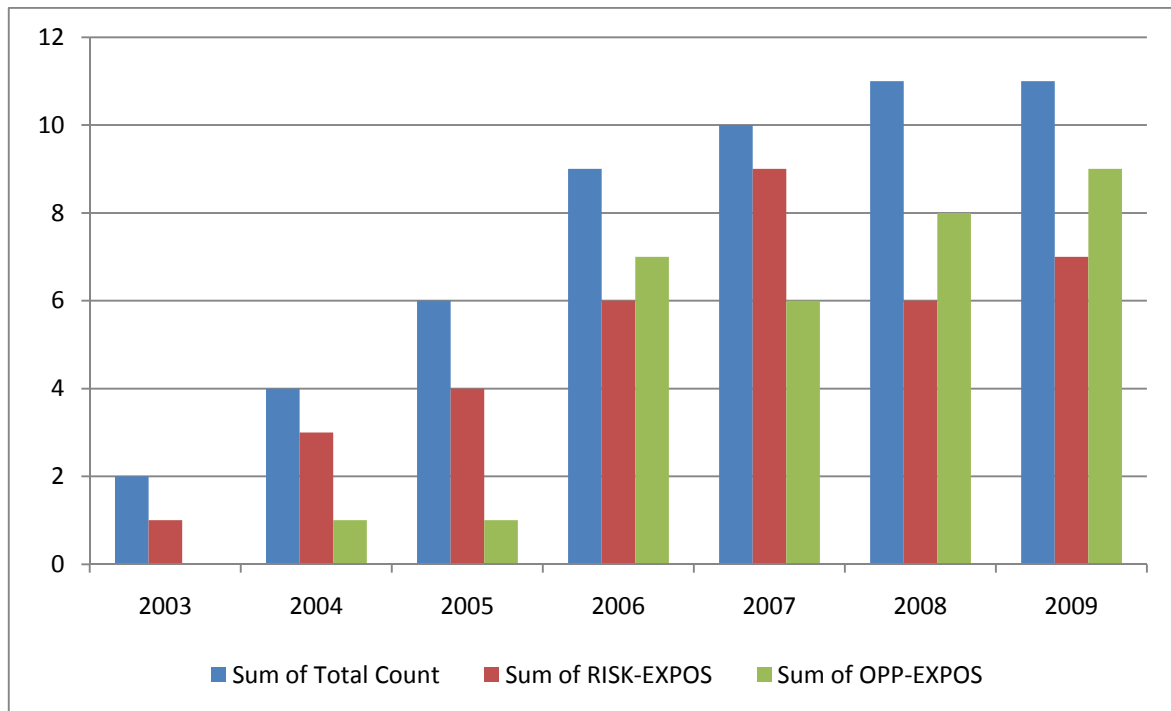
**Total counts by Year – Raw Materials and Mining Sector**



**Total Counts by Year – Energy Sector**



### Total Counts by Year – Financial Services and Insurance Sector



**VARIABLES AS:**

**RISK-EXPOS**

**RISK-DIRSUD**

**RISK-GRAD**

**RISK-INDRCT**

**RISK-WTHR**

**RISK-SEA**

**RISK-PRECIP**

**RISK-ECO**

**RISK-HEALTH**

**RISK-OTHR**

**RISK-OTHR**

**RISK-OTHR**

**RISK-OTHR**

**RISK-OTHR**

**RISK-OTHR**

**RISK-OTHR**

**VARIABLES AS:**

**OPP-EXPOS**

**OPP-TEMP**

**OPP-OTHR**

**OPP-EXIST**

**OPP-EXIST**

**OPP-EXIST**

**OPP-EXIST**

**OPP-NEW**

**OPP-NEW**

**SOCIATED WITH PERCEIVED RISKS FROM PHYSICAL IMPACTS OF CLIMATE CHANGE**

*CDP response indicated a perceived exposure to risks associated with physical impacts from climate change.*

*CDP response indicated a perceived exposure to risks associated with direct and sudden physical impacts to climate change (e.g. damage to physical assets as a result of patterns of weather extremes).*

*CDP response indicated a perceived exposure to risks associated with gradual, long-term physical impacts of climate change (e.g. changing precipitation patterns, water shortages, ecosystem effects, human health effects, etc.).*

*CDP response indicated a perceived indirect exposure to physical impacts from climate change (e.g. supply chain disruptions, increased commodity prices, changing demand for goods and services).*

*CDP response indicated a perceived exposure to risks associated with severe weather events associated with climate change (e.g. hurricanes, tornadoes, cyclones, storm surges, extreme flooding, etc.).*

*CDP response indicated a perceived exposure to risks associated with potential sea level rise from climate change.*

*CDP response indicated a perceived exposure to risks associated with changing precipitation patterns from climate change (e.g. drought, water shortages, reduced snowpack and runoff, etc.).*

*CDP response indicated a perceived exposure to risks associated with ecosystem impacts from climate change (e.g. biodiversity loss, invasive species, ecosystem changes, etc.).*

*CDP response indicated a perceived exposure to risks associated with potential human health impacts from climate change (e.g. change disease vectors, health impacts from heat waves, etc.).*

*CDP response indicated a perceived exposure to risks associated with other physical impacts of climate change (e.g. increased incidence of forest fires, melting permafrost, impacts on ice roads and winter transportation, melting arctic icepack, etc.).*

**SOCIATED WITH PERCEIVED OPPORTUNITIES FROM PHYSICAL IMPACTS OF CLIMATE CHANGE**

*CDP response indicated one or more perceived business opportunities related to the potential physical impacts of climate change.*

*CDP response indicated a perceived opportunity related to changing air temperatures and reduced heating costs.*

*CDP response indicated a perceived opportunity related to indirect and/or other physical impacts of climate change (e.g. changes in market conditions, improvements/new efficiencies in supply chains, etc.)*

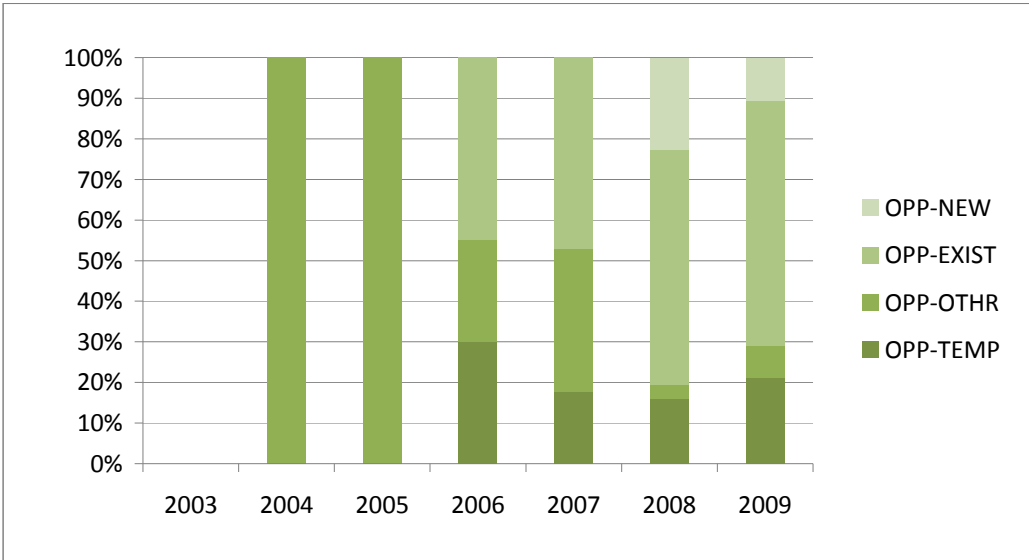
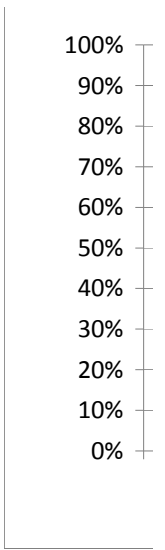
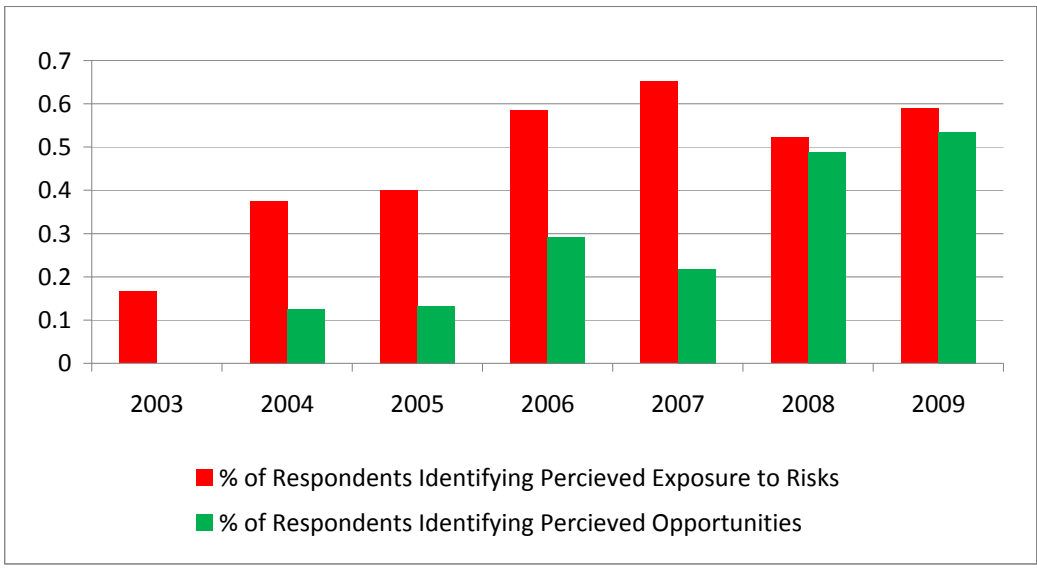
*CDP response indicated a perceived opportunity for enhanced profitability or sales of existing business lines stemming from physical impacts of climate change (including increased sales of existing products and services, and increased profitability of sales of existing products or services due to lower production costs or less competition).*

*CDP response indicated a perceived opportunity for the development of new products, services, and technologies stemming from physical impacts of climate change.*

Year	CDP Survey Sample Size	# of Public Canadian CDP Responses	RISK-EXPOS	RISK-DIRSUD	RISK-GRAD	RISK-INDRCT	RISK-WTHR	RISK-SEA
2003	16	6	6	6	6	6	6	6
2004	21	8	8	8	8	8	8	8
2005	20	15	15	15	15	15	15	15
2006	200	58	58	58	58	58	58	58
2007	200	69	69	69	69	69	69	69
2008	200	88	88	88	88	88	88	88
2009	200	73	73	73	73	73	73	73
<b>Totals</b>	<b>857</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>

Year	CDP Survey Sample Size	# of Public Canadian CDP Responses	RISK-EXPOS	RISK-DIRSUD	RISK-GRAD	RISK-INDRCT	RISK-WTHR	RISK-SEA
2003	16	6	1	1	0	1	1	0
2004	21	8	3	1	1	3	1	0
2005	20	15	6	1	2	5	1	0
2006	200	58	34	22	20	11	20	5
2007	200	69	45	31	31	18	31	9
2008	200	88	46	30	22	9	30	5
2009	200	73	43	35	21	11	34	6
<b>Totals</b>	<b>857</b>	<b>317</b>	<b>178</b>	<b>121</b>	<b>97</b>	<b>58</b>	<b>118</b>	<b>25</b>

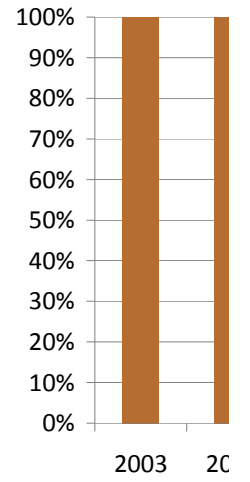
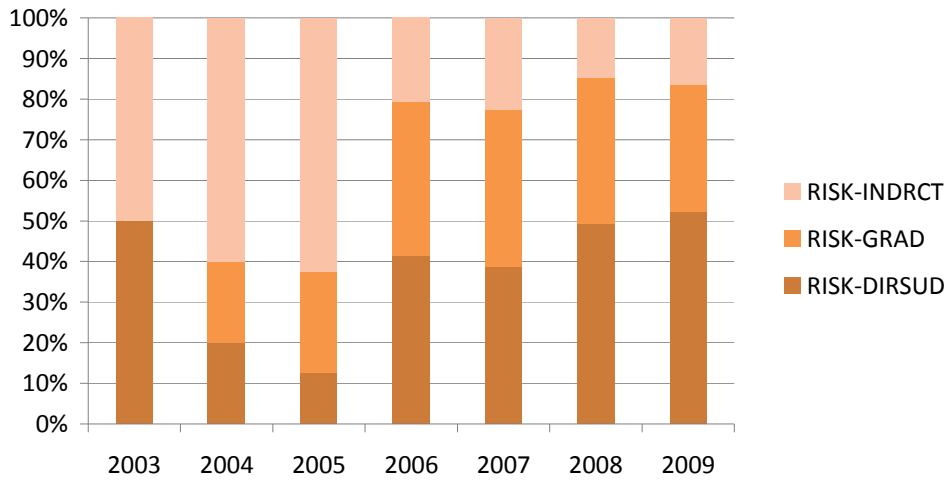
16.7%	16.7%	0.0%	16.7%	16.7%	0.0%
37.5%	12.5%	12.5%	37.5%	12.5%	0.0%
40.0%	6.7%	13.3%	33.3%	6.7%	0.0%
58.6%	37.9%	34.5%	19.0%	34.5%	8.6%
65.2%	44.9%	44.9%	26.1%	44.9%	13.0%
52.3%	34.1%	25.0%	10.2%	34.1%	5.7%
58.9%	47.9%	28.8%	15.1%	46.6%	8.2%
56.0%	38.1%	30.5%	18.2%	37.1%	7.9%



RISK-PRECIP	RISK-ECO	RISK-HEALTH	RISK-OTHR	OPP-EXPOS	OPP-TEMP	OPP-OTHR	OPP-EXIST	OPP-NEW
6	6	6	6	6	6	6	6	6
8	8	8	8	8	8	8	8	8
15	15	15	15	15	15	15	15	15
58	58	58	58	58	58	58	58	58
69	69	69	69	69	69	69	69	69
88	88	88	88	88	88	88	88	88
73	73	73	73	73	73	73	73	73
<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>

RISK-PRECIP	RISK-ECO	RISK-HEALTH	RISK-OTHR	OPP-EXPOS	OPP-TEMP	OPP-OTHR	OPP-EXIST	OPP-NEW
0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	1	0	0
1	0	0	0	2	0	2	0	0
16	5	2	10	17	6	5	9	0
19	6	3	17	15	3	6	8	0
16	3	3	7	43	5	1	18	7
16	0	3	15	39	8	3	23	4
<b>68</b>	<b>14</b>	<b>11</b>	<b>49</b>	<b>117</b>	<b>22</b>	<b>18</b>	<b>58</b>	<b>11</b>

0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.0%	0.0%	0.0%	0.0%	12.5%	0.0%	12.5%	0.0%	0.0%
6.7%	0.0%	0.0%	0.0%	13.3%	0.0%	13.3%	0.0%	0.0%
27.6%	8.6%	3.4%	17.2%	29.3%	10.3%	8.6%	15.5%	0.0%
27.5%	8.7%	4.3%	24.6%	21.7%	4.3%	8.7%	11.6%	0.0%
18.2%	3.4%	3.4%	8.0%	48.9%	5.7%	1.1%	20.5%	8.0%
21.9%	0.0%	4.1%	20.5%	53.4%	11.0%	4.1%	31.5%	5.5%
21.4%	4.4%	3.5%	15.4%	36.8%	6.9%	5.7%	18.2%	3.5%





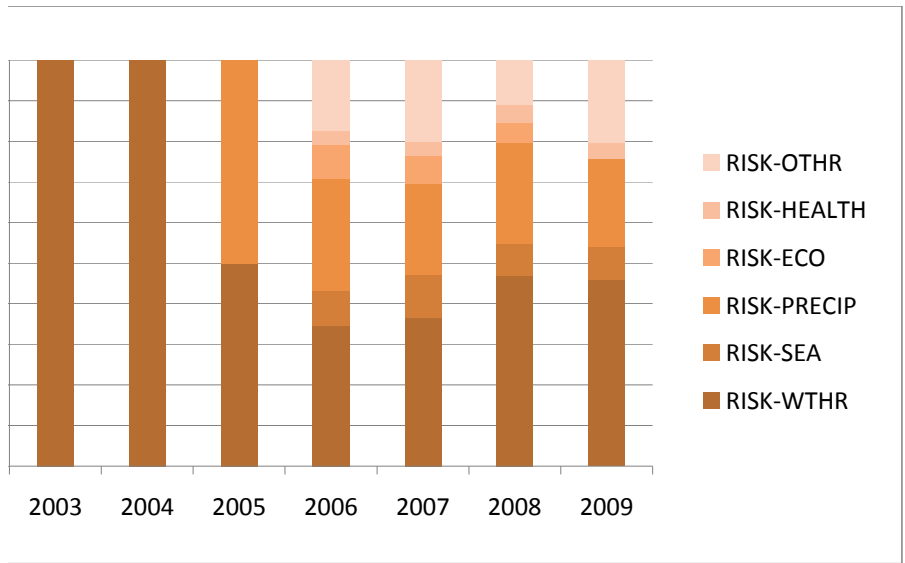
PLAN

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<b>9</b>

- 0.0%
- 0.0%
- 6.7%
- 5.2%
- 0.0%
- 0.0%
- 6.8%
  
- 2.8%



Company Name	Sector	Physical risks□□
AGF Management	Diversified Financials	We do not consider our company
Agnico-Eagle Mines	Materials	We do not consider our company
Air Canada	Transportation	We consider our company to be €
Alimentation Couche-Tard	Retailing	
ARC Energy Trust	Energy	We do not consider our company
ATCO Ltd.	Utilities	We consider our company to be €
Bank of Montreal	Banks	We consider our company to be € We consider our company to be €
Bank of Nova Scotia (Scotiabank)	Banks	
Barrick Gold	Materials	We consider our company to be €
Bell Aliant Regional Communications	Telecommunication Service	We consider our company to be €
Bombardier Inc.	Capital Goods	We consider our company to be €
Bonavista Energy Trust	Energy	We consider our company to be €
BPO Properties (see Brookfield Properties)	Real Estate	
Brookfield Properties	Real Estate	We consider our company to be €
Cameco Corporation	Materials	We consider our company to be €
Canadian Imperial Bank of Commerce (CIBC)	Banks	We consider our company to be €
Canadian National Railways	Transportation	We consider our company to be €
Canadian Natural Resources	Energy	We consider our company to be €
Canadian Oil Sands Trust	Energy	We consider our company to be €
Canadian Pacific Railway	Transportation	We consider our company to be €
Canadian Utilities	Utilities	We consider our company to be €
Canadian Western Bank	Banks	We consider our company to be €
Catalyst Paper	Materials	We consider our company to be €
CGI Group	Commercial Services and Supplies	We do not consider our company
Emera Inc.	Utilities	We consider our company to be €
Enbridge Inc.	Energy	We consider our company to be €
Enbridge Income Fund (see Enbridge Inc.)	Energy	
Encana	Energy	We do not consider our company
Enerplus Resources Fund	Energy	We consider our company to be €
Epcor Power L.P.	Utilities	We consider our company to be €
Finning International	Transportation	We do not consider our company
Gaz Metro L.P.	Commercial Services and Supplies	We do not consider our company
Goldcorp Inc	Materials	We consider our company to be €
Groupe Aeroplan	Diversified Financials	We do not consider our company
HudBay Minerals	Materials	We do not consider our company
Husky Energy	Energy	We consider our company to be €
Iamgold Corporation	Materials	We consider our company to be €

Imperial Oil	Energy	We consider our company to be € We do not consider our company
Industrial Alliance Ins. & Fin. Svs.	Insurance	
Inmet Mining	Materials	We do not consider our company
Intact Financial Corporation (see ING Group)	Diversified Financials	We consider our company to be €
Keyera Facilities Income Fund	Energy	
Kinross Gold	Materials	We consider our company to be €
Manitoba Telecom Services	Capital Goods	We consider our company to be €
Manulife Financial	Insurance	We consider our company to be €
Methanex Corporation	Materials	We do not consider our company
Nexen Inc.	Energy	We do not consider our company
Norbord Inc.	Materials	We do not consider our company We consider our company to be €
Nortel Networks	Telecommunication Service	
Nova Chemicals	Materials	We do not consider our company
OPTI Canada	Energy	We do not consider our company
Penn West Energy Trust	Energy	We consider our company to be €
Petro Canada	Energy	
Potash Corporation of Saskatchewan	Materials	We consider our company to be €
Research In Motion	Technology Hardware and Equipment	We do not consider our company
Ritchie Bros. Auctioneers	Retailing	We do not consider our company We consider our company to be €
Rogers Communications	Telecommunication Service	
Royal Bank of Canada	Banks	We consider our company to be €
Russel Metals	Transportation	We do not consider our company
Saputo Inc.	Food Beverage and Tobacco Commercial Services and Supplies	We consider our company to be €
ShawCor Ltd.		
SNC-Lavalin Group	Capital Goods	We do not consider our company
Stantec Inc.	Capital Goods	We consider our company to be €
Suncor Energy Inc	Energy	We consider our company to be €
Talisman Energy	Energy	We do not consider our company
Teck Cominco	Materials	We consider our company to be € We consider our company to be €
Telus Corporation	Telecommunication Service	
Toronto-Dominion Bank	Banks	We consider our company to be €
TransAlta Corporation	Utilities	We consider our company to be €
Transcontinental Inc.	Media	We do not consider our company
UTS Energy	Energy	We do not consider our company
Yamana Gold	Materials	We consider our company to be €
Yellow Pages Income Fund	Media	We do not consider our company



## 2.1 Physical Risks

Description	Further information Attachments
<p>As an investment management operation, we are not subject to the effects of extreme weather events. Our current operations (Laronde and Goldex) are located in North-Western Quebec, far from the coast. The physical risks from climate change on the aviation industry arise from projected increases in extreme weather events.</p>	
<p>Our views have not changed in the past twelve months. At this time we see minimal physical risks. ATCO is exposed to physical risks from climate change. Some examples are: • Impact of extreme weather events on air traffic control. Due to both their high likelihood of occurrence and moderate to high impacts when they occur, ATCO is exposed to physical risks associated with climate change directly through its operations.</p>	
<p>Barrick has an in-house system of risk management that applies throughout the company. The scientific consensus is that Canada's East Coast will continue to see a rise in the frequency and intensity of extreme weather events.</p>	
<p>Process for Identifying Physical Risks: The risks described within this section represent the most significant physical risks. We do not foresee any material short-term risks related to our company and its operations.</p>	
<p>Like all real estate companies, we have exposure to physical risks such as earthquakes, hurricanes, and flooding. In the fall of 2008, Cameco conducted facilitated workshops to determine the risks and opportunities associated with climate change. As an office-based organization primarily located in Canada with operations in other parts of the world, we are not directly exposed to physical risks from climate change.</p>	
<p>At CN, we recognize that climate change presents physical risks. In reviewing the risks and opportunities presented by climate change, we identified several physical risks. Extreme weather events and changes in weather patterns affect project and region-specific risks. The Syncrude facility is located in northern Alberta and would be vulnerable to any extreme weather events. Responsibility for identifying risks and assessing their impact is a shared responsibility between the company and its stakeholders. CU is exposed to physical risks from climate change. Some examples are: • Impact of extreme weather events on infrastructure. Climate change could impact CWB's physical premises across Western Canada. However, Catalyst Paper Corporation is working closely with local authorities around water supply. With respect to the physical risks associated with climate change, ensuring business continuity is a key priority.</p>	
<p>A change in precipitation levels would affect the amount of water available for hydroelectric power generation. Of all Enbridge's infrastructure the most vulnerable to potential climate change impacts are the pipelines.</p>	
<p>We do not anticipate any material physical risks associated with climate change. Enerplus has operations in northeastern British Columbia and northern Alberta which are not directly exposed to physical risks from climate change. Performance of the Partnership's hydroelectric facilities is partly dependent upon the availability of water. To the best of our understanding, our business is not exposed to physical risks from climate change. Gaz Métro has a modern gas system that meets the strictest standards. The Partnership is not directly exposed to physical risks from climate change.</p>	
<p>Goldcorp addresses the physical risks of Climate Change by ensuring that extreme weather events do not impact its operations. Groupe Aeroplan does not consider itself directly exposed to physical risks from climate change. Given the geographic locations of the company's operations there has been no apparent impact. Husky is managing physical risk through the Company's engineering best practice of design and construction. Potential physical HAZARDS associated with Climate Change include fluctuating weather patterns and extreme weather events.</p>	

Imperial's operations include remote and offshore areas that present challenges from The Industrial Alliance head office and the other buildings the Company owns are not i

Climate change research, based on long-term, numeric climate change models contain

Keyera's plants are well designed based on the operating conditions to which they are

Provisions for physical risks such as extreme weather events are an integral part of the MTS Allstream is a national company which may be impacted by major service disrupti The following Manulife Financial business units and affiliates that hold and manage ass Based upon current knowledge we do not believe that our existing facilities (life expect (Nexen has answered this question in previous CDP submissions. After reviewing perti Norbord believes that there is minimal physical risk to our business operations based c As a global company operating throughout the world, Nortel has limited, but real, risk

In the course of normal business, NOVA Chemicals facilities, including those that are ne All of our current and proposed projects are in the Athabasca oil sands region in North A portion of our assets are in areas that are currently only accessible on frozen surface

2.1. Is your company exposed to physical risks from climate change?  Yes. There ar

As any company, we are exposed to the possible effects of extreme weather; however

RBA conducts operations through a global network of 38 auction sites, ranging in size f Rogers operates an expansive physical network of telecommunications facilities and in

1) RBC'S PROCESS FOR IDENTIFYING C For more informatio <http://cdp.cdproject.net/c> We do not anticipate material physical risks to Company property or personnel, from t Saputo purchases raw materials that may repres

Many of ShawCor's customers are in the oil and gas industry. Any physical impacts fro

SNC-Lavalin has expertise in engineering projects in all types of climates. As climate ch Exposure to physical risks may increase the likelihood of project disruptions and delays The response to this question focuses primarily on Suncor's operations. The biggest ph Talisman's assets are designed to withstand probable extreme weather events based c There is now general consensus regarding broad, large-scale shifts in climate and weat At TELUS, business risk is defined as the degree of exposure associated with key strate

Risk to Business Operations:  We have low exposure to physical risks of climate cha We consider the physical risks to be relatively low. We do not anticipate any material A detailed assessment of the potential physical impacts has not been conducted, howe Negligible - potential production facilities are inland and in Northern Canada. Future p The physical risks exposed at our operations are mainly related to extreme weather co The key physical risks associated with climate change include adverse weather conditi





## 5.1 Physical opportunities

5.1 Physical opportunities			RISK-EXPOS	RISK-DIRSUD
Physical opportunities	Description	Further informati	Attachments	
Physical changes present opportu	The climate changes may present opportunities in			0
Physical changes present opportu	All AEM's operations have heating requirements. E			0
Physical changes do not present o	There are no physical opportunities from climate c			1
				0
Physical changes do not present o	Our industry operates in all temperature variances			0
Physical changes present opportu	One example is that climate change may create an			1
Physical changes present opportu	Our views have not changed in the last 12 months.			1
Physical changes present opportu	Certain financial products and services, such as we			1
				1
Physical changes present opportu	Barrick is looking at the opportunities for the busin			1
Physical changes present opportu	The increase in energy costs will improve market o			1
				1
Physical changes present opportu	Process for Ident The opportunities described with			1
Physical changes present opportu	As indicated in the previous question, we anticipat			1
				0
Physical changes present opportu	We are in the business of building new buildings ar			1
Physical changes present opportu	Based on a 2008 risk assessment, physical opportu			1
Physical changes present opportu	Physical changes resulting from climate change do			1
				1
Physical changes present opportu	At CN, we also re In reviewing the risks and opport			1
Physical changes do not present o	Not applicable			1
Physical changes do not present o	No			1
Physical changes present opportu	Possible physical changes such as lengthening grov			1
Physical changes present opportu	One example is that climate change may create an			1
Physical changes present opportu	Lending Activities? CWB provides financing to ren			1
Physical changes present opportu	In the short term, warmer weather on BC coast cou			1
Physical changes do not present opportunities for my company.				0
Physical changes present opportu	As outlined in the response to Question 2, higher p			1
Physical changes present opportu	Please refer to related discussion under Questions			1
				0
Physical changes do not present o	Aside from the possible opportunities to materially			0
Physical changes present opportu	Increased climate/weather related issues could dis			1
Physical changes do not present o	Physical changes are not forecasted to significantly			1
Physical changes do not present o	At this point, physical changes resulting from clima			0
Physical changes present opportu	Gaz Métro is examining the physical opportunities			0
				0
Physical changes do not present o	Mines are constrained in their location by the pres			1
Physical changes present opportu	Climatic change may result in changes in destinatic			0
Physical changes do not present o	Physical changes have not been identified, therefo			0
Physical changes do not present o	Husky has not identified any opportunities.			1
Physical changes do not present o	None identified at this time.			1

Physical changes present opportunity We are actively focusing on improving efficiency in	1	1
Physical changes do not present opportunities for my company.	0	
Physical changes do not present opportunity The climate change research suggesting increased	0	
We don't know the answer to this question At this point, we have not identified significant oppo	0	
Physical changes present opportunity Kinross has begun reviewing available climatic mod	1	1
Physical changes present opportunity Communication is essential in the time a natural di	1	1
Physical changes present opportunity The following Manulife business units reported tha	1	
Physical changes do not present opportunities for my company.	0	
Physical changes do not present opportunity We have not identified any opportunities from cur	0	
We don't know the answer to this question.	0	
Physical changes present opportunity Our products can enable people to use mobility tec	1	1
Physical changes present opportunity As a primary plastics and petrochemical company,	0	
Physical changes present opportunity Our research into carbon capture may present the	0	
Physical changes do not present opportunity We do not consider that current or anticipated phy	1	1
	0	
Physical changes present opportunity 5.1. Do physical changes resulting from climate cha	1	1
Physical changes do not present opportunities for my company.	0	
Physical changes do not present opportunity Opportunities related to physical changes resulting	0	
Physical changes do not present opportunities for my company.	0	
Physical changes present opportunity Physical impacts For more informat <a href="http://cdp.cdp">http://cdp.cdp</a>	1	1
Physical changes do not present opportunity Russel is a distributor of steel, which is used in the	0	
sent up to 85% of the cost of products. It processes Saputo purchases raw materials t	0	
Physical changes present opportunity ShawCor assists in providing environmentally soun	1	
Physical changes present opportunity SNC-Lavalin's business related to water and sanitat	0	
Physical changes present opportunity Physical changes resulting from climate change are	1	1
Physical changes do not present opportunity Suncor does not predict any opportunities that wil	1	1
Physical changes do not present opportunities for my company.	0	
Physical changes present opportunity For mining and exploration companies, global warr	1	1
Physical changes present opportunity TELUS opportunities in relation to physical changes	1	1
Physical changes present opportunity Business Operations: Yes. Physical changes pro	1	1
Physical changes do not present opportunity We do not see any material opportunity for our ge	1	
Physical changes present opportunity Climate change will bring business impacts that wil	0	
We don't know the answer to this question.	0	
Physical changes present opportunity If in face of the climate change, an increase of the	1	1
Physical changes do not present opportunities for my company.	0	



RISK-GRAD	RISK-INDRCT	RISK-WTHR	RISK-SEA	RISK-PRECIP	RISK-ECO	RISK-HEALTH	RISK-OTHR	OPP-EXPOS	OPP-TEMP
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OPP-OTHR	OPP-EXIST	OPP-NEW	PLAN	Comment
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