

# A Introduction

## 1. Background

It is widely recognized that continued emission of greenhouse gases will cause further warming of the Earth and that warming above 2° Celsius (2°C), relative to the pre-industrial period, could lead to catastrophic economic and social consequences.<sup>7</sup> As evidence of the growing recognition of the risks posed by climate change, in December 2015, nearly 200 governments agreed to strengthen the global response to the threat of climate change by “holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels,” referred to as the Paris Agreement.<sup>8</sup> The large-scale and long-term nature of the problem makes it uniquely challenging, especially in the context of economic decision making. Moreover, the current understanding of the potential financial risks posed by climate change—to companies, investors, and the financial system as a whole—is still at an early stage.

There is a growing demand for decision-useful, climate-related information by a range of participants in the financial markets.<sup>9</sup> Creditors and investors are increasingly demanding access to risk information that is consistent, comparable, reliable, and clear. There has also been increased focus, especially since the financial crisis of 2007-2008, on the negative impact that weak corporate governance can have on shareholder value, resulting in increased demand for transparency from organizations on their risks and risk management practices, including those related to climate change.

The growing demand for decision-useful, climate-related information has resulted in the development of several climate-related disclosure standards. Many of the existing standards, however, focus on disclosure of climate-related information, such as greenhouse gas (GHG) emissions and other sustainability metrics. Users of such climate-related disclosures commonly cite the lack of information on the financial implications around the climate-related aspects of an organization's business as a key gap. Users also cite inconsistencies in disclosure practices, a lack of context for information, use of boilerplate, and non-comparable reporting as major obstacles to incorporating climate-related risks and opportunities (collectively referred to as climate-related issues) as considerations in their investment, lending, and insurance underwriting decisions over the medium and long term.<sup>10</sup> In addition, evidence suggests that the lack of consistent information hinders investors and others from considering climate-related issues in their asset valuation and allocation processes.<sup>11</sup>

In general, inadequate information about risks can lead to a mispricing of assets and misallocation of capital and can potentially give rise to concerns about financial stability since markets can be vulnerable to abrupt corrections.<sup>12</sup> Recognizing these concerns, the G20 (Group of 20) Finance Ministers and Central Bank Governors requested that the Financial Stability Board (FSB) “convene public- and private-sector participants to review how the financial sector can take account of climate-related issues.”<sup>13</sup> In response to the G20's request, the FSB held a meeting of public- and private-sector representatives in September 2015 to consider the implications of climate-related issues for the financial sector. “Participants exchanged views on the existing work of the financial sector, authorities, and standard setters in this area and the challenges they face,

<sup>7</sup> Intergovernmental Panel on Climate Change, *Fifth Assessment Report*, Cambridge University Press, 2014.

<sup>8</sup> United Nations Framework Convention on Climate Change, “[The Paris Agreement](#),” December 2015.

<sup>9</sup> Avery Fellow, “[Investors Demand Climate Risk Disclosure](#),” Bloomberg, February 2013.

<sup>10</sup> Sustainability Accounting Standards Board (SASB), *SASB Climate Risk Technical Bulletin#: TB001-10182016*, October 2016.

<sup>11</sup> Mercer LLC, *Investing in a Time of Climate Change*, 2015.

<sup>12</sup> Mark Carney, “[Breaking the tragedy of the horizon—climate change and financial stability](#),” September 29, 2015.

<sup>13</sup> “[Communiqué from the G20 Finance Ministers and Central Bank Governors Meeting in Washington, D.C. April 16-17, 2015](#),” April 2015.

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areas for possible further work, and the possible roles the FSB and others could play in taking that work forward. The discussions continually returned to a common theme: the need for better information.”<sup>14</sup>

In most G20 jurisdictions, companies with public debt or equity have a legal obligation to disclose material risks in their financial reports—including material climate-related risks. However, the absence of a standardized framework for disclosing climate-related financial risks makes it difficult for organizations to determine what information should be included in their filings and how it should be presented. Even when reporting similar climate-related information, disclosures are often difficult to compare due to variances in mandatory and voluntary frameworks. The resulting fragmentation in reporting practices and lack of focus on financial impacts have prevented investors, lenders, insurance underwriters, and other users of disclosures from accessing complete information that can inform their economic decisions. Furthermore, because financial-sector organizations’ disclosures depend, in part, on those from the companies in which they invest or lend, regulators face challenges in using financial-sector organizations’ existing disclosures to determine system-wide exposures to climate-related risks.

In response, the FSB established the industry-led Task Force on Climate-related Financial Disclosures (TCFD or Task Force) in December 2015 to design a set of recommendations for consistent “disclosures that will help financial market participants understand their climate-related risks.”<sup>15</sup> See [Box 1](#) (p. 3) for more information on the Task Force.

## 2. The Task Force’s Remit

The FSB called on the Task Force to develop climate-related disclosures that “could promote more informed investment, credit [or lending], and insurance underwriting decisions” and, in turn, “would enable stakeholders to understand better the concentrations of carbon-related assets in the financial sector and the financial system’s exposures to climate-related risks.”<sup>16,17</sup> The FSB noted that disclosures by the financial sector in particular would “foster an early assessment of these risks” and “facilitate market discipline.” Such disclosures would also “provide a source of data that can be analyzed at a systemic level, to facilitate authorities’ assessments of the materiality of any risks posed by climate change to the financial sector, and the channels through which this is most likely to be transmitted.”<sup>18</sup>

The FSB also emphasized that “any disclosure recommendations by the Task Force would be voluntary, would need to incorporate the principle of materiality and would need to weigh the balance of costs and benefits.”<sup>19</sup> As a result, in devising a principle-based framework for voluntary disclosure, the Task Force sought to balance the needs of the users of disclosures with the challenges faced by the preparers. The FSB further stated that the Task Force’s climate-related financial disclosure recommendations should not “add to the already well developed body of existing disclosure schemes.”<sup>20</sup> In response, the Task Force drew from existing disclosure frameworks where possible and appropriate.

The FSB also noted the Task Force should determine whether the target audience of users of climate-related financial disclosures should extend beyond investors, lenders, and insurance underwriters. Investors, lenders, and insurance underwriters (“primary users”) are the appropriate target audience. These primary users assume the financial risk and reward of the

<sup>14</sup> FSB, “[FSB to establish Task Force on Climate-related Financial Disclosures](#),” December 4, 2015.

<sup>15</sup> *Ibid.*

<sup>16</sup> FSB, “[Proposal for a Disclosure Task Force on Climate-Related Risks](#),” November 9, 2015.

<sup>17</sup> The term carbon-related assets is not well defined, but is generally considered to refer to assets or organizations with relatively high direct or indirect GHG emissions. The Task Force believes further work is needed on defining carbon-related assets and potential financial impacts.

<sup>18</sup> FSB, “[Proposal for a Disclosure Task Force on Climate-Related Risks](#),” November 9, 2015.

<sup>19</sup> *Ibid.*

<sup>20</sup> *Ibid.*

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decisions they make. The Task Force recognizes that many other organizations, including credit rating agencies, equity analysts, stock exchanges, investment consultants, and proxy advisors also use climate-related financial disclosures, allowing them to push information through the credit and investment chain and contribute to the better pricing of risks by investors, lenders, and insurance underwriters. These organizations, in principle, depend on the same types of information as primary users.

This report presents the Task Force’s recommendations for climate-related financial disclosures and includes supporting information on climate-related risks and opportunities, scenario analysis, and industry feedback that the Task Force considered in developing and then finalizing its recommendations. In addition, the Task Force developed a “stand-alone” document—[Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures](#) (Annex)—for organizations to use when preparing disclosures consistent with the recommendations. The Annex provides supplemental guidance for the financial sector as well as for non-financial groups potentially most affected by climate change and the transition to a lower-carbon economy. The supplemental guidance assists preparers by providing additional context and suggestions for implementing the recommended disclosures.

The Task Force’s recommendations provide a foundation for climate-related financial disclosures and aim to be ambitious, but also practical for near-term adoption. The Task Force expects that reporting of climate-related risks and opportunities will evolve over time as organizations, investors, and others contribute to the quality and consistency of the information disclosed.

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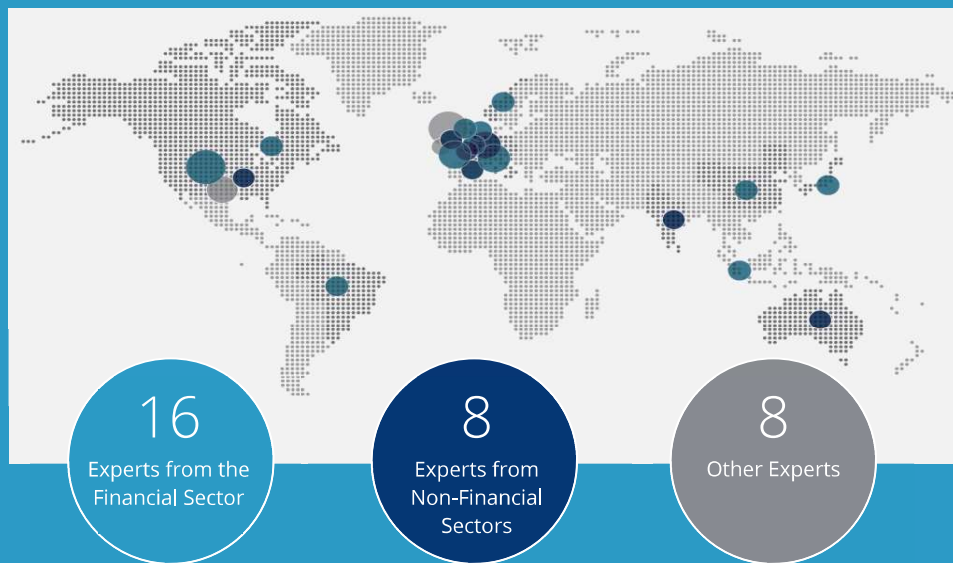
Box 1

### Task Force on Climate-related Financial Disclosures

The Task Force membership, first announced on January 21, 2016, has international representation and spans various types of organizations, including banks, insurance companies, asset managers, pension funds, large non-financial companies, accounting and consulting firms, and credit rating agencies—a unique collaborative partnership between the users and preparers of financial reports.

In its work, the Task Force drew on its members’ expertise, stakeholder engagement, and existing climate-related disclosure regimes to develop a singular, accessible framework for climate-related financial disclosure. See Appendix 1 for a list of the Task Force members and Appendix 2 for more information on the Task Force’s approach.

The Task Force is comprised of 32 global members representing a broad range of economic sectors and financial markets and a careful balance of users and preparers of climate-related financial disclosures.



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# B Climate-Related Risks, Opportunities, and Financial Impacts

## B Climate-Related Risks, Opportunities, and Financial Impacts

Through its work, the Task Force identified a growing demand by investors, lenders, insurance underwriters, and other stakeholders for decision-useful, climate-related financial information. Improved disclosure of climate-related risks and opportunities will provide investors, lenders, insurance underwriters, and other stakeholders with the metrics and information needed to undertake robust and consistent analyses of the potential financial impacts of climate change.

The Task Force found that while several climate-related disclosure frameworks have emerged across different jurisdictions in an effort to meet the growing demand for such information, there is a need for a standardized framework to promote alignment across existing regimes and G20 jurisdictions and to provide a common framework for climate-related financial disclosures. An important element of such a framework is the consistent categorization of climate-related risks and opportunities. As a result, the Task Force defined categories for climate-related risks and climate-related opportunities. The Task Force's recommendations serve to encourage organizations to evaluate and disclose, as part of their annual financial filing preparation and reporting processes, the climate-related risks and opportunities that are most pertinent to their business activities. The main climate-related risks and opportunities that organizations should consider are described below and in [Tables 1 and 2](#) (pp. 10-11).

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### 1. Climate-Related Risks

The Task Force divided climate-related risks into two major categories: (1) risks related to the *transition* to a lower-carbon economy and (2) risks related to the *physical* impacts of climate change.

#### a. Transition Risks

Transitioning to a lower-carbon economy may entail extensive policy, legal, technology, and market changes to address mitigation and adaptation requirements related to climate change. Depending on the nature, speed, and focus of these changes, transition risks may pose varying levels of financial and reputational risk to organizations.

#### Policy and Legal Risks

Policy actions around climate change continue to evolve. Their objectives generally fall into two categories—policy actions that attempt to constrain actions that contribute to the adverse effects of climate change or policy actions that seek to promote adaptation to climate change. Some examples include implementing carbon-pricing mechanisms to reduce GHG emissions, shifting energy use toward lower emission sources, adopting energy-efficiency solutions, encouraging greater water efficiency measures, and promoting more sustainable land-use practices. The risk associated with and financial impact of policy changes depend on the nature and timing of the policy change.<sup>21</sup>

Another important risk is litigation or legal risk. Recent years have seen an increase in climate-related litigation claims being brought before the courts by property owners, municipalities, states, insurers, shareholders, and public interest organizations.<sup>22</sup> Reasons for such litigation include the failure of organizations to mitigate impacts of climate change, failure to adapt to climate change, and the insufficiency of disclosure around material financial risks. As the value of loss and damage arising from climate change grows, litigation risk is also likely to increase.

<sup>21</sup> Organizations should assess not only the potential direct effects of policy actions on their operations, but also the potential second and third order effects on their supply and distribution chains.

<sup>22</sup> Peter Seley, "Emerging Trends in Climate Change Litigation," *Law 360*, March 7, 2016.

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### Technology Risk

Technological improvements or innovations that support the transition to a lower-carbon, energy-efficient economic system can have a significant impact on organizations. For example, the development and use of emerging technologies such as renewable energy, battery storage, energy efficiency, and carbon capture and storage will affect the competitiveness of certain organizations, their production and distribution costs, and ultimately the demand for their products and services from end users. To the extent that new technology displaces old systems and disrupts some parts of the existing economic system, winners and losers will emerge from this “creative destruction” process. The timing of technology development and deployment, however, is a key uncertainty in assessing technology risk.

### Market Risk

While the ways in which markets could be affected by climate change are varied and complex, one of the major ways is through shifts in supply and demand for certain commodities, products, and services as climate-related risks and opportunities are increasingly taken into account.

### Reputation Risk

Climate change has been identified as a potential source of reputational risk tied to changing customer or community perceptions of an organization’s contribution to or detraction from the transition to a lower-carbon economy.

#### b. Physical Risks

Physical risks resulting from climate change can be event driven (acute) or longer-term shifts (chronic) in climate patterns. Physical risks may have financial implications for organizations, such as direct damage to assets and indirect impacts from supply chain disruption. Organizations’ financial performance may also be affected by changes in water availability, sourcing, and quality; food security; and extreme temperature changes affecting organizations’ premises, operations, supply chain, transport needs, and employee safety.

#### Acute Risk

Acute physical risks refer to those that are event-driven, including increased severity of extreme weather events, such as cyclones, hurricanes, or floods.

#### Chronic Risk

Chronic physical risks refer to longer-term shifts in climate patterns (e.g., sustained higher temperatures) that may cause sea level rise or chronic heat waves.

## 2. Climate-Related Opportunities

Efforts to mitigate and adapt to climate change also produce opportunities for organizations, for example, through resource efficiency and cost savings, the adoption of low-emission energy sources, the development of new products and services, access to new markets, and building resilience along the supply chain. Climate-related opportunities will vary depending on the region, market, and industry in which an organization operates. The Task Force identified several areas of opportunity as described below.

#### a. Resource Efficiency

There is growing evidence and examples of organizations that have successfully reduced operating costs by improving efficiency across their production and distribution processes, buildings, machinery/appliances, and transport/mobility—in particular in relation to energy efficiency but also including broader materials, water, and waste management.<sup>23</sup> Such actions can

<sup>23</sup> UNEP and Copenhagen Centre for Energy Efficiency, *Best Practices and Case Studies for Industrial Energy Efficiency Improvement*, February 16, 2016.

result in direct cost savings to organizations' operations over the medium to long term and contribute to the global efforts to curb emissions.<sup>24</sup> Innovation in technology is assisting this transition; such innovation includes developing efficient heating solutions and circular economy solutions, making advances in LED lighting technology and industrial motor technology, retrofitting buildings, employing geothermal power, offering water usage and treatment solutions, and developing electric vehicles.<sup>25</sup>

### **b. Energy Source**

According to the International Energy Agency (IEA), to meet global emission-reduction goals, countries will need to transition a major percentage of their energy generation to low emission alternatives such as wind, solar, wave, tidal, hydro, geothermal, nuclear, biofuels, and carbon capture and storage.<sup>26</sup> For the fifth year in a row, investments in renewable energy capacity have exceeded investments in fossil fuel generation.<sup>27</sup> The trend toward decentralized clean energy sources, rapidly declining costs, improved storage capabilities, and subsequent global adoption of these technologies are significant. Organizations that shift their energy usage toward low emission energy sources could potentially save on annual energy costs.<sup>28</sup>

### **c. Products and Services**

Organizations that innovate and develop new low-emission products and services may improve their competitive position and capitalize on shifting consumer and producer preferences. Some examples include consumer goods and services that place greater emphasis on a product's carbon footprint in its marketing and labeling (e.g., travel, food, beverage and consumer staples, mobility, printing, fashion, and recycling services) and producer goods that place emphasis on reducing emissions (e.g., adoption of energy-efficiency measures along the supply chain).

### **d. Markets**

Organizations that pro-actively seek opportunities in new markets or types of assets may be able to diversify their activities and better position themselves for the transition to a lower-carbon economy. In particular, opportunities exist for organizations to access new markets through collaborating with governments, development banks, small-scale local entrepreneurs, and community groups in developed and developing countries as they work to shift to a lower-carbon economy.<sup>29</sup> New opportunities can also be captured through underwriting or financing green bonds and infrastructure (e.g., low-emission energy production, energy efficiency, grid connectivity, or transport networks).

### **e. Resilience**

The concept of climate resilience involves organizations developing adaptive capacity to respond to climate change to better manage the associated risks and seize opportunities, including the ability to respond to transition risks and physical risks. Opportunities include improving efficiency, designing new production processes, and developing new products. Opportunities related to resilience may be especially relevant for organizations with long-lived fixed assets or extensive supply or distribution networks; those that depend critically on utility and infrastructure networks or natural resources in their value chain; and those that may require longer-term financing and investment.

<sup>24</sup> Environmental Protection Agency Victoria (EPA Victoria), "Resource Efficiency Case Studies: Lower your Impact."

<sup>25</sup> As described by Pearce and Turner, circular economy refers to a system in which resource input and waste, emission, and energy leakage are minimized. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling. This is in contrast to a linear economy which is a "take, make, dispose" model of production.

<sup>26</sup> IEA, "Global energy investment down 8% in 2015 with flows signaling move towards cleaner energy," September 14, 2016.

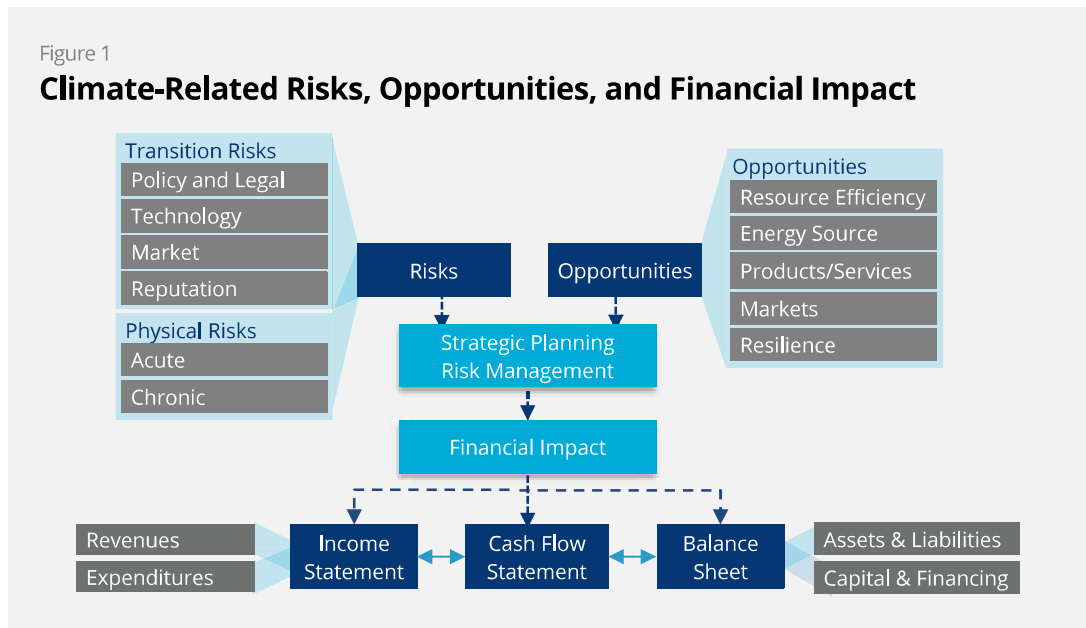
<sup>27</sup> Frankfurt School-United Nations Environmental Programme Centre and Bloomberg New Energy Finance, "Global Trends in Renewable Energy Investment 2017," 2017.

<sup>28</sup> Ceres, "Power Forward 3.0: How the largest US companies are capturing business value while addressing climate change," 2017.

<sup>29</sup> G20 Green Finance Study Group. *G20 Green Finance Synthesis Report*. 2016. The proposal to launch the Green Finance Study Group was adopted by the G20 Finance Ministers and Central Bank Deputies in December 2015.

### 3. Financial Impacts

Better disclosure of the financial impacts of climate-related risks and opportunities on an organization is a key goal of the Task Force’s work. In order to make more informed financial decisions, investors, lenders, and insurance underwriters need to understand how climate-related risks and opportunities are likely to impact an organization’s future financial position as reflected in its income statement, cash flow statement, and balance sheet as outlined in Figure 1. While climate change affects nearly all economic sectors, the level and type of exposure and the impact of climate-related risks differs by sector, industry, geography, and organization.<sup>30</sup>



Fundamentally, the financial impacts of climate-related issues on an organization are driven by the specific climate-related risks and opportunities to which the organization is exposed and its strategic and risk management decisions on managing those risks (i.e., mitigate, transfer, accept, or control) and seizing those opportunities. The Task Force has identified four major categories, described in Figure 2 (p. 9), through which climate-related risks and opportunities may affect an organization’s current and future financial positions.

The financial impacts of climate-related issues on organizations are not always clear or direct, and, for many organizations, identifying the issues, assessing potential impacts, and ensuring material issues are reflected in financial filings may be challenging. Key reasons for this are likely because of (1) limited knowledge of climate-related issues within organizations; (2) the tendency to focus mainly on near-term risks without paying adequate attention to risks that may arise in the longer term; and (3) the difficulty in quantifying the financial effects of climate-related issues.<sup>31</sup> To assist organizations in identifying climate-related issues and their impacts, the Task Force developed Table 1 (p. 10), which provides examples of climate-related risks and their potential financial impacts, and Table 2 (p. 11), which provides examples of climate-related opportunities and their potential financial impacts. In addition, Section A.4 in the Annex provides more information on the major categories of financial impacts—revenues, expenditures, assets and liabilities, and capital and financing—that are likely to be most relevant for specific industries.

<sup>30</sup> SASB research demonstrates that 72 out of 79 Sustainable Industry Classification System (SICS™) industries are significantly affected in some way by climate-related risk.

<sup>31</sup> World Business Council for Sustainable Development, “Sustainability and enterprise risk management: The first step towards integration.” January 18, 2017.

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Figure 2

## Major Categories of Financial Impact

Income Statement	Balance Sheet
<p><b>Revenues.</b> Transition and physical risks may affect demand for products and services. Organizations should consider the potential impact on revenues and identify potential opportunities for enhancing or developing new revenues. In particular, given the emergence and likely growth of carbon pricing as a mechanism to regulate emissions, it is important for affected industries to consider the potential impacts of such pricing on business revenues.</p> <p><b>Expenditures.</b> An organization's response to climate-related risks and opportunities may depend, in part, on the organization's cost structure. Lower-cost suppliers may be more resilient to changes in cost resulting from climate-related issues and more flexible in their ability to address such issues. By providing an indication of their cost structure and flexibility to adapt, organizations can better inform investors about their investment potential.</p> <p>It is also helpful for investors to understand capital expenditure plans and the level of debt or equity needed to fund these plans. The resilience of such plans should be considered bearing in mind organizations' flexibility to shift capital and the willingness of capital markets to fund organizations exposed to significant levels of climate-related risks. Transparency of these plans may provide greater access to capital markets or improved financing terms.</p>	<p><b>Assets and Liabilities.</b> Supply and demand changes from changes in policies, technology, and market dynamics related to climate change could affect the valuation of organizations' assets and liabilities. Use of long-lived assets and, where relevant, reserves may be particularly affected by climate-related issues. It is important for organizations to provide an indication of the potential climate-related impact on their assets and liabilities, particularly long-lived assets. This should focus on existing and committed future activities and decisions requiring new investment, restructuring, write-downs, or impairment.</p> <p><b>Capital and Financing.</b> Climate-related risks and opportunities may change the profile of an organization's debt and equity structure, either by increasing debt levels to compensate for reduced operating cash flows or for new capital expenditures or R&amp;D. It may also affect the ability to raise new debt or refinance existing debt, or reduce the tenor of borrowing available to the organization. There could also be changes to capital and reserves from operating losses, asset write-downs, or the need to raise new equity to meet investment.</p>

The Task Force encourages organizations to undertake both historical and forward-looking analyses when considering the potential financial impacts of climate change, with greater focus on forward-looking analyses as the efforts to mitigate and adapt to climate change are without historical precedent. This is one of the reasons the Task Force believes scenario analysis is important for organizations to consider incorporating into their strategic planning or risk management practices.

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Table 1

## Examples of Climate-Related Risks and Potential Financial Impacts

Type	Climate-Related Risks <sup>32</sup>	Potential Financial Impacts
<b>Transition Risks</b>  A Introduction  B Climate-Related Risks, Opportunities, and Financial Impacts  C Recommendations and Guidance  D Scenario Analysis and Climate-Related Issues  E Key Issues Considered and Areas for Further Work  F Conclusion  Appendices	<b>Policy and Legal</b> <ul style="list-style-type: none"> <li>– Increased pricing of GHG emissions</li> <li>– Enhanced emissions-reporting obligations</li> <li>– Mandates on and regulation of existing products and services</li> <li>– Exposure to litigation</li> </ul>	<ul style="list-style-type: none"> <li>– Increased operating costs (e.g., higher compliance costs, increased insurance premiums)</li> <li>– Write-offs, asset impairment, and early retirement of existing assets due to policy changes</li> <li>– Increased costs and/or reduced demand for products and services resulting from fines and judgments</li> </ul>
	<b>Technology</b> <ul style="list-style-type: none"> <li>– Substitution of existing products and services with lower emissions options</li> <li>– Unsuccessful investment in new technologies</li> <li>– Costs to transition to lower emissions technology</li> </ul>	<ul style="list-style-type: none"> <li>– Write-offs and early retirement of existing assets</li> <li>– Reduced demand for products and services</li> <li>– Research and development (R&amp;D) expenditures in new and alternative technologies</li> <li>– Capital investments in technology development</li> <li>– Costs to adopt/deploy new practices and processes</li> </ul>
	<b>Market</b> <ul style="list-style-type: none"> <li>– Changing customer behavior</li> <li>– Uncertainty in market signals</li> <li>– Increased cost of raw materials</li> </ul>	<ul style="list-style-type: none"> <li>– Reduced demand for goods and services due to shift in consumer preferences</li> <li>– Increased production costs due to changing input prices (e.g., energy, water) and output requirements (e.g., waste treatment)</li> <li>– Abrupt and unexpected shifts in energy costs</li> <li>– Change in revenue mix and sources, resulting in decreased revenues</li> <li>– Re-pricing of assets (e.g., fossil fuel reserves, land valuations, securities valuations)</li> </ul>
	<b>Reputation</b> <ul style="list-style-type: none"> <li>– Shifts in consumer preferences</li> <li>– Stigmatization of sector</li> <li>– Increased stakeholder concern or negative stakeholder feedback</li> </ul>	<ul style="list-style-type: none"> <li>– Reduced revenue from decreased demand for goods/services</li> <li>– Reduced revenue from decreased production capacity (e.g., delayed planning approvals, supply chain interruptions)</li> <li>– Reduced revenue from negative impacts on workforce management and planning (e.g., employee attraction and retention)</li> <li>– Reduction in capital availability</li> </ul>
	<b>Acute</b> <ul style="list-style-type: none"> <li>– Increased severity of extreme weather events such as cyclones and floods</li> </ul>	<ul style="list-style-type: none"> <li>– Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)</li> <li>– Reduced revenue and higher costs from negative impacts on workforce (e.g., health, safety, absenteeism)</li> <li>– Write-offs and early retirement of existing assets (e.g., damage to property and assets in “high-risk” locations)</li> </ul>
	<b>Chronic</b> <ul style="list-style-type: none"> <li>– Changes in precipitation patterns and extreme variability in weather patterns</li> <li>– Rising mean temperatures</li> <li>– Rising sea levels</li> </ul>	<ul style="list-style-type: none"> <li>– Increased operating costs (e.g., inadequate water supply for hydroelectric plants or to cool nuclear and fossil fuel plants)</li> <li>– Increased capital costs (e.g., damage to facilities)</li> <li>– Reduced revenues from lower sales/output</li> <li>– Increased insurance premiums and potential for reduced availability of insurance on assets in “high-risk” locations</li> </ul>

<sup>32</sup> The sub-category risks described under each major category are not mutually exclusive, and some overlap exists.

Table 2

## Examples of Climate-Related Opportunities and Potential Financial Impacts

Type	Climate-Related Opportunities <sup>33</sup>	Potential Financial Impacts
Resource Efficiency	<ul style="list-style-type: none"> <li>– Use of more efficient modes of transport</li> <li>– Use of more efficient production and distribution processes</li> <li>– Use of recycling</li> <li>– Move to more efficient buildings</li> <li>– Reduced water usage and consumption</li> </ul>	<ul style="list-style-type: none"> <li>– Reduced operating costs (e.g., through efficiency gains and cost reductions)</li> <li>– Increased production capacity, resulting in increased revenues</li> <li>– Increased value of fixed assets (e.g., highly rated energy-efficient buildings)</li> <li>– Benefits to workforce management and planning (e.g., improved health and safety, employee satisfaction) resulting in lower costs</li> </ul>
Energy Source	<ul style="list-style-type: none"> <li>– Use of lower-emission sources of energy</li> <li>– Use of supportive policy incentives</li> <li>– Use of new technologies</li> <li>– Participation in carbon market</li> <li>– Shift toward decentralized energy generation</li> </ul>	<ul style="list-style-type: none"> <li>– Reduced operational costs (e.g., through use of lowest cost abatement)</li> <li>– Reduced exposure to future fossil fuel price increases</li> <li>– Reduced exposure to GHG emissions and therefore less sensitivity to changes in cost of carbon</li> <li>– Returns on investment in low-emission technology</li> <li>– Increased capital availability (e.g., as more investors favor lower-emissions producers)</li> <li>– Reputational benefits resulting in increased demand for goods/services</li> </ul>
Products and Services	<ul style="list-style-type: none"> <li>– Development and/or expansion of low emission goods and services</li> <li>– Development of climate adaptation and insurance risk solutions</li> <li>– Development of new products or services through R&amp;D and innovation</li> <li>– Ability to diversify business activities</li> <li>– Shift in consumer preferences</li> </ul>	<ul style="list-style-type: none"> <li>– Increased revenue through demand for lower emissions products and services</li> <li>– Increased revenue through new solutions to adaptation needs (e.g., insurance risk transfer products and services)</li> <li>– Better competitive position to reflect shifting consumer preferences, resulting in increased revenues</li> </ul>
Markets	<ul style="list-style-type: none"> <li>– Access to new markets</li> <li>– Use of public-sector incentives</li> <li>– Access to new assets and locations needing insurance coverage</li> </ul>	<ul style="list-style-type: none"> <li>– Increased revenues through access to new and emerging markets (e.g., partnerships with governments, development banks)</li> <li>– Increased diversification of financial assets (e.g., green bonds and infrastructure)</li> </ul>
Resilience	<ul style="list-style-type: none"> <li>– Participation in renewable energy programs and adoption of energy-efficiency measures</li> <li>– Resource substitutes/diversification</li> </ul>	<ul style="list-style-type: none"> <li>– Increased market valuation through resilience planning (e.g., infrastructure, land, buildings)</li> <li>– Increased reliability of supply chain and ability to operate under various conditions</li> <li>– Increased revenue through new products and services related to ensuring resiliency</li> </ul>

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<sup>33</sup> The opportunity categories are not mutually exclusive, and some overlap exists.