

CLIMATE RISK: FROM PRINCIPLES TO PRACTICE

Phase 1: SASB, CDSB, and TCFD Converge on
a Global Approach to a Global Challenge



CLIMATE RISK TECHNICAL BULLETIN

ABOUT CDSB

The Climate Disclosure Standards Board (CDSB) is an international consortium of nine business and environmental NGOs committed to advancing and aligning the global mainstream corporate reporting model to equate natural capital with financial capital. It does so by offering companies a framework for reporting environmental information with the same rigor as financial information. In turn, this helps them to provide investors with decision-useful environmental information via the mainstream corporate report, enhancing the efficient allocation of capital. Collectively, we aim to contribute to more sustainable economic, social, and environmental systems. www.cdsb.net

ABOUT SASB

Established in 2011, the Sustainability Accounting Standards Board (SASB) is an independent, not-for-profit standard-setting organization that develops and maintains robust reporting standards that enable businesses around the world to identify, manage, and communicate financially-material sustainability information to their investors. SASB standards are evidence based, developed with broad market participation, and are designed to be cost-effective for companies and decision-useful for investors. For more information, visit www.sasb.org and follow us @SASB.

ABOUT THIS BULLETIN

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Sustainability Accounting Standards Board
1045 Sansome Street, Suite 450
San Francisco, CA 94111

(415) 830-9220
info@sasb.org

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INTRODUCTION

Similar to scientists reaching consensus in the 1990s about the existence and human-linked causes of climate change, economists have recently aligned on the likely economic impacts of this systemic, global risk.¹ A “business as usual” approach, they agree, will result in significant—and potentially “catastrophic”—economic loss. Naturally, such an outcome would also go hand in hand with consequential threats to human health, infrastructure, natural resources, energy security, and ultimately international order.

Piercing this troubling backdrop, the climate agreement reached at the 2015 Conference of the Parties (COP 21) in Paris provided structure for a globally coordinated response.² The 195 countries that adopted the agreement did so not only in service of human, environmental, and ecological well-being, but also to protect against the large-scale, systemic risk that climate change poses to the global economy. Among other provisions, the agreement charged developed countries with taking the lead in mobilizing “climate finance” and noted the significant role that businesses and financial markets can—and, indeed, must—play in mitigation and adaptation efforts. As the global transition to a more resilient, low-carbon economy accelerates, meaningful progress will require extraordinary financing—far beyond what can be harnessed by governments and civil society alone.

1 Institute for Policy Integrity, *Expert Consensus on the Economics of Climate Change*, New York University School of Law (December 2015).

2 United Nations, “Paris Agreement” (December 2015).

Meanwhile, complementary efforts, including the Sustainable Development Goals, have helped rally capital markets to address climate change, spurring businesses and investors to take important—albeit early—steps toward improving their climate-related performance. (See “Sustainable Development Goals” sidebar.) Like the Paris Agreement, the SDGs recognize the role of markets as a powerful mechanism to connect financing with opportunity, thus transforming global ambition into global action.

Sustainable Development Goals

Private-sector climate action has been motivated by the Sustainable Development Goals (SDGs), which were established in 2015 by the UN to provide a common set of economic, social, and environmental outcomes that governments, non-profits, companies, and investors can work together to achieve. Including a focus on urgent action to combat climate change and its impacts, 15 out of the 17 goals are investible, enabling private capital to play a crucial role. Indeed, UNCTAD estimates the need for \$5 to \$7 trillion a year will be required to realize the SDGs by 2030, including investments in infrastructure, clean energy, agriculture, water, and sanitation.[†] Today, 78% of institutions integrating or considering sustainable investing are also at least considering an alignment with the SDGs as part of their investment strategy.^{††} Meanwhile, more than four in 10 of the world’s largest companies have begun connecting their sustainability activities directly to the SDGs,^{†††} and climate action is the most frequently referenced of the goals.^{††††}

[†] UNCTAD (2014), World Investment Report 2014. Investing in the SDGs: An action plan, p. xi. and UNFCCC (2017), Bridging Climate Ambition and Finance Gaps. Press Release.

^{††} Morgan Stanley, Sustainable Signals (June 13, 2018).

^{†††} KPMG, The Road Ahead: The KPMG Survey of Corporate Responsibility Reporting 2017 (October 2017).

^{††††} PwC, SDG Reporting Challenge 2017 (2017).

However, prompting capital markets to direct adequate financing toward large-scale mitigation and adaptation efforts requires that companies and investors better understand the interrelated economic and environmental impacts of their investments. To that end, a variety of initiatives have emerged that call for enhanced transparency, which in turn will “lead to smarter, more efficient allocation of capital, and help smooth the transition to a more sustainable, low-carbon economy.”³ Perhaps chief among these initiatives is the set of recommendations set forth by the Financial Stability Board’s Task Force on Climate-related Financial Disclosures (TCFD) in 2017, which have since garnered broad support within the global capital markets.

The embrace of the recommendations —by investors, corporations, governments, and others—is largely due to their focus on the climate-related impacts that are financially material to business. In other words, they zero in on risks and opportunities

that can mutually benefit companies, investors, and society at large. (See “Materiality Unlocks Win-Win Scenarios” sidebar.) In so doing, the TCFD recommendations facilitate mainstream participation in the low-carbon transition and thus are positioned to unlock large-scale impact.

Although the TCFD guidance is largely principles-based, practical tools exist to implement the recommendations—most notably, those resources developed over many years by the Climate

Materiality Unlocks Win-Win Scenarios

Energy consumption can indirectly contribute to climate change and air pollution because it involves the combustion of fossil fuels by utilities. Meanwhile, energy consumption also accounts for approximately 9 percent of revenue in the Iron & Steel industry, where operating profit margins average about 10 percent. Energy management is therefore a business-critical issue for companies in the industry—and an example of how financially material sustainability factors can help align the interests of business, investors, and society at large.

Applying statistical techniques to the 30 percent of iron and steel companies that currently report energy management metrics, SASB created a normal distribution of results for all companies in the industry. The results indicate that if companies in the bottom half of performance improved their energy consumption per dollar of revenue to the industry average, not only would they deliver significant environmental benefits, their operating margins would improve by 3.6 percent of revenue—or 36 percent.

Disclosure Standards Board (CDSB) and the Sustainability Accounting Standards Board (SASB). Together, these market-tested resources can improve the quality of climate-related corporate reporting, providing crucial information to decision makers at all levels. Such data points—taken individually and in aggregate—can be used to inform performance management within companies, investment allocation within portfolios, macroprudential regulation across capital markets, and climate-related policymaking efforts more broadly. By explicitly connecting the dots between climate change and financial outcomes, this information can help these decision makers better identify, understand, and manage an emerging and rapidly evolving set of 21st century risks and opportunities.

Like the TCFD recommendations, CDSB and SASB offerings are focused on a financially based conception of materiality, are globally applicable, and are suitable for use in multiple reporting locations, including financial filings, annual reports, and sustainability reports. Beginning with this document, SASB and CDSB present a TCFD-ready approach to climate-related disclosure in two phases, as follows:

- **Phase 1:** This document provides an overview of updated CDSB and SASB resources and explains how

³ Michael R. Bloomberg, Letter to Financial Stability Board Chairman Mark Carney, *Recommendations of the Task Force on Climate-related Financial Disclosures* (June 15, 2017).

they are aligned with the TCFD. Because these tools can only be useful if they are connected in a meaningful way to the interests of financial markets, this document clearly establishes those links using a Climate Risk Map that identifies the channels through which an organization's climate-related risks and opportunities may impact its financial statements. The paper also provides examples of how the SASB Standards have been used by investors to address climate risk, and how they may be further used to inform emerging initiatives, such as the European Commission's Action Plan for Sustainable Finance—an effort that is likely to serve as a blueprint for a global approach.

- **Phase 2:** A follow-on document will present a comprehensive view of climate risk on an industry-specific basis, including a full set of recommended climate-related topics and metrics designed to help companies fulfill the "Metrics & Targets" recommendations of the TCFD. Such reporting will provide the capital markets with comparable, consistent, and reliable information about how companies are managing their financially material climate-related risks. These performance metrics will draw from the codified SASB Standards, which are expected to be released later in 2018.

The materiality-focused alignment among the CDSB Framework, the SASB Standards, and the TCFD recommendations establishes a coherent foundation for a global standard to address climate risk in financial markets.

For market participants—including companies, investors, exchanges, regulators, and others—the time has come for understanding to give way to action. Their efforts will play an important role in catalyzing a critical economic transition and enabling more focused companies; better informed investors; and more efficient, stable, and resilient markets.

A FRAGMENTED LANDSCAPE

Investors and companies recognize that global capital markets have a significant role to play in transitioning to a low-carbon economy. As markets look to align with the SDGs, and countries work to fulfill and improve their nationally determined contributions (NDCs) to the global climate effort, a variety of such initiatives seek to spur businesses to improve their climate-related performance, their climate-related disclosure, or both (Table 1).

Table 1. Select Approaches to Addressing Corporate Climate Risk

Initiative	Description	Participation
Companies		
Science-Based Targets sciencebasedtargets.org	Initiative that “champions science-based target setting as a powerful way of boosting companies’ competitive advantage in the transition to the low-carbon economy.”	At least 454 companies—including many of the world’s largest, such as Walmart, Nestlé, Dell, Sony, and PepsiCo ^(a)
RE100 there100.org	Collaborative, global initiative “working to massively increase demand for—and delivery of—renewable energy.”	More than 140 influential companies—such as Apple, General Motors, IKEA, AB InBev, and Kellogg’s—have committed to use 100 percent renewable electricity. ^(b)
America’s Pledge americaspledgeonclimate.com	U.S. companies, along with cities, states, and communities, have pledged to uphold the country’s NDCs to the Paris Agreement despite faded support from federal government.	More than 1,361 businesses with U.S. operations, representing \$25 trillion in market capitalization and accounting for 14 percent of U.S. emissions, have adopted voluntary GHG emissions targets ^(c)
Investors		
Ceres Investor Network on Climate Risk and Sustainability ceres.org/networks/ceres-investor-network	U.S.-based investor group working to advance best practices, corporate engagement strategies, and policy solutions related to climate risk.	More than 160 institutional investors, representing more than \$25 trillion in assets under management ^(d)
Institutional Investors Group on Climate Change (IIGCC) iigcc.org	Collaborative platform for European investors to encourage public policies, investment practices, and corporate behavior that address long-term risks related to climate change.	More than 150 members, representing approximately \$22 trillion in assets under management ^(e)
Stock Exchanges		
Sustainable Stock Exchanges sseinitiative.org	Initiative to build the capacity of stock exchanges and securities market regulators to promote responsible investment in sustainable development and advance corporate performance on ESG issues.	50 global stock exchanges have now published—or have committed to publish—guidance for listed companies on making effective ESG disclosure. ^(f)
World Federation of Exchanges (WFE), “ESG Guidance and Metrics” world-exchanges.org	Published document in June 2018 as a reference point for exchanges looking to introduce, improve, or require ESG reporting in their markets.	Represents over 200 market infrastructure providers, including a Sustainability Working Group comprised of 31 global stock exchanges working toward consensus on the purpose, practicality, and materiality of ESG data. ^(g)

(a) Science Based Targets website, accessed August 14, 2018.

(b) RE100 website, accessed August 14, 2018.

(c) America’s Pledge, *Phase 1 Report: States, Cities, and Businesses in the United States Are Stepping Up on Climate Action* (November 2017).

(d) Ceres website, accessed August 14, 2018.

(e) Institutional Investors Group on Climate Change (IIGCC), *2017 Year in Review* (November 29, 2017).

(f) Sustainable Stock Exchanges website, accessed August 14, 2018.

(g) World Federation of Exchanges website, accessed September 3, 2018.

Regulators ^(h)		
Directive 2014/95/EU (European Union)	2014 directive requires large companies to disclose non-financial information including policies, risks and KPIs they implement in relation to environmental and climate-related matters, amongst other sustainability factors.	The directive compels climate-related (and other) disclosure from approximately 6,000 large companies across Europe and, although reporting has increased, the law has been applied inconsistently across member states. ⁽ⁱ⁾
U.S. Securities and Exchange Commission (SEC) guidance regarding disclosure related to climate change	2010 guidance suggests that a duty to disclose material climate-related information may arise under the existing requirements of Regulation S-K. For example, Item 303 requires that companies describe known trends, events, and uncertainties that are reasonably likely to have material impacts on their financial condition or operating performance in the MD&A section of Form 10-K.	A review of SEC filings indicates that, although companies frequently acknowledge climate-related risks, more than half of such disclosure consists of boilerplate language and less than a quarter includes performance metrics. ^(j)
Article 173 of the Energy Transition for Green Growth Law (France)	Article 173, enacted in 2015, compels listed companies to disclose in their annual report: <ul style="list-style-type: none"> • Financial risks related to the effects of climate change • The measures adopted by the company to reduce them • The consequences of climate change on the company’s activities and of the use of goods and services it produces 	Although the French government will conduct a review of how the law is being applied later this year, early reviews indicate disclosure has been inconsistent across firms in terms of completeness and quality. ^(k)

Disclosure-based efforts largely rest on the idea that greater transparency will lead to a “race to the top” among corporations to more effectively minimize their climate-related risks and capitalize on their climate-related opportunities.

Similarly, investors will be better able to allocate capital toward businesses that create more sustainable long-term value. Meanwhile, at the market level, the net effect will be that climate-related risks and opportunities will be more efficiently priced, easing what could otherwise be a volatile economic transition.

However, a precondition for productive, market-based competition is that all participants are playing the same game. The fragmented nature of today’s climate-reporting landscape may thus be challenged to sow, ripen, and harvest the fruits of the competitive process. Companies, investors, exchanges, regulators, and others are taking disparate approaches to a common goal. In many ways, the recommendations of the TCFD arose to fill a void of leadership in coordinating these efforts.

(h) These are but a handful of examples of the climate-related and environmental disclosures that are either required or encouraged internationally. Other reporting schemes have been established in a variety of countries, perhaps most notably in Asia (India, Indonesia, Malaysia, Taiwan, Thailand, Turkey, etc.), Europe (Denmark, France, Spain, Sweden, U.K., etc.), South Africa, and South America (Brazil, Chile, Peru, etc.).

(i) Purpose of the Corporation Project, *Comparing the implementation of the EU Non-Financial Reporting Directive in the UK, Germany, France and Italy* (November 2017).

(j) Sustainability Accounting Standards Board, *Climate Risk Technical Bulletin* (October 2016).

(k) Four Twenty Seven, “Art. 173: Lessons Learned from Climate Risk Disclosures in France” (March 21, 2018).

SINGING FROM DIFFERENT SONGBOOKS

Companies

In the wake of the Paris agreement, companies around the world have voluntarily committed to a variety of initiatives aimed at decoupling economic growth from greenhouse gas (GHG) emissions. Even in the U.S., where federal government support for the Paris Agreement has waned, companies (along with cities, states, and communities) have pledged to uphold the country’s NDC.

Such voluntary action is likely to accelerate globally as the B20—the private sector’s voice in the G20 community—establishes priorities, builds consensus among business leaders, and identifies practical policies in coming years. In a 2017 policy paper, the B20 stated it “welcomes the G20’s prioritization of Green Finance” and called on the G20 to promote greater coherence of related concepts and disclosure while working to remove regulatory hurdles.⁴ Under Argentina’s leadership in 2018 and Japan’s in 2019, the B20 will continue to address its climate adaptation agenda in the context of key G20 priorities, such as aligning and mobilizing financial flows for the implementation of NDCs and low-emission development strategies.

Meanwhile, companies have made efforts to improve their climate-related reporting using a variety of frameworks—including those of SASB, CDSB, CDP, the Global Reporting Initiative (GRI), the International Integrated Reporting Council (IIRC), and others—often referred to as the “alphabet soup” of sustainability reporting. In the absence of a market standard, however, the quality of such disclosure has improved only incrementally

4 B20 Taskforce on Financing Growth & Infrastructure, *Investing in Resilient, Future-oriented Growth: Boosting Infrastructure Investment and Balancing Financial Regulation* (March 2017).

despite a rapid increase in the volume of information. For example, although about half of the world's 250 largest companies now acknowledge the financial risk of climate change in their annual reports, just 2 percent of those firms quantify that risk, and only 3 percent model the impacts using scenario analysis.⁵

Investors

Although these business-led efforts are valuable, in many cases they may be too narrowly focused to address financial risks within a portfolio or to the markets at large. For example, thus far, voluntary activity among corporations has largely centered on reducing carbon footprints, and much of the discussion around “climate finance”—including that of the B20—has centered primarily on niche instruments such as “green bonds.” These approaches can—and likely will—make important contributions to global mitigation and adaptation efforts, but investors increasingly recognize that financially material climate risks extend far beyond a company's GHG emissions, and they increasingly demand that climate solutions be embedded not just in parts of but rather throughout the global financial infrastructure.

Indeed, the role of business in addressing climate change is likely to be shaped in large part by the investor community, which provides most of the financial capital that fuels the global economy. Institutional investors have called climate change “one of the greatest long-term risks we face in our portfolio,”⁶ the mitigation of which is “essential for the safeguarding of our investments.”⁷

As climate-related uncertainty has increased, large investors—such as pension funds, investment funds, insurance companies, foundations, endowments, and others—have begun to explore various approaches to managing this risk and capitalizing on its upside potential. Globally, a group of 409 institutional investors, collectively managing more than \$24 trillion in assets, has issued a statement pledging their commitment to meaningfully address climate risk and calling on international governments for stronger political leadership and more ambitious policies.⁸

Increasingly, these investors recognize that a company's carbon footprint “is an essential first step in understanding carbon efficiency of past operations, but it has a blind spot in regard to future carbon pricing risk exposure.”⁹ Thus, investors have begun to call for more complete, sophisticated, and often indus-

try-specific approaches to measuring, managing, and reporting climate-related risks and opportunities.

Stock Exchanges & Regulators

Meanwhile, in response to this growing interest from investors, other market actors—primarily regulators and stock exchanges—have developed a variety of initiatives aimed at improving climate-related disclosure as a lever for improving performance. Globally, signs indicate an increasing recognition among securities regulators that many of the financial implications posed by climate change are central to their function given their three primary objectives:¹⁰

- Protecting investors;
- Ensuring markets are fair, efficient, and transparent; and
- Reducing systemic risk.

In many countries, regulators have concluded that one or more—and arguably all three—of these objectives compels them to address climate risk. Investors are vulnerable to hidden climate-related risks in their portfolios; markets are challenged to efficiently price climate-related risks due to a lack of meaningful disclosure; and, due to its nature and pervasiveness, climate change has the potential to trigger collapse within a given market or the financial system at large.

Awareness of the importance of addressing financially material climate risk is evident in the fact that all but five G20 countries now have mandatory corporate reporting schemes in place for climate-related risks—although they vary widely in scope, application, and intended reporting channel.¹¹ This “regulatory divergence” presents a key challenge for investors with global portfolios, who require some degree of standardization across jurisdictions in order to accurately assess risks and allocate capital accordingly.¹²

5 KPMG, *The Road Ahead: The KPMG Survey of Corporate Responsibility Reporting 2017* (October 2017).

6 Office of the New York State Comptroller, “New York State Comptroller DiNapoli Statement in Response to Majority Support at Exxon Annual Meeting” (May 31, 2017).

7 “Letter From Global Investors to Governments of the G7 and G20 Nations” (May 8, 2017), accessed June 5, 2017, at <http://aigcc.net/wp-content/uploads/2017/05/22-May-Updated-Global-Investor-Letter-to-G7andG20-Governments.pdf>.

8 Global Investor Statement on Climate Change (September 2014).

9 TruCost/S&P Dow Jones Indices, “Carbon Pricing: Discover Your Blind Spots on Risk and Opportunity” (January 2018).

10 International Organization of Securities Commissions (IOSCO), *Objectives and Principles of Securities Regulation* (May 2017).

11 See, for example: United Kingdom, The Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013 (SI 1970), available from: www.legislation.gov.uk/uksi/2013/1970/made; Denmark, Financial Statements Act 2008 (2013), Copenhagen, available from: www.retsinformation.dk/Forms/R0710.aspx?id=158560; Institute of Directors in Southern Africa (2009) King code of governance for South Africa King III, available from: <http://www.iodsa.co.za/resource/collection/94445006-4F18-4335-B7FB-7F5A8B23FB3F/KingCodeofGovernanceforSA2009UpdatedJune2012.pdf>; France, LOI no 2010-788 du 12 Juillet 2010 portant engagement national pour l'environnement Grenelle II (2010), Paris, available from: www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000022470434; Canadian Securities Administrators (2010) Environmental reporting guidance, available from: www.securities-administrators.ca/aboutcsa.aspx?id=928; U.S. Securities and Exchange Commission (2010), Commission guidance regarding disclosure related to climate change, available from: www.sec.gov/rules/interp/2010/33-9106.pdf.

12 ClientEarth, *Mobilising IOSCO to take action on the TCFD recommendations* (August 2018).

THE INFLUENCE OF THE TCFD RECOMMENDATIONS

Although companies, investors, regulators, exchanges, and others have made progress in promoting improved performance and enhanced transparency related to climate-related risks, the lack of alignment among their approaches has limited their utility in global capital markets that serve companies and investors with multinational interests. This state of affairs helped clarify a need for global markets to “provide a common set of principles that should help existing disclosure regimes come into closer alignment over time.”¹³

In 2015, the Financial Stability Board (FSB) established the Task Force on Climate-related Financial Disclosures (TCFD), citing a need for consistent, comparable, clear, and reliable corporate disclosure of climate-related information to support informed decision-making by investors, lenders, and insurance underwriters. In developing recommendations for such disclosure, which the TCFD released in June 2017, the FSB aimed to ensure more stable, resilient markets over the medium and long term by facilitating a smoother transition—with less abrupt price adjustments—to a lower-carbon economy.

By mid-2018, more than 400 companies with a combined market capitalization of over \$7.1 trillion had publicly expressed support for the TCFD recommendations.¹⁴ Meanwhile, nearly 400 investors managing more than \$22 trillion in assets had also done so.¹⁵ Located in 40 countries on six continents, supporters of TCFD span a variety of industries, investors, trade associations, central banks, regulators and national governments. This embrace of the TCFD by broad swaths of the global capital markets is why the EU High Level Expert Group on Sustainable Finance called TCFD “the first industry-led framework with the potential to become a ‘new normal’ of climate disclosure.”¹⁶

Similarly, in a 2017 policy paper, the B20 called TCFD the “first step towards an internationally accepted standard in climate-related financial disclosure” and suggested the G20 “encourage its members to build on the TCFD recommendations and work towards their implementation, in particular through harmonized metrics endorsed by relevant industries and business associations.”¹⁷ The TCFD recommendations are therefore likely to be a key consideration of worldwide efforts to enhance climate-related disclosure.

13 TCFD, “Recommendations of the Task Force on Climate-related Financial Disclosures” (December 2016).

14 Task Force on Climate-Related Financial Disclosures (TCFD) website, “FAQ: Supporting the TCFD recommendations” (accessed August 13, 2018).

15 TCFD website, “Support Through Additional Initiatives and Organizations” (accessed August 13, 2018).

16 EU High Level Expert Group on Sustainable Finance (HLEG), *Financing a Sustainable European Economy* (January 2018).

17 B20 Taskforce on Financing Growth & Infrastructure, *Investing in Resilient, Future-oriented Growth: Boosting Infrastructure Investment and Balancing Financial Regulation* (March 2017).

THE ROLE OF CDSB AND SASB RESOURCES

In light of the potential to apply the TCFD recommendations in the context of national, regional, and international disclosure initiatives, market participants—including companies, investors, regulators, and others—are also likely to benefit from considering the practical tools that exist to implement the TCFD recommendations. Among these, the Climate Disclosure Standards Board (CDSB) and the Sustainability Accounting Standards Board (SASB)—two of the most extensively referenced organizations throughout the TCFD recommendations—have, over time, each developed approaches for companies to use in identifying, assessing, and reporting their performance on climate-related issues. Working together, SASB’s sustainability accounting standards and CDSB’s Framework for Reporting Environmental Information, Natural Capital and Associated Business Impacts complement each other to ensure a company can more easily integrate climate factors into a mainstream financial filing and fulfill the recommendations of the TCFD.

SASB and CDSB have demonstrated the considerable alignment of their work with the TCFD recommendations,¹⁸ and continue to refine their approaches to improve harmonization. For example, CDSB has recently mapped the four core elements of the TCFD recommendations to its Framework’s reporting requirements, while SASB is in the process of updating its standards to more fully overlap with all aspects of the TCFD guidance. (See the following section, “TCFD: Promoting Alignment,” for more information.)

The value of the CDSB Framework and the SASB Standards is enhanced by the fact that these initiatives have begun to gain significant traction in global markets. For example, the CDSB Framework is used in 32 countries—most commonly in the United Kingdom—by 374 companies across 10 sectors with a combined market capitalization of \$5.2 trillion. Further, the Framework is well established in the E.U. regulatory environment with references in the guidance on the E.U.’s Non-Financial Reporting Directive (“NFR Directive”),¹⁹ the UK Companies Act environmental reporting guidelines,²⁰ and the London Stock Exchange and Borsa Italiana ESG Guidance.²¹

Meanwhile, a growing number of global companies—including S&P 500 firms such as GM,²² NRG,²³ Kellogg’s,²⁴ CBRE Group,

18 Climate Disclosure Standards Board (CDSB) and Sustainability Accounting Standards Board (SASB), *Converging on Climate Risk: CDSB, the SASB, and the TCFD* (September 2017).

19 European Commission, Guidelines on Non-Financial Reporting (June 2017).

20 UK Department for Environment Food & Rural Affairs, *Environmental Reporting Guidelines: Including mandatory greenhouse gas emissions reporting guidance* (June 2013).

21 London Stock Exchange Group, *Revealing the Full Picture: Your Guide to ESG Reporting* (January 2018).

22 General Motors, *2017 Sustainability Report* (June 2018).

23 NRG, *Sustainability Report 2017* (April 26, 2018).

24 Kellogg’s, Full Year 2017 Sustainability Accounting Standard Board (SASB) Disclosure (May 2018).

²⁵ Host Hotels,²⁶ Medtronic,²⁷ Digital Realty Trust,²⁸ and Nike²⁹—have already begun to integrate the SASB Standards into their financial filings, sustainability reports, and other core communications to investors, despite the fact that SASB won't officially codify its standards until later this year. ³⁰ Likewise, investors have begun to incorporate the SASB Standards into their investment analyses and decision-making processes. (See "Investor Use Cases," Page 26.) Since 2016, 32 institutional investors representing combined assets under management of \$26.2 trillion, have joined SASB's Investor Advisory Group (IAG), which comprises leading asset owners and asset managers who recognize the need for consistent, comparable, and reliable disclosure of financially-material, decision-useful sustainability information to investors. Like the CDSB Framework, the SASB Standards have also been recognized by the European Commission as a suitable framework for compliance with the NFR Directive.³¹

As standard-setters, stock exchanges, regulators, and policy-makers work to shape the future of climate reporting—and as companies and investors use their voices to influence this effort—they can create valuable efficiencies by leveraging existing resources as a starting point in their efforts.

The TCFD recommendations and related practical tools provided by SASB and CDSB are informed by years of technical research and stakeholder input, lending each a level of credibility that obviates any need to "reinvent the wheel."

Given the importance of climate risk and the surge of related activity in financial markets, the remainder of this document highlights key aspects of the TCFD recommendations, the SASB Standards, and the CDSB Framework and how they are aligned. A follow-on document will then seek to help those parties taking action to evaluate and—where appropriate—incorporate these important tools into efforts to integrate climate-related risks into the inputs, processes, and products of financial markets.

²⁵ CBRE Group, *2017 Corporate Responsibility Report* (June 27, 2018).

²⁶ Host Hotels & Resorts, FY 2017 Form 10-K, February 27, 2018.

²⁷ Medtronic, *FY17 GRI Supplement*, November 2, 2017.

²⁸ Digital Realty Trust, FY 2017 Form 10-K, February 26, 2018.

²⁹ Nike, *FY16/17 Sustainable Business Report*, May 14, 2018.

³⁰ An analysis of SEC filings for fiscal year 2016 revealed 805 instances of companies disclosing information on SASB metrics across all sectors, including 15 companies—most of them 20-F filers, such as Diageo and Deutsche Bank—that provided disclosure on at least half of the metrics included in the provisional SASB standard for their industry.

³¹ European Commission, *Guidelines on Non-Financial Reporting* (June 2017).

Policy-making Use Case: Leveraging SASB and CDSB to Apply the TCFD Recommendations

Although the TCFD, SASB, and CDSB tools were designed primarily for use by reporting entities, they may also provide useful inputs to the work of many ongoing efforts, including those of exchanges, regulators, and policymakers. For example, the European Commission issued an Action Plan on sustainable finance in March 2018 with several overarching goals, including “to manage financial risks stemming from climate change, resource depletion, environmental degradation and social issues.” The Action Plan notes that newly revised guidelines for the NFR Directive “should provide further guidance to companies on how to disclose climate-related information, in line with the Financial Stability Board’s Task Force on Climate-related Financial Disclosure.”⁽ⁱ⁾ The TCFD recommendations—and the implementation tools provided by SASB and CDSB—are therefore likely to inform the EU’s ongoing efforts to improve climate disclosure and near objectives such as developing a climate taxonomy.

- Improving climate-related disclosure: In 2018, the EU High Level Experts Group noted that “A transparent financial system is a prerequisite for sustainable finance.”⁽ⁱⁱ⁾ Indeed, by facilitating disclosure of high-quality climate-related performance information, European policymakers can strengthen the foundation upon which all their sustainable finance objectives rest. As the EU works to establish key performance indicators to improve climate-related disclosure, the TCFD-aligned tools and resources of CDSB and SASB can play an essential role. Through many years of work, involving rigorous, evidence-based research and extensive market outreach, these organizations have established a practical roadmap for identifying, assessing, and reporting information on climate-related risks and opportunities in a way that not only upholds the TCFD recommendations, but is also cost-effective for preparers and useful for decision makers.
- Developing a climate taxonomy: The TCFD’s focus on material financial impacts of climate change may provide a practical lens through which to classify climate risks and opportunities into a practical taxonomy.⁽ⁱⁱⁱ⁾ Similarly, the SASB Standards are underpinned by a rigorously developed materiality framework that establishes the areas in which corporate issuers of financial securities have their most significant sustainability impacts, including those related to climate change mitigation, adaptation, and other environmental activities. Indeed, as outlined in the CDSB Framework,^(iv) in order for climate-related activities to be meaningfully cross-referenced against targets, performance must be comparable among similar organizations. SASB’s Materiality Map™ identifies key areas of focus for companies in each of 77 different Sustainable Industry Classification System™ (SICS™) industries, enhancing comparability and enabling performance thresholds to be tailored to industry-specific impacts and baselines. Thus, the Map—supported by the SASB metrics—may serve as a useful starting point for consideration when developing a sustainable finance taxonomy, including one focused on climate risk.
- Developing low-carbon indices: The Materiality Map™ and SASB metrics may also help the EU establish an effective methodology for constructing low-carbon benchmarks that promote long-term investing and are aligned with the NDC of the EU and its 28 member states. Investors have pointed to a variety of shortcomings of existing low-carbon indices, including a tendency to focus solely on carbon reserves and direct emissions. To address this and other concerns, alternative methodologies can be considered that are rooted in transparent performance data on a range of financially material climate-related factors. Improved climate-related metrics—such as SASB’s performance-based approach to measuring and managing indirect greenhouse gas (GHG) emissions—may also help better align a low-carbon benchmark with national or regional emissions-reduction targets.
- Establishing green bond standards: Assessing the suitability of projects, assets, and activities to be financed by labeled securities, such as green bonds, relies on the extent to which issuer use of proceeds is climate-friendly. According to HLEG, a key goal of green bond standards and labels should be to make visible those assets that need to be understood as high priority assets in a low-carbon and climate-resilient economy. In other words, such standards and labels should help identify and mobilize capital toward those projects most likely to have significant impacts on climate mitigation and adaptation efforts. Coal, steel, utility and other high carbon emitters, and even other climate-exposed companies may issue green bonds and transparently disclose the climate-beneficial use of proceeds, but investors will also want to know that the issuer is similarly transparent in their disclosure of the climate and other sustainability issues within core operations. Corporate reporting of SASB standards will help green bond buyers understand the extent to which issuers are also improving results in what is likely to be a substantially larger business with potentially larger climate impacts.

Although this use case is hypothetical, the TCFD recommendations have already informed climate-related efforts undertaken by the Canadian Securities Administrators,^(v) Moroccan Capital Market Authority,^(vi) and the Netherlands Authority for the Financial Markets,^(vii) among other securities regulators. Additionally, they have been endorsed by a growing number of global stock exchanges, including the London Stock Exchange,^(viii) Euronext,^(ix) National Stock Exchange of India, Egyptian Exchange, Singapore Exchange, Ho-Chi-Minh Stock Exchange, Chittagong Stock Exchange,^(x) and others.

i. European Commission, Action Plan: Financing Sustainable Growth (March 8, 2018).
 ii. EU High Level Expert Group on Sustainable Finance (HLEG), Financing a Sustainable European Economy (January 2018).
 iii. Climate Disclosure Standards Board, Position paper: Materiality and climate-related financial disclosures (January 2018).
 iv. CDSB, Framework for Reporting Environmental Information, Natural Capital and Associated Business Impacts; see Principle 4 (“Disclosures shall consistent and comparable”) and REQ-05 (“Performance and comparative analysis”) (April 2018).
 v. Canadian Securities Administrators, Staff Notice 51-354 Report on Climate change-related Disclosure Project (April 5, 2018).

vi. Bank Al-Maghrib et. al. Roadmap of the Moroccan Financial Sector for the Emergence of Sustainable Finance in Africa (2016).
 vii. Sustainable Finance Platform, DNB Sustainable Finance Platform’s Working Group on Climate Risk (March 2018).
 viii. London Stock Exchange Group, Revealing the Full Picture: Your Guide to ESG Reporting (January 2018).
 ix. TCFD press release, “Euronext, FSMA, NBB and Belgian Ministry of Finance Show Joint Support for the TCFD Recommendations” (March 22, 2018).
 x. TCFD website, accessed August 15, 2018

TCFD: PROMOTING ALIGNMENT

By design, the TCFD recommendations promote alignment across a variety of existing disclosure regimes, frameworks, and initiatives, including those focused on both financial and non-financial reporting. As the TCFD has stated, “The Task Force’s recommendations provide a common set of principles that should help existing disclosure regimes come into closer alignment over time.”³² (See “Harmonization Through Dialogue” sidebar.)

Among those initiatives, two in particular—CDSB and SASB—have produced, and are in the process of developing further, tools for climate-related disclosures that incorporate and align closely to the recommendations and supporting recommended disclosures of the TCFD. Furthermore, both organizations are committed to carrying the TCFD’s work forward by refining their reporting frameworks with the goal of increased harmonization.

Harmonization Through Dialogue

The Corporate Reporting Dialogue (“the Dialogue”) is an initiative designed to respond to market calls for greater coherence, consistency, and comparability between corporate reporting frameworks, standards, and related requirements. Participants include not only SASB and CDSB, but also CDP, GRI, IIRC, the Financial Accounting Standards Board (FASB), the International Financial Reporting Standards Foundation (IFRS), and the International Organization for Standardization (ISO).

The Dialogue has issued a “statement of common principles of materiality” to help identify practical ways and means by which the various frameworks, standards, and related requirements can be better aligned. Building on these efforts, over the next three years, the Dialogue plans to undertake a joint project to align all participant frameworks with each other, using the TCFD recommendations as a focal point.

By promoting this type of alignment, the TCFD recommendations can help streamline corporate reporting, thus easing confusion in the marketplace, reducing the burden on companies, and raising the signal-to-noise ratio for investors.

In part, this natural integration of the work of CDSB, SASB, and the TCFD springs from the ample common ground they occupy philosophically and technically. For example, the three organizations share identical or complementary perspectives on a variety of key issues, including their view of materiality, their accord with existing regulation, and their vision of having traditional financial disclosures and climate-related financial disclosures live side-by-side in mainstream financial filings. The approaches of CDSB, SASB, and the TCFD are:

- **Focused on materiality:** All three organizations share a financially-based view of the concept of materiality—in other words, they primarily consider those climate-related impacts related to the financial or operational performance of a company and thus to its market valuation. This is crucial given the investment shortfalls that exist in many countries. For example, Europe must close a yearly investment gap of about \$200 billion to achieve E.U. climate and energy targets by 2030.³³ (See “Focus on Materiality, Page 10.”)
- **Globally applicable within existing regulations:** The TCFD “recommendations are designed to leverage, rather than replace, existing disclosure regimes.”³⁴ Like CDSB and SASB, the Task Force explicitly “sought to balance the needs of the users of disclosures with the challenges faced by the preparers.”³⁵ One result of this effort is that all three organizations are focused on principles-based guidance, frameworks, metrics, and other tools that are broadly applicable across global jurisdictions within existing disclosure requirements, meaning their implementation places no additional regulatory burden on corporate issuers. Rather, the resources provided by CDSB, SASB, and the TCFD are intended to help companies comply more effectively with existing disclosure obligations.
- **Designed for use in mainstream financial filings:** All three organizations believe material climate-related financial disclosures should be included in existing channels of financial reporting, such as mainstream financial filings (e.g., in annual reports). By integrating this information with traditional financial statements and supporting disclosures, companies and their investors can draw clearer links between material climate-related risks and opportunities and their financial impacts.

³² TCFD, “Recommendations of the Task Force on Climate-related Financial Disclosures” (December 2016).

³³ European Commission, *Action Plan: Financing Sustainable Growth* (March 8, 2018).

³⁴ Mark Carney, “Remarks on the launch of the Recommendations of the Task Force on Climate-related Financial Disclosures,” Bank of England (December 14, 2016).

³⁵ TCFD, “Recommendations of the Task Force on Climate-related Financial Disclosures” (December 2016).

Focus on Materiality

Global climate efforts to finance sustainable growth increasingly recognize the importance of mobilizing private capital to meaningfully address sustainability challenges such as climate change. In the face of unpredictable and potentially catastrophic consequences, “the financial system ... can be part of the solution towards a greener and more sustainable economy.”[†]

Creating a truly sustainable, robust, and resilient future will naturally require extraordinary financing. Thus, such efforts must tap into the full power of the capital markets by engaging a broad spectrum of mainstream investors, lenders, and insurance underwriters, and by directing capital to where it can have its most significant impacts on climate mitigation and adaptation initiatives.

The TCFD recommendations—like the SASB Standards and the CDSB Framework—attempt to achieve these twin goals by focusing on material impacts.^{††}

1. **Mainstream acceptance:** Many sustainable finance initiatives have thus far struggled to gain widespread traction in large part because of a pervasive belief that considering environmental and social objectives is incompatible with meeting desirable investment risk and return targets. However, by focusing on the subset of climate-related impacts that are material to an issuer’s business, the TCFD, CDSB, and SASB enable investors to find the common ground between “doing well” and “doing good.” A growing body of research supports the idea that strategically focused sustainability efforts—through the lens of materiality—are a key driver of business value, leading to higher risk-adjusted stock performance, sales growth, and margins.^{†††, ††††}
2. **High-value impact:** The principle of comparative advantage says an economic entity should focus its efforts on those value-creating activities it is able to perform more efficiently than others can. By focusing on materiality, the TCFD, CDSB, and SASB extend that principle to issues of sustainability, including climate mitigation and adaptation efforts. For example, requiring banks or professional services firms to measure, manage, and report data on their greenhouse gas emissions will contribute little to the alleviation of a global temperature increase. Rather, companies in each industry should focus on the handful of key issues on which they can gain the most traction and make the biggest difference. For software companies, addressing climate change may involve the energy-intensity of data centers, whereas for automakers, it will be more about the use-phase emissions of their products. These industry-specific levers of change are not only more relevant to investors, they represent the areas where companies are best positioned to make significant contributions to local, national, regional, and global sustainability goals.

Furthermore, this approach—viewing climate risk through the lens of materiality—results in a more focused set of disclosures that are tailored to the needs of stakeholders (such as investors, lenders, and insurers) and management fulfilling their fiduciary duties, as well as financial regulators and supervisory authorities. This minimizes any undue reporting burden on companies while also improving the efficiency of investment analysis.

[†] European Commission, Action Plan: Financing Sustainable Growth (March 8, 2018).

^{††} For the purpose of standard-setting, SASB has identified sustainability topics that are reasonably likely to have a material effect on the financial condition or operating performance of companies within each Sustainable Industry Classification System (SICS). CDSB adopts and adapts the definition of and approach to materiality expressed in the International Accounting Standards Board’s (IASB’s) Conceptual Framework. Meanwhile, to ensure as much compatibility as possible with national disclosure requirements for financial filings, the TCFD encourages companies to determine the materiality of climate-related issues (particularly with respect to disclosures made under its Strategy and Metrics & Targets recommendations) in a way that is consistent with how they determine the materiality of other information included in their financial filings.

^{†††} Mozaffar Khan, George Serafeim, and Aaron Yoon, “Corporate Sustainability: First Evidence on Materiality,” *The Accounting Review*, Vol. 91, No. 6 (Nov. 9, 2016).

^{††††} Emily Steinbarth, Scott Bennett, “Materiality Matters: Targeting the ESG issues that impact performance,” Russell Investment Management Ltd. (February 2018).

FUNDAMENTAL PRINCIPLES FOR EFFECTIVE DISCLOSURE

The TCFD recommendations were established on the bedrock of seven Fundamental Principles for Effective Disclosure, which the Task Force adopted not only to underpin its own work but also to “help guide current and future developments in climate-related financial reporting.”³⁶ Those principles, discussed in more detail below, are closely aligned with the foundational concepts of both CDSB³⁷ and SASB³⁸ (see Table 2).

Table 2. Alignment of CDSB Framework and SASB Metrics with TCFD Principles

TCFD	CDSB	SASB
<i>Principles for Effective Disclosures</i> <i>Intended to "help achieve high-quality and decision-useful disclosures that enable users to understand the impact of climate change on organizations."</i>	<i>Guiding Principles and Reporting Requirements</i> <i>Principles [P] designed to ensure that environmental information in mainstream reports is useful to investors, is correct and complete and supports assurance activities. Requirements [REQ] designed to encourage standardised disclosure of environmental information that complements and supplements other information in mainstream reports.</i>	<i>SASB Criteria for Accounting Metrics</i> <i>Designed to ensure the delivery of material, decision-useful information to the capital markets in a way that is cost-effective.</i>
Disclosures should represent relevant information	[P1] Environmental information shall be prepared applying the principles of relevance and materiality	SASB metrics are applicable to most companies in the industry.
Disclosures should be specific and complete	[P2] Disclosures shall be faithfully represented	SASB metrics are complete , capturing a fair representation of performance.
Disclosures should be clear, balanced, and understandable	[P5] Disclosures shall be clear and understandable [P3] Disclosures shall be connected with other information in the mainstream report	SASB metrics are useful to decision-makers and neutral (free from bias).
Disclosures should be consistent over time	[P4] Disclosures shall be consistent and comparable	SASB metrics are comparable over time.
Disclosures should be comparable among companies within a sector, industry, or portfolio	[P4] Disclosures shall be consistent and comparable	SASB metrics are comparable across peers within an industry.
Disclosures should be reliable, verifiable, and objective	[P6] Disclosures shall be verifiable	SASB metrics are verifiable .
Disclosures should be provided on a timely basis	[REQ 9] Disclosures shall be provided on an annual basis	SASB metrics are useful to decision-makers.

36 TCFD, “Final Report: Recommendations of the Task Force on Climate-Related Financial Disclosures” (June 2017).

37 CDSB, *Framework for Reporting Environmental Information, Natural Capital and Associated Business Impacts* (April 2018).

38 SASB, *Conceptual Framework* (February 2017).

RECOMMENDED DISCLOSURES AND GENERAL GUIDANCE

The TCFD recommendations are organized by four thematic areas:

1. Governance
2. Strategy
3. Risk management
4. Metrics and targets

Wherever possible, the TCFD attempted to align its recommendations with existing voluntary and mandatory climate-related reporting frameworks, including those of CDSB and SASB.

Governance

Boards of directors and C-suite executives play an increasingly important role in addressing climate-related risks and opportunities. Accordingly, investors and other users of financial filings have a growing interest in developing a robust understanding of how an organization's governance is involved in overseeing, assessing, and managing these issues.

Governance

Disclose the organization's governance around climate-related risks and opportunities.

Recommended Disclosures:

- a) Describe the board's oversight of climate-related risks and opportunities.
- b) Describe management's role in assessing and managing climate-related risks and opportunities.

The TCFD's recommendations with respect to governance are well-aligned with Reporting Requirement 3 of the CDSB Framework, which asserts that climate-related financial disclosures should "describe the governance of environmental policies, strategy and information." As the framework explains, "successful environmental policies require the support and leadership of an organization's Board, or highest governing body." Thus, the framework calls for reporting organizations to identify the committee responsible for climate-related policies, strategy, and information; and to explain how this responsibility cascades through the organization, including how management is held accountable or incentivized to effectively implement environmental policies, such as those related to climate risk. This corresponds closely to the TCFD's recommended Governance Disclosure (a).

Additionally, Reporting Requirement 1 of the CDSB Framework calls for organizations to "report management's environmental policies, strategy and targets," including information about how they are resourced and how performance is assessed. This is closely related to the recommended Governance Disclosure (b).

Strategy

Many organizations are currently facing impacts from climate-related issues, and they are likely to increase over time, with important implications for businesses, strategy, and financial planning. Improved disclosure on the issues, their existing and anticipated impacts, and the organizational outlook will help investors and other stakeholders better understand how strategic functions are likely to be impacted over the short, medium, and long term.

The TCFD recommendations call for such disclosure to help ensure that users of mainstream financial filings can establish informed expectations about an organization's future performance. These strategy-related recommendations—which call for the identification of risks and opportunities, the description of related impacts, and the analysis of future scenarios—overlap considerably with aspects of the CDSB Framework's Reporting Requirements 2, 4, and 6.

Strategy

Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.

Recommended Disclosures:

- a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.
- b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.
- c) Describe the resilience of the organization's strategy taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

For example, Requirement 2 of the CDSB Framework calls for reporting organizations to identify and explain their current and anticipated material environmental risks and opportunities, which includes physical, regulatory, and other impacts of climate change. Further, it compels preparers to explain the implications of these impacts "in terms of operations, supply chain, business model, financial results, achievement of strategic objectives, etc." This requirement is closely analogous to the TCFD's recommended Strategy Disclosure (a).

Meanwhile, to satisfy the CDSB Framework's Requirement 4, organizations must report quantitative and qualitative information reflecting the material sources of environmental impact from operations, entities and activities within the organization's reporting boundary. Additionally, Requirement 6 asks that management summarize its "conclusions about the effect of environmental impacts, risks and opportunities on the organization's future performance and position." This includes how climate-related risks and opportunities affect the organization's capacity to innovate, execute its strategy, and create value over time. Together, these disclosures (Requirements 4 and 6) provide information that is analogous to the TCFD's recommended Strategy Disclosure (b).

Risk Management

Although some organizations have begun to apply traditional enterprise risk management (ERM) processes to the identification, assessment, and management of climate-related risks, the practice is not yet widespread or well developed.³⁹ In the absence of a robust approach to monitoring and managing these risks, organizations may face unexpected impacts to their success, profitability, or even survival. Lacking reliable information about how these risks are managed, investors and other decision makers are unable to properly evaluate the risk profile of an organization or its securities. The TCFD recommendations therefore call for disclosure on climate-related risk management practices and how they are integrated into an organization's overall ERM function.

Risk Management

Disclose how the organization identifies, assesses, and manages climate-related risks.

Recommended Disclosures:

- a) Describe the organization's processes for identifying climate-related risks.
- b) Describe the organization's processes for managing climate-related risks.
- c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.

Reporting Requirement 6 of the CDSB Framework necessitates the disclosure of management's outlook regarding the material effects of climate-related risks, including a description of the process used to identify those risks—a parallel to the TCFD's recommended Risk Management Disclosure (a).

Approaches to assessing the materiality of climate-related risks are outlined in Guiding Principle 1. Plans for managing material risks—including climate-related risks—should be disclosed according to Reporting Requirement 1; and, according to Requirement 2, climate-related risks must be explained in terms of their broader implications for the business—e.g., operations, supply chain, business model, financial results, achievement of strategic objectives, etc. By fulfilling these requirements, an organization may also satisfy the recommended Risk Management Disclosures (b) and (c).

Metrics & Targets

In addition to the more qualitative considerations related to governance, strategy, and risk management, organizations can benefit greatly from measuring and managing their performance on climate-related issues using metrics and targets. The TCFD recommendations encourage the disclosure of such information, which can help investors and other decision makers “better assess the organization's potential risk-adjusted returns, ability to meet financial obligations, general exposure to climate-related issues, and progress in managing or adapting to those issues.”⁴⁰ Importantly, such data can also facilitate the apples-to-apples comparison of organizations within a given industry or sector.

Metrics & Targets

Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.

Recommended Disclosures:

- a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.
- b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
- c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

Similarly, the CDSB Framework requires the disclosure of “qualitative and quantitative results” (Requirement 4) related to material sources of environmental impacts, which may include GHG and other emissions; energy generation, use, and consumption; land use, land-use change, and forestry activities; water use and consumption; and other measurements deemed material. This requirement is closely aligned with the TCFD's recommended Metrics & Targets disclosures (a) and (b).

Further, the framework requires organizations to disclose targets, timelines, and indicators (Requirement 1) against which its climate-related policies and strategies may be assessed. This requirement echoes the recommended Metrics & Targets disclosure (c).

Because SASB metrics are designed to capture industry-specific impacts that are financially material (according to evidence-based research and market input), organizations can incorporate these performance indicators into their strategy and risk management processes, using them for target-setting, benchmarking, and tactical performance management. The following section, which covers sector-specific guidance, includes examples of SASB metrics that can provide useful information to decision makers both inside and outside an organization.

³⁹ WBCSD, “Sustainability and enterprise risk management: The first step towards integration” (January 2017).

⁴⁰ TCFD, “Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures” (December 2016).

Supplemental Guidance for Specific Sectors

In addition to its general recommendations, the TCFD also issued sector-specific guidance for preparers in financial and non-financial sectors it considers most likely to be affected by climate change and the transition to a lower-carbon economy. This guidance acknowledges “the need to consider the variability of climate-related impacts across and within different sectors and markets.”⁴¹ The TCFD has encouraged organizations to provide metrics “tailored to their particular climate-related risks and opportunities,” and has suggested that “in determining the most relevant and useful metrics, organizations are encouraged to engage with their key stakeholders, including investors.”⁴²

The supplemental guidance is closely aligned with SASB’s approach to climate risk, which identifies the industry-specific risks and opportunities that are material to investors. Increasingly, investors understand that climate change has differentiated implications across a portfolio—for example, it is likely to affect a customer-facing professional services firm very differently than it will an upstream oil and gas exploration and production firm. Thus, today’s investors are looking to better understand the nature of their risk exposures in each industry, especially those industries in which risk is likely to have been uncompensated due to inadequate disclosure.

According to research by SASB, climate risk is likely to have material impacts on companies in 72 of 77 industries, representing \$27.5 trillion.⁴³ More specifically, SASB’s analysis showed that “transition risk”—those risks and opportunities related to mitigation and adaptation efforts—is the most prevalent type of climate risk, affecting 89 percent of companies by market cap. However, although climate risk is nearly ubiquitous, its impacts are diverse, and therefore require specialized disclosures. The SASB Standards identify performance metrics that account for climate-related performance in a way that reflects each industry’s unique perspective. Because of this, the TCFD referenced many SASB metrics in the draft of its sector-specific guidance.

Financial Sectors

Because the concentration of carbon-related assets in the financial sector is both prevalent and poorly understood, much of the TCFD’s sector-specific guidance for the financial sector is related to risk management. For example, the recommendations cite a number of relevant SASB metrics intended to provide insight into how different financial organizations integrate climate-related considerations into their lending practices, investment management, and advisory services. These include:

- **Commercial Banks:** In its draft supplemental guidance, the TCFD cited a SASB metric that calls for a discussion of the credit risk posed to a bank’s loan

41 TCFD, “Final Report: Recommendations of the Task Force on Climate-Related Financial Disclosures” (June 2017).

42 TCFD, “Recommendations of the Task Force on Climate-related Financial Disclosures” (December 2016).

43 SASB, *Climate Risk Technical Bulletin* (October 2016).

portfolio by sustainability issues, including climate change. Such disclosure is also aligned with the CDP Climate Change Information Request (CC5) and the CDSB Framework (REQ-02, Risks and opportunities).

- **Insurance:** The TCFD also cited a SASB metric that calls for a discussion of climate-related risks to the investment portfolio of an insurance company, including a description of how the organization “assesses and has identified the risks to its investment portfolio(s) presented by climate change.” Such disclosure is also aligned with the CDP Climate Change Information Request (CC5) and the CDSB Framework (REQ-02, Risks and opportunities).
- **Asset Management & Custody Activities:** The TCFD cited a SASB metric that calls for a discussion of how climate risk is integrated into investment analysis and decisions, as well as how this integration intersects with the organization’s fiduciary duties. Such disclosure is also aligned with the CDP Climate Change Information Request (CC2.2).

These are but a few examples of the overlap between the TCFD recommendations and SASB metrics, which may be appropriate for use not only in satisfying recommendations related to Risk Management in the financial sector, but also to Strategy and Metrics & Targets.

Non-Financial Sectors

The TCFD’s sector-specific guidance also extends to a handful of non-financial industries, which it expects to be most affected by the transition to a low-carbon economy, due to the role of green-house gas (GHG) emissions, energy, and/or water dependencies associated with their operations and/or products. They include the following:

- **Energy Group:** Oil & Gas, Coal, Electric Utilities
- **Transportation Group:** Air Freight, Passenger Air Transportation, Maritime Transportation, Rail Transportation, Trucking Services, Automobiles, Related Transportation Infrastructure
- **Materials & Buildings Group:** Metals & Mining, Chemicals, Construction Materials, Capital Goods, Real Estate Management & Development
- **Agriculture, Food & Forest Products Group:** Beverages, Agriculture, Packaged Foods & Meats, Paper & Forest Products

Supplemental guidance for key non-financial sectors is largely focused in the thematic areas of Strategy and Metrics & Targets. For example, although the Task Force recommends all organizations describe their impact of climate-related risks and

opportunities on businesses, strategy, and financial planning (a recommended Strategy disclosure), it asks organizations in these sector groups to disclose more detailed information related to potential impacts on revenues, expenditures, assets and liabilities, and capital planning and allocation. Similarly, the supplemental guidance for Metrics & Targets disclosures recommends the reporting of additional information related to these specific types of financial impact.

This guidance goes hand-in-hand with SASB’s approach to standardizing industry-specific performance metrics, which is also focused on specific financial impacts related to an organization’s balance sheet, income statement, and cost of capital. As such, the TCFD referenced dozens of SASB metrics in its draft guidance as examples of performance indicators that satisfy its disclosure recommendations. For examples, see Table 3.

Table 3. Examples of Alignment of SASB Metrics with TCFD Supplemental Guidance for Non-Financial Sectors

Automobiles Industry (Transportation Group)			
Financial Impact	Description	Unit of Measure	TCFD Rationale
Revenues	Sales-weighted average passenger fleet fuel economy, consumption, or emissions, by region Number of (1) zero emission vehicles (ZEV) sold, (2) hybrid vehicles sold, and (3) plug-in hybrid vehicles sold	Mpg, L/km, gCO2/km, km/L Vehicle units sold	New technologies are needed to manage transition risk as demand grows for lower-carbon product alternatives. Organizations with stronger offerings of low-carbon alternative products in their core business will be better-positioned for success in the low carbon economy.
Assets/Liabilities	Amount of total waste from manufacturing, percentage recycled Weight of end-of-life material recovered, percentage recycled Average recyclability of vehicles sold, by weight	Metric tons (t), Percentage (%) Metric tons (t), Percentage (%) Percentage (%) by sales-weighted weight (metric tons)	How an organization manages its product life cycle emissions and utilization of raw materials will provide insight into the organization’s ability to adapt to a low-carbon economy.
Real Estate Development & Management Industry (Materials & Buildings Group)			
Financial Impact	Description	Unit of Measure	TCFD Rationale
Revenues/Assets & Liabilities	Percentage of eligible portfolio that (1) has obtained an energy rating and (2) is certified to ENERGY STAR®, by property subsector	Percentage (%) by floor area (m2)	Regulatory measures such as carbon pricing as well as transition to low-carbon properties may impact the financial viability of existing properties. Understanding the percentage certified as sustainable (against relevant indices) provides investors with an indication about the potential impact of regulatory measures and demand changes on earning capacity of real estate portfolios.
Expenditures	Total energy consumed by portfolio area with data coverage, percentage grid electricity, and percentage renewable, each by property subsector	Gigajoules (GJ), Percentage (%)	The real estate industries are energy- and carbon-intensive industries in terms of the use of the properties. Understanding the levels of energy consumption by source provides an indication of the potential impacts of regulatory measures in relation to the use of certain energy sources and transition risks in a low-carbon economy scenario. In the transition to a low-carbon economy, the energy efficiency of properties provides investors with an indication of the vulnerability of the portfolio to transition risk and thus earning capacity of real estate portfolios.

Expenditures	Water withdrawal data coverage as a percentage of total floor area and percentage in regions with High or Extremely High Baseline Water Stress, each by property subsector	Percentage (%) by floor area (m2)	Water stress can result in increased cost of supply, inability to deliver water to real estate tenants, and/or legislation to regulate water consumption. The percent withdrawn in high-water-stress areas informs the risk of significant costs or limitations to this service capacity.
Assets & Liabilities	Area of properties located in in 100-year flood zones, by property subsector	Square meters (m2)/ Square Feet (ft2)	Flooding risks can result in physical damage to properties, impacting their serviceability. Understanding the relative size of properties in high-flood-risk areas by subsector informs investors about potential changes to the earning capacity of real estate portfolios.
Agriculture Industry (Agriculture, Food & Forest Products Group)			
Financial Impact	Description	Unit of Measure	TCFD Rationale
Expenditures	(1) Total water withdrawn, total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	Cubic meters (m3), Percentage (%)	Water stress can result in increased cost of supply, factual inability to produce, and/or legislation to regulate water withdrawal for production. The quantity of water consumed, and percent withdrawn in high-water-stress areas inform the risk of significant costs or limitations to production capacity.
Expenditures	(1) Gross global Scope 1 emissions (2) Biogenic carbon dioxide (CO2) emissions	Metric tons (t) CO2e	(Relatively) high carbon emissions in the value chain are expected to result in regulations (including carbon prices) to drive lower emissions from products. This can result in a significant decrease in future earning capacity.

Again, the examples listed in Table 3 are only a small sample of the SASB metrics that are well-aligned with the TCFD’s recommendations, as well as only a small sample of those specifically cited by the TCFD in its draft guidance. A full set of recommended climate-related disclosures for 77 industries will be provided in the forthcoming Phase 2 document cited in the introduction, drawing from the codified SASB Standards.

The SASB metrics referenced by the TCFD illustrate that SASB’s evidence-based, market-informed approach to metrics selection has achieved a high degree of alignment with other reporting frameworks. For example, in addition to alignment with the TCFD recommendations, many of the metrics also mirror requirements of the CDP and CDSB. For instance, disclosures made

using the SASB metrics for the Automotive industry may also satisfy CDP Climate Change Information Request AU2.3a and CDSB Framework REQ-02 (TR0101-09), and CDP Climate Change Information Request items AU1.3a-c and CC3.2 (TR0101-10). Additionally, most of the cited SASB metrics represent indicators that are commonly used within their respective industries, such as the portfolio-level metric in the Real Estate industry (IF0402-04), which is aligned with the GRESB Real Estate Assessment (Q30.2, Q31). This harmonization of SASB metrics with existing industry approaches is in line with TCFD Principle 6, which calls for the use of best-in-class measurement methodologies, such as those that constitute common industry practice.

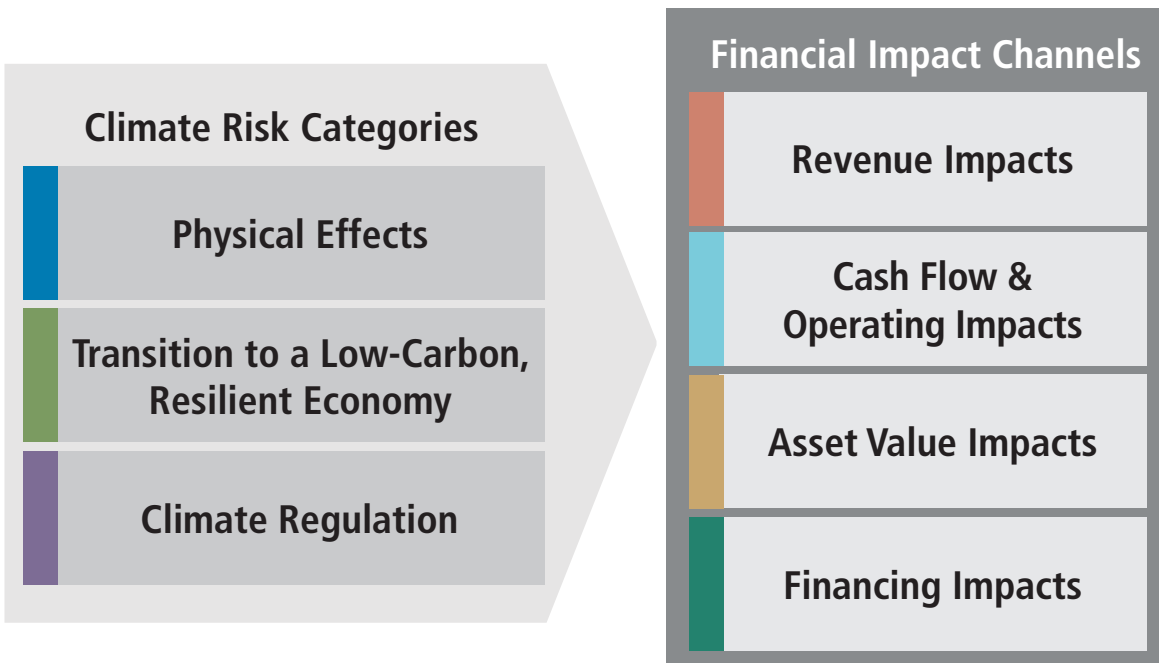
CLIMATE RISK MAP

Climate risk can affect investment returns in the near, medium, or long term. To date, however, the most common approach to evaluating the impacts of climate risk on investment portfolios has focused solely on assessing and reducing their “carbon intensity” (i.e., the Scope 1 and Scope 2 GHG emissions associated with each investment) or “divestment” from certain high-carbon industries, such as those involved in oil, gas, coal, and tar sands. These approaches are inherently limited given the ubiquity of climate risk and the wide range of impacts it has across myriad business operations.⁴⁴

Several groups have attempted to characterize the nature of climate risk for various purposes and various audiences. Few efforts, however, have approached climate risk from the perspective of an investor, directly linking climate-related impacts to corporate financial performance. The TCFD established such an approach, drawing on SASB’s work, which not only maps climate risk to specific financial impacts, but ultimately provides industry-specific metrics that enable analysis of how these impacts are being managed.

The SASB Climate Risk Map used in this document (Figure 1) addresses three distinct types of climate risk (and opportunity) and four channels of financial impact through which climate change can ultimately impact investment returns.

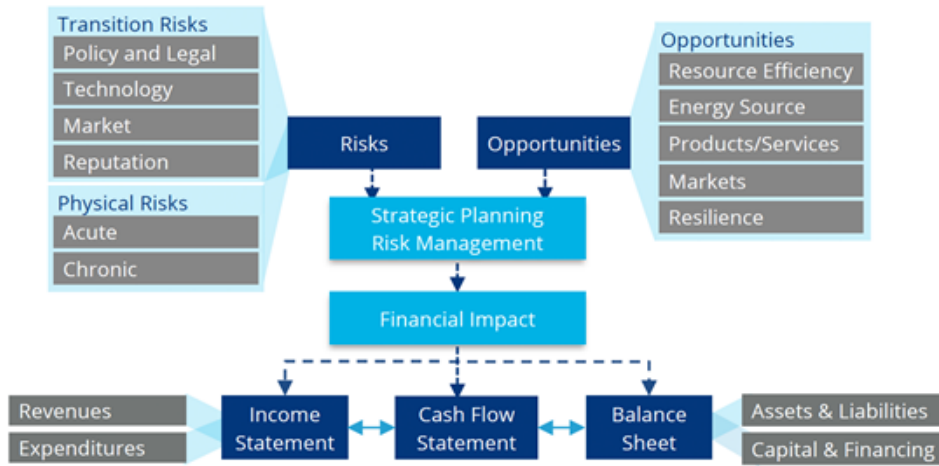
Figure 1. SASB Climate Risk Map



Similarly, the TCFD framework categorizes various types of climate-related impact and draws direct links to financial statements. (See Figure 2.)

⁴⁴ Sophie Robinson-Tillett, “Green metric or red herring? The value of carbon footprinting for investment portfolios is being questioned by market professionals,” ESG Magazine, Issue 5 (September 2016).

Figure 2. TCFD’s Climate-Related Risks, Opportunities, and Financial Impact



There are clear similarities between the two approaches in both form and function. Table 4 illustrates more explicitly how the risks and opportunities identified by the SASB Climate Risk Map are mapped to those of the TCFD:

Table 4. Overlap between SASB Climate Risk Map and TCFD Risks & Opportunities

TCFD Risks & Opportunities			SASB Climate Risk Map		
			Physical Effects	Transition to Low-Carbon, Resilient Economy	Climate Regulation
Risks	Transition Risks	Policy & Legal Risk			
		Technology Risk			
		Market Risk			
		Reputation Risk			
	Physical Risks	Acute Risk			
		Chronic Risk			
Opportunities	Resource Efficiency				
	Energy Source				
	Products & Services				
	Markets				
	Resilience				

Individually and collectively, these frameworks have a variety of applications relevant to global efforts to more fully and consistently integrate climate-related risks into financial markets, including their ability to enable:

- Identification of climate risk and the manner in which it has material impacts on corporate financial value.
- Recognition that climate-related impacts manifest themselves in industry-specific ways.
- Development of metrics that help corporate issuers disclose decision-useful information to investors in a cost-effective way.

A deeper dive into the elements and mechanics of the SASB Climate Risk Map—and their relation to the TCFD’s approach—is presented in the following subsections on climate risk categories and financial impact channels.

CLIMATE RISK CATEGORIES

Climate-related risks and opportunities can be broken down into three main categories: physical effects, transition to a low-carbon, resilient economy, and climate regulation.

Physical Effects

Climate change has a range of current and projected acute (punctuated, unpredictable) and chronic (progressive, predictable) effects on the physical environment, leading to risks and opportunities for business entities. The probability, magnitude, and timing of these impacts remain uncertain and may be influenced by geographic location, industry, political response, and capacity for adaptation. However, suitable disclosures can help an investor understand their possible exposure to the physical risks of climate change, many of which are already evident.

Connection to the TCFD Recommendations

Physical Effects map directly to the TCFD category “Physical Risk,” which is similarly broken down into “Acute” and “Chronic” sub-categories.

Acute (event-related)

Acute physical risks are the impacts of more frequent and more severe catastrophic weather events (e.g., severe droughts, extensive wildfires, more intense precipitation, more intense cyclones/hurricanes, etc.). Impacts include physical damage to assets, transport networks, supply chain disruptions, and/or electricity grid disruptions. Potential financial impacts from acute physical effects include:

- Asset impairment – long-lived physical asset and natural asset damage and impairment.
- Cost increases – operational disruptions (services and/or products like energy and water); disruptions to transportation, supply chains, and distribution chains; increases in insurance premiums.

Chronic (progressive)

Chronic physical risks are the impacts of more intense and sustained GHG emissions to the atmosphere, as well as the progressive impacts of increasing temperatures, changing precipitation patterns, and rising sea levels, among others. Impacts may affect agricultural yields, shift growing seasons and species distribution, cause human disease migration, affect the availability and quality of water resources, and impact coastal residential and commercial real estate. Potential financial impacts from progressive physical effects include:

- Revenue loss (demand contraction) – lower yields, decreased output.
- Cost increases – natural resource constraints, materials cost increases, logistics cost increases.
- Asset impairment – premature impairment or devaluation (e.g., coast land, agricultural and grazing land and nearby processing facilities).
- Revenue growth – increased agricultural and forestland productivity, increased patient load in health care delivery, or sales growth for HVAC and associated equipment producers.
- Cost reduction – reduced materials costs as agricultural productivity increases.

Transition to a Low-Carbon, Resilient Economy

Transition risks relate to the market-based need to transition to a low-carbon economy, including development of, and investment in, new technologies and services that support this transition. Specific activities comprise the mitigation of carbon emissions, and/or adaptation to be resilient against climate change:

- **Mitigation** responses are those technologies and services that increase energy efficiency, relate to increased renewable energy uptake and decreased demand for fossil fuels, and/or capture or sequester carbon dioxide.
- **Adaptation** responses include, but are not limited to, infrastructure resiliency efforts and business model shifts (e.g., changing geographic location of production and/or sales, the introduction of new

products and services, and aligning business models with new environmental conditions).

Connection to the TCFD Recommendations

Transition to a Low-Carbon, Resilient Economy is closely mapped to the TCFD classifications "Transition Risks" and "Opportunities," with certain key differences:

- TCFD further separates its transition risk classification into sub-categories, including "Technology," "Market," "Reputation" and "Policy & Legal" risks. In the case of the latter, SASB's framework treats policy and legal issues as a separate risk classification to maintain its focus on transition risks that are market-driven. (See "Climate Regulation.")
- TCFD also separates its opportunities into sub-categories, which include "Resource Efficiency," "Energy Source," "Products & Services," "Markets," and "Resilience." SASB's framework combines risks and opportunities together, considering the latter to be the upside of the former. It also recognizes that certain opportunities—such as those related to resource efficiency, energy sourcing, and products and services—may be related to market-driven considerations or may alternatively be motivated by climate-related regulation. (See "Climate Regulation.")

These responses are motivated by emerging customer needs and incentives, shifts in consumer preferences (including those related to company reputation or changes to investors' perceptions of risk—e.g., "divestment" actions), and indirect impacts from suppliers. Potential financial impacts from this transition include:

- Revenue loss (demand contraction) – reduced demand for fossil fuels, related services, and energy consuming products.
- Stranded assets – devaluation/impairment or "asset stranding" of fossil fuel reserves.
- Revenue growth – growth in renewable energy, emergence of new industries, including carbon capture and sequestration, smart grid technologies, energy-efficient products, infrastructure adaptations, and green chemistry solutions.
- Long-term cost reductions – operational cost reduction from investments in updated infrastructure and technologies that facilitate the transition to a low-carbon, resilient economy.

Climate Regulation

Regulatory risks resulting from climate regulation include a range of legal, regulatory, policy, and liability issues associated with climate change. This encompasses all international, national, and subnational targets, mandates, legislation, and regulations to address climate change. It also includes those issues that establish a price for carbon emissions and compliance with policy-driven responses to climate change, such as those that mandate energy and fuel efficiency, regulate greenhouse gas emissions, restrict or mandate specific energy sources; and/or those that directly incentivize and subsidize certain services and technologies (for market-driven responses to climate regulations see "Transition Risks," Page 20).

Connection to the TCFD Recommendations

Climate Regulation impacts map directly to the TCFD sub-category of "Policy & Legal Risk" on the down side, and to the following opportunity sub-categories on the up side: "Resource Efficiency," "Energy Source," and "Products & Services."

SASB's framework recognizes that certain opportunities within these sub-categories may be related to regulatory or legal action rather than due to market forces. For example, climate regulations and policy mechanisms such as subsidies, incentives, credits, and renewable portfolio standards will create revenue growth opportunities for a range of industries including renewable energy providers and carbon offset project developers. Additionally, as the climate-related risks for which entities may be held liable increase, new insurance products will likely emerge, such as those that cover directors and officers on negligence, nuisance, and fiduciary matters related to climate change.

This category also encompasses a range of potential impacts that may occur due to legal actions against issuers in response to climate change. These include action against those deemed liable for the physical effects of climate change (also referred to as "liability risks"), allegations of breach of fiduciary duty by directors and officers, and disputes over the implementation of climate-related regulation. Potential financial impacts from climate regulation include:

- Operating costs – Cost of carbon taxes and emission trading schemes, compliance costs, or fines from breaches of climate regulations.
- Revenue growth impacts – Fossil fuel providers or large greenhouse gas emitters may be denied permits for new facilities or expansion of facilities due to climate considerations.
- Legal expenses or liabilities – If an entity is held liable by individuals, governments, or other corporates for 1) its past or present greenhouse gas emissions, 2) breach of fiduciary duty to manage

climate-related risks, and/or 3) its non-compliance with climate regulations.

- Revenue growth – Subsidies, incentives, credits, and renewable portfolio standards; and new insurance products that will emerge, such as those that cover directors and officers on negligence, nuisance, and fiduciary matters related to climate change.

FINANCIAL IMPACT CHANNELS

The climate-related risks and opportunities outlined above can impact a company's financial or operating performance through a variety of channels, which include revenue and operating cost impacts, asset value impacts, and financing cost impacts.

Revenue and Operating Cost Impacts

Climate-related risks can have a material impact on a company's income statement, including through revenue and operating costs.

Connection to the TCFD Recommendations

The Revenue and Operating Cost impact channels map directly to the "Income Statement" impact channel identified in the TCFD model.

Revenue Impacts

This category includes the impact on revenues and/or future cash inflows from climate-related effects on the financial condition and operating performance of business entities. These may be due to, for example, operational disruptions, changes in demand for products or services, changes in market share or product yield, reputational impacts, legal and regulatory factors, and/or loss of social license to operate. Revenue may be affected positively or negatively depending on the risks and opportunities a company or industry faces.

Operating Cost Impacts

This category includes the impact on capital expenditures, operating expenses, and/or other cash outflows from climate-related risks. These may be due to changes in the costs of supplies, labor, investments needed to maintain or improve resource efficiency or adjust an entity's energy source mix, investments needed to comply with new regulations, legal expenses, and research and development expenses necessary to respond to competitive and market pressure. It may also include investments needed to repair facilities, improve infrastructure resiliency from exposure to increased storm events, and/or the cost of insurance from such exposure. Costs can be affected either positively (e.g., through increased resource efficiency) or negatively (e.g., CAPEX required to reduce emissions, increased cost of materials, higher insurance premiums, etc.).

Asset Value Impacts

This category comprises effects on the value of core assets due to a price on carbon and other regulatory outcomes, changes in asset value due to the physical effects of climate change, and/or devaluation of assets due to the transition to a low-carbon, resilient economy. Current assets (e.g., inventory, crops, and livestock) and long-lived physical assets (e.g., coastal properties, infrastructure, and forestland) may be at risk for impairment or devaluation due to increased extreme weather events. Additionally, the amount of capitalized hydrocarbon reserves that are viable for extraction and production may be reduced due to increases in carbon prices, or a reduction in market prices influenced by a shift of demand to renewable energy sources and battery-powered vehicles.

Connection to the TCFD Recommendations

The Asset Value impact channel maps directly to the "Assets & Liabilities" aspect of the "Balance Sheet" impact channel identified in the TCFD model.

Financing Cost Impacts

Climate change will have a range of effects on the viability of businesses, depending on their ability to adequately manage climate risks and exploit opportunities. These scenarios will impact entities' ability to gain access to debt and equity capital, affect company or security valuation, and influence investment and asset value. Entities that have greater exposure to the physical effects of climate change, demonstrate poor management of their transition risks, fail to sufficiently prepare for or adapt to climate regulations, and/or put themselves at risk to incur legal liability related to climate change will face debt and equity risk premiums. Creditworthiness will erode and interest rates could rise as ratings agencies, investors, insurers, and lenders consider such climate risks. Certain industries may face "divestment" risks due to investor concerns over their contribution to GHG emissions, as well as due to reputational concerns. Entities better able to manage—and communicate their management of—climate risks and/or those that are positioned to benefit from a low-carbon economy, should see better access to capital, lower costs of loans, lower yields and higher ratings for bonds, and lower cost of equity capital.

Connection to the TCFD Recommendations

The Financing Cost impact channel maps directly to the "Capital & Financing" aspect of the "Balance Sheet" impact channel identified in the TCFD model.

APPLYING THE CLIMATE RISK MAP

Six years in the making, the SASB Standards are set to be codified in 2018, thus providing the first comprehensive set of accounting standards for financially material sustainability factors, including those related to climate risk. With these critical tools available to global capital markets, companies, investors, and other market actors will be empowered to apply the preceding Climate Risk Map to their own efforts.

Although the CDSB Framework and the SASB Standards, SASB Materiality Map, Climate Risk Map, and other associated tools are designed primarily for use by companies and their investors, they may also serve as useful inputs to other decision makers—including exchanges, regulators, and policymakers.

This is due to the bottom-up nature of SASB’s standard-setting process.

SASB’s iterative process leverages evidence-based research, extensive market input, public feedback, and expert-led oversight to surface the sustainability factors—including those related to climate risk—most likely to have financially material impacts on companies in each of 77 SICs industries. During this process, SASB also identifies or develops best-practice performance metrics related to key aspects of each factor. (See Table 5.) The Phase 2 publication will include a full set of industry-specific climate-related topics and metrics designed to help companies fulfill the “Metrics & Targets” recommendations of the TCFD.

Table 5. SASB Climate-Related Metrics for the Marine Transportation Industry (Exposure Draft)

Topic and climate risk	Metric	Category	Unit of Measure	Alignment/Source
Environmental footprint of fuel use ■ Transition Risk ■ Regulatory Risk	Gross global Scope 1 emissions	Quantitative	Metric tons CO2-e	CDP Climate Change Information Request CC8.2 Emissions Data, CC8.5 Data Accuracy CDSB Framework REQ-04 Sources of environmental impacts Climate Change Reporting Framework 4.19.1, 4.29 GRI G4 Aspect: Emissions (EN15) Additional Source(s): WRI/WBCSD Greenhouse Gas Protocol (definitions and calculation methodology)
	Description of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	Discussion and Analysis	N/A	CDP Climate Change Information Request CC3. Targets and Initiatives CDSB Framework REQ-01 Management’s environmental policies, strategy and targets, REQ-05 Performance and comparative analysis Climate Change Reporting Framework 4.12 GRI G4 Aspect: Emissions (EN19) SEC Guidance Regarding Disclosure on Climate Change
	Total energy consumed, percentage from heavy fuel oil, percentage from renewables	Quantitative	Gigajoules, Percentage (%)	CDP Climate Change Information Request CC11.3, CC3.1d Climate Change Reporting Framework 4.31.f GRI G4 Aspect: Energy (EN3)
	Energy Efficiency Design Index (EEDI) for new ships	Quantitative	Grams of CO2 per ton-nautical mile	N/A

As illustrated by the last column, the SASB metrics are well-aligned with commonly used standards, frameworks, and methodologies. SASB incorporates these sources of alignment by reference in the technical protocols underlying its performance metrics, thereby maintaining the cost-effectiveness of the standards for companies. Because the SASB Standards identify sustainability topics by industry—cutting across national borders—SASB cites globally applicable standards wherever possible. (See “Global Protocols” sidebar.)

Examples of Global Protocols in SASB Standards

Industry: Oil & Gas Exploration & Production

Topic: GHG Emissions

Metric: Gross global Scope 1 emissions, percentage methane, and percentage covered under a regulatory program

Technical protocol: The registrant shall disclose the percentage of its emissions that are covered under a regulatory program, such as the European Union Emissions Trading Scheme (EU ETS), Western Climate Initiative (WCI), California Cap-and-Trade (California Global Warming Solutions Act), or other regulatory programs.

Industry: Biofuels

Topic: Lifecycle Emissions Balance

Metric: Lifecycle greenhouse gas (GHG) emissions, by biofuel type

Technical protocol: The registrant should disclose all applicable lifecycle GHG emissions results, including those calculated for the California Air Resources Board Low Carbon Fuel Standard Program, the European Union Renewable Energy Directive, and the Roundtable on Sustainable Biomaterials (RSB) certification, if results from any of these calculations are materially different than the results from the EPA RFS2 calculation.

Industry: Software & IT Services

Topic: Environmental Footprint of Hardware Infrastructure

Metric: Total energy consumed, percentage grid electricity, percentage renewable energy

Technical protocol: The scope of renewable energy includes renewable fuel the registrant consumes and renewable energy the registrant directly produces, purchases through a renewable power purchase agreement (PPA) that explicitly includes renewable energy certificates (RECs), or for which Green-e Energy Certified RECs are paired with grid electricity, European Union Guarantees of Origin (GOs), and other recognized renewable energy attribute certificates.

To enhance the utility of these topics and metrics, SASB draws explicit links between each sustainability factor—including those related to climate risk—and the related financial impacts most likely to affect a company’s balance sheet, income statement, or risk profile. (See Table 6.) The Phase 2 publication will map each industry-specific climate-related factor to one or more specific financial impacts.

Table 6. Financial Impacts of Climate Risk for the Marine Transportation Industry

SECTOR	INDUSTRIES	Financial Impact Channel			
		REVENUE IMPACTS	OPERATING COSTS	ASSET VALUE	FINANCING COSTS
Transportation	Air Freight & Logistics				
	Marine Transportation				
	Rail Transportation				

Although the three types of climate risk identified in the previous section (physical, transition, and regulatory) are helpful in terms of thinking about how climate-related impacts affect different industries, business models, or specific companies, financial analysts require an understanding of how those climate risks impact a company’s valuation, outlook, or its risk profile. For this reason, the TCFD framework—like that of SASB—enables climate-related impacts to be linked directly to a firm’s financial statements and cost of capital. This information allows companies and their investors to better understand the **specific risk** (or idiosyncratic risk) unique to a company or industry.

By aggregating the outcomes of its standard-setting process, SASB has also developed the Materiality Map, which reveals a portfolio-wide view of where sustainability risks and opportunities—including those related to climate change—are most likely to manifest. (See Table 7.)

Table 7. Climate Risk Materiality Map for the Marine Transportation Industry

SECTOR	INDUSTRIES	Climate Risk Category		
		PHYSICAL	TRANSITION	REGULATION
Transportation	Air Freight & Logistics			
	Marine Transportation			
	Rail Transportation			

Companies—and, by extension, their investors—face three primary types of climate risk: physical effects, impacts related to the transition to a low-carbon, resilient economy, and the effects of climate regulation. Each of these risks is likely to be prevalent in a given industry depending on a variety of factors, including its typical business model, factors of production, the type of assets on which it depends, the regulatory environment, evolving market dynamics, and others.

Developing a more robust understanding of these types of climate-related risks, how they are likely to manifest in various industries, and how they relate to the UN Sustainable Development Goals (see “The SDGs and the Materiality Map”) can provide companies and investors with valuable insights in managing their exposures. Such understanding may also provide a useful starting point for national or global efforts to establish a taxonomy for climate finance, which should “provide detailed information on the relevant sectors and activities, based on screening criteria, thresholds, and metrics.”⁴⁵

With this top-level view, SASB facilitates a deeper understanding of **systematic risk**, the uncertainty inherent to the entire market that is therefore un-diversifiable. SASB research validates the systematic nature of climate risk, indicating that all but seven industries are impacted in some way. The Phase 2 publication will include a full Climate Risk Materiality Map covering physical, transition, and regulatory risks for each of 77 industries.

Finally, the SASB Standards are designed to yield performance data that, when aggregated, may provide supplemental information useful to regulators or policymakers in studying and addressing **systemic risk** that could trigger the collapse of an entire market or the financial system at large. A growing body of research suggests that climate change has the potential to be a systemic risk, primarily through two channels:

- First, the regulatory and transition risks of climate change could lead to a rapid shift in energy usage and a re-pricing of assets (primarily carbon-intensive). This shock could impair financial assets and propagate throughout the financial system and wider economy.^{46, 47}

- Second, climate change has the potential to lead to physical impacts that, through real losses and damage, can cause financial losses significant enough to propagate contagion and cripple the global economy. These could be in form of either a catastrophic incident (i.e., “fat tail” risk event) or (if over time due to inaction) global average temperature simply rising too high.⁴⁸

A more detailed exploration of how SASB and CDSB’s practical tools can be used to unlock the potential of the TCFD recommendations will be the subject of the forthcoming Phase 2 publication.

45 European Commission, Action Plan: Financing Sustainable Growth (March 8, 2018).

46 “Too late, too sudden: Transition to a low-carbon economy and systemic risk,” Reports of the ESRB Advisory Scientific Committee, No. 6 (February 2016).

47 Weyzig, F., B. Kuepper, J. W. van Gelder and R. van Tilburg, “The price of doing too little too late; the impact of the carbon bubble on the European financial system,” *Green New Deal Series*, Volume 1 (2014).

48 “The cost of inaction: Recognising the value at risk from climate change,” *The Economist Intelligence Unit* (2015).

INVESTOR USE CASES

SASB's climate-related disclosures are designed to yield comparable, consistent, and reliable data on the climate risk factors that matter most to businesses' financial performance. The metrics thus enable rigorous integration of climate-related considerations into investment decisions, across many types of investment strategies and asset classes.

The following examples demonstrate the increasing depth, breadth, and rigor of the global investment community's approach to integrating ESG factors, including climate risk. They cover the use of the TCFD-aligned SASB Standards and related tools to perform fundamental analysis, index construction, and integration of the SDGs. As these cases illustrate, the SASB Standards have gained significant traction with global investors for these and other uses, including fixed income analysis, manager evaluation and selection, and corporate engagement. This is due, in large part, to the fact that SASB's work is informed by an Investor Advisory Group (IAG), which comprises 32 leading asset owners and managers with more than \$26.2 trillion in assets who are committed to improving the quality and comparability of sustainability-related disclosure. The IAG is made up of institutional investors from such countries as Canada, Netherlands, Sweden, Scotland, Switzerland, and the U.S., including global asset managers such as UBS, BlackRock, Goldman Sachs, Morgan Stanley, and State Street Global Advisors.

NORDEA ASSET MANAGEMENT (STOCKHOLM)

As one of the first asset managers in the Nordic market to sign the Principles for Responsible Investment (PRI), Nordea Asset Management (€217 billion in assets under management) has long been committed to incorporating ESG factors into its investment approach. In 2011, it launched the Nordea 1 Emerging Stars Equity Fund, with the aim of creating a unique emerging market equity fund in which fundamental strategy and valuation analysis in portfolio stock selection fully integrates ESG factors.

Rather than using a "first-generation" approach to ESG considerations (i.e., "negative screening" to avoid certain companies and sectors), Nordea employed a positive, "second-generation" approach, in which ESG analysis could add value to the investment case. The vision was to create a high alpha performing fund in which ESG considerations act not only as risk mitigators

in securities analysis and portfolio construction, but also improve understanding of a company's value drivers more holistically.

Nordea used the SASB Standards and underlying materiality framework to inform its fundamental analysis and identify attractive and responsible investments for inclusion in the fund. For example, using this methodology enabled it to better assess a Chilean copper mining company it might otherwise have avoided due to the inherently high operational risks that characterize the industry.

Copper plays an increasingly important role in the transition to a low-carbon economy because of its wide use in rapidly growing market segments, including the electric vehicles (EVs), renewable energy infrastructure, and buildings constructed to meet LEED (Leadership in Energy and Environmental Design) designation. Thus, mining companies that can meet this demand while maintaining a strong focus on mitigating their material ESG risks will be well positioned to make important contributions to global transition efforts.

By using SASB tools, Nordea assessed the Chilean copper mining company's performance on key ESG metrics—including those related to energy management, GHG emissions, water management, employee health and safety, and community engagement. By comparing its findings to peer performance and industry benchmarks, it determined the firm was a best-in-class performer that could deliver an attractive risk-adjusted return in a sustainable way.

ET RESEARCH (LONDON)

London-based ET Research uses SASB tools to construct its Engaged Tracking Low Carbon Index Series, the only low-carbon index series on the market that is based on a public, transparent carbon ranking of each constituent company. Each index in the series has outperformed the market for the last six years.

To enable improved peer-to-peer comparison of GHG emission intensity across industries, ET Research has been using SASB's Sustainable Industry Classification System™ (SICS™) for the series since 2014. Traditional industry classification systems—such as the Industry Classification Benchmark (ICB) or the Global Industry Classification System (GICS)—presented challenges to the construction of the index series because they have been slow to adapt to the transition to a low-carbon economy. For example, neither system includes the Renewable Resources & Alternative Energy sector recognized by SICS. Because traditional classification systems group these firms together with conventional energy companies, their emissions would have been benchmarked against those of oil, gas, and coal

companies. Such apples-to-oranges comparisons would reduce the usefulness of the index series—both for investors and for broader efforts to incentivize reduction of GHG emissions and improve related disclosure. (The series penalizes non-disclosing companies by assigning an surrogate emissions-intensity score based on its worst-performing SICS peer.)

In addition to its “off-the-shelf” indices, ET Research also develops tailored strategies using SICS. For example, its Low Carbon Momentum strategy tracks companies that have most lowered

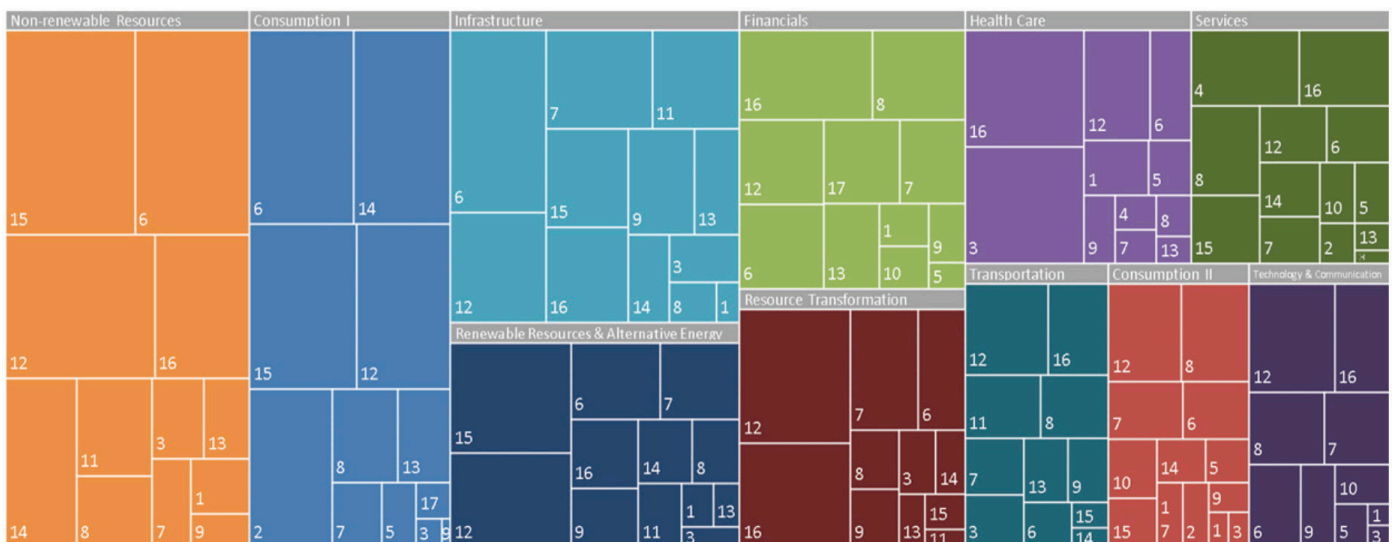
their year-on-year emissions relative to SICS peers within a given investment universe. In order to meet the objectives of the 2015 Paris Agreement—limiting global warming to no more than 2 degrees Celsius (2°C) this century—the global economy must, on average, decarbonize by 6-7 percent each year. Thus, ET Research developed this strategy for an investor in France, where Article 173 of the 2015 French Energy Transition Law mandates that institutional investors explain their 2° decarbonization plans in their annual reporting.

CALVERT RESEARCH & MANAGEMENT (UNITED STATES)

Washington, D.C.-based Calvert Research and Management is a leader in responsible investing with approximately \$14 billion of mutual fund and separate account assets under management. Recently, Calvert has endeavored to meaningfully translate the 17 UN Sustainable Development Goals (SDGs) into the investor context by using SASB’s Materiality Map™ and the associated performance metrics included in the SASB Standards. Calvert chose to use these tools because SASB’s materiality-focused approach is well aligned with its own investment research methodology, emphasizing sustainability issues that most impact a company’s financial performance over the long term. The SDGs provide a similar, parallel framework for nation-states and national programming that emphasize key development goals, the achievement of which are necessary to reach sustained, equitable economic growth and prosperity for all global citizens.

The United Nations, since adopting the SDGs, has made it clear that the Goals cannot be achieved without the active involvement of the private sector and investors. Calvert conducted a mapping exercise to identify common themes between the Materiality Map and the SDGs. Because they are designed for different purposes, the two frameworks did not match perfectly; however, Calvert found that a substantial portion (71 percent) of SASB’s performance metrics do map to the SDGs and their related targets, which helped it identify industries in which the SDGs are most likely to be financially material. This finding, in turn, enables Calvert to see a clearer path to investments most likely to achieve the SDGs and related positive societal outcomes, as well as those better positioned to generate positive financial outcomes.

Figure 3. Calvert View of Exposure to the SDGs by SICS Sector



- Goal #1. Poverty
- Goal #2. Hunger and food security
- Goal #3. Health
- Goal #4. Education
- Goal #5. Gender equality and women's empowerment
- Goal #6. Water and Sanitation
- Goal #7. Energy
- Goal #8. Economic Growth
- Goal #9. Infrastructure, industrialization
- Goal #10. Inequality
- Goal #11. Cities
- Goal #12. Sustainable consumption and production
- Goal #13. Climate Change
- Goal #14. Oceans
- Goal #15. Biodiversity, forests, desertification
- Goal #16. Peace, justice and strong institutions
- Goal #17. Partnership

Calvert’s mapping against the SASB metrics extends to more than 200 SDG sub-targets or indicators, allowing it to more meaningfully track how companies are changing their practices in response to shifting social norms. Because such an exercise reveals useful insights regarding which industries have a financially material interest in advancing one or more of the SDGs—and the specific performance-based levers they may use to do so—it may also be useful to global, regional, or national efforts to establish a climate finance taxonomy and associated metrics that will support SDG implementation.

CONCLUSION

Financing the low-carbon transition of the global economy presents a major opportunity for long-term investors.⁴⁹ However, given the scale of the challenge they face, global capital markets will likely need to coordinate their efforts around a common approach. Furthermore, due to the complexity and highly technical nature of the task, they will need ample time to adapt to this newly understood and rapidly evolving economic reality.

Thus, by rallying around the TCFD recommendations, and by drawing on the TCFD-aligned tools and resources developed by CDSB and SASB, market participants can more efficiently and effectively ramp up their efforts in parallel, working toward a common goal. These market-tested resources can help companies, investors, and others achieve progress on key objectives related to climate finance—not only those related to individual companies and portfolios, but also broader targets set by unions, nations, states, or international bodies, including nationally defined contributions related to the Paris Agreement and SDGs, among others.

By drawing explicit links between climate change and financial performance, the TCFD-aligned SASB Standards and CDSB *Framework* can help decision makers at all levels better identify, understand, and manage climate-related risks and opportunities to the benefit of companies, their investors, and society at large. Indeed, decision-useful performance data is the cornerstone in building the capacity of markets to finance sustainable growth, which in turn lays the groundwork for a more robust and resilient economy around the world.

⁴⁹ Mark Carney, “A Transition in Thinking and Action,” Remarks given by the Governor of the Bank of England at the International Climate Risk Conference for Supervisors, De Nederlandsche Bank, Amsterdam (April 6, 2018).

APPENDIX I TCFD INDUSTRIES MAPPED TO SICS

The table below shows how the sector groups and industries identified by the TCFD correspond to those included in the SASB's Sustainable Industry Classification System (SICS™).

TCFD Industry/Group	TCFD Group Industries	SASB Sector	SASB Industry
Banks	N/A	Financials	Commercial Banks
			Investment Banking & Brokerage
Insurance Companies			Mortgage Finance
Asset Owners			Insurance
Asset Managers			Asset Management and Custody Activities
Energy	Oil and Gas	Extractives and Minerals Processing	Oil and Gas – Exploration and Production
			Oil and Gas – Midstream
			Oil and Gas – Refining and Marketing
	Coal		Oil and Gas – Services
	Coal		Coal Operations
	Electric Utilities	Infrastructure	Electric Utilities & Power Generators
Transportation	Air Freight	Transportation	Air Freight & Logistics
	Passenger Air Transportation		Airlines
	Maritime Transportation		Marine Transportation
	Rail Transportation		Rail Transportation
	Trucking Services		Road Transportation
	Automobiles		Automobiles
			Auto Parts
	Related Transportation Infrastructure	Car Rentals & Leasing	
		N/A	
Materials and Buildings	Metals and Mining	Extractives and Minerals Processing	Metals and Mining
	Chemicals	Resource Transformation	Chemicals
	Construction Materials	Extractives and Minerals Processing	Construction Materials
	Capital Goods	Resource Transformation	Aerospace & Defense
			Electrical & Electronic Equipment
		Industrial Machinery & Goods	
		Containers & Packaging	
	Real Estate Management and Development	Infrastructure	Home Builders
			Real Estate
			Real Estate Services
Agriculture, Food, and Forest Products	Beverages	Food and Beverage	Non-Alcoholic Beverages
			Alcoholic Beverages
	Agriculture		Agricultural Products
	Packaged Foods and Meats	Tobacco	
			Meat, Poultry, and Dairy
			Processed Foods
	Paper and Forest Products	Renewable Resources and Alternative Energy	Forestry Management
			Pulp & Paper Products