Task Force on Climate-related Financial Disclosures

2020 Status Report

TCFD

TASK FORCE ON
CLIMATE–RELATED
FINANCIAL
DISCLOSURES

October 2020

September 22, 2020

Mr. Randal K. Quarles
Chair
Financial Stability Board
Bank for International Settlements
Centralbahnplatz 2
CH-4002 Basel
Switzerland

Dear Chair Quarles,

It is my pleasure to present the third annual status report of the Task Force on Climate-related Financial Disclosures (TCFD). It outlines steady and encouraging progress since our last report.

As you know, the Task Force's recommendations are intended to help build consideration of the effects of climate change into routine business and financial decisions, and their adoption can help companies demonstrate responsibility and foresight. Better disclosure will lead to more informed and more efficient allocation of capital, and help facilitate the transition to a more sustainable, lower-carbon economy.

Support for the TCFD framework has exceeded initial expectations, in both the private and public sectors. Nearly 1,500 organizations have expressed their support, a group that includes every major type of financial market participant. Disclosure in line with the TCFD recommendations has increased every year since their release in 2017. Climate change considerations are becoming increasingly common in the private sector — and investors, lenders, and insurance underwriters are developing better capabilities for assessing climate-related risk in their decision-making. However, greater disclosure and transparency are urgently needed.

Progress in the public sector is also accelerating. Among others, Canada, Chile, the European Union, Hong Kong, Japan, New Zealand, the UK, Singapore, and South Africa have announced new policies, partnerships, or other formal support for climate-related financial disclosure in line with the TCFD recommendations. Going forward, it will be important to bring more standardization to reporting requirements across different countries and jurisdictions, in order to minimize the burden for reporting companies and maximize the value of disclosure for investors.

The impacts of climate change continue to worsen, with clear and significant effects on the global economy and on people's lives. At the same time, global efforts to recover from the economic damage of the coronavirus pandemic have provided a unique opportunity to set a foundation for a more sustainable and resilient future. So the work of the Task Force is more important and more urgent than ever before. We're grateful for your continued support and dedication to this work.

Sincerely,

Michael R. Bloomberg

Executive Summary

In June 2017, the Financial Stability Board's Task Force on Climate-related Financial Disclosures (Task Force or TCFD) released its final recommendations (2017 report), which provide a framework for companies and other organizations to develop more effective climate-related financial disclosures through their existing reporting processes (see Figure ES1).[1, 2] In its 2017 report, the Task Force emphasized the importance of transparency in pricing risk — including risk related to climate change — to support informed, efficient capital-allocation decisions.

Since the release of its 2017 report and at the request of the Financial Stability Board (FSB), the Task Force has issued two status reports — with this being its third — describing the alignment of companies' reporting with the TCFD recommendations.[3] In the months between this status report and the 2019 status report, the Task Force has seen significant momentum around adoption of and support for its recommendations. This report describes the progress made to date and highlights the challenges of more consistent and robust implementation. It is important to view these challenges in the context of the substantial progress made in "mainstreaming" the Task Force's recommendations in the financial markets through investor demand for TCFD disclosures, policy and regulatory actions, and good business practices.

Over the past 15 months, the number of organizations expressing support for the TCFD has grown more than 85%, reaching over 1,500 organizations globally, including over 1,340 companies with a market capitalization of $12.6 trillion and financial institutions responsible for assets of $150 trillion. Many of these companies have begun to implement the TCFD recommendations or continue to refine and improve their climate-related financial disclosures. Through the efforts of the World Business Council for Sustainable Development, the Institute for International Finance, the United Nations Environment Programme Finance Initiative, and other organizations, peer companies implementing the TCFD recommendations have come together to discuss effective climate-related financial disclosure practices and undertake work needed to enhance the effectiveness of such disclosures.[4]

Figure ES1
The Task Force's Remit

In April 2015, the Group of 20 (G20) Finance Ministers and Central Bank Governors asked the Financial Stability Board (FSB) to convene public- and private-sector participants to review how the financial sector can take account of climate-related issues. As part of its review, the FSB identified the need for better information to support informed investment, lending, and insurance underwriting decisions and improve understanding of climate-related risks.

To help identify the information needed to assess and price climate-related risks, the FSB established an industry-led task force — the TCFD. The FSB asked the TCFD to develop voluntary climate-related financial disclosures that would be useful to investors and others in understanding material risks.

Similar to the growth in the number of organizations supporting the TCFD, investor demand for companies to report information in line with the TCFD recommendations has also grown dramatically. For example, as part of Climate Action 100+, more than 500 investors with over $47 trillion in assets under management are engaging the world's largest corporate greenhouse gas emitters to strengthen their climate-related disclosures by implementing the TCFD recommendations.[5] In addition, many large asset managers and asset owners have asked or encouraged investee companies broadly to report in line with the TCFD recommendations and reflected this in their investment practices or policies.[6]

Over 110 regulators and governmental entities from around the world support the TCFD, including the governments of Belgium, Canada, Chile, France, Japan, New Zealand, Sweden, and the United Kingdom. In addition, central banks and supervisors from across the globe — through the Network for Greening the Financial System — have encouraged companies issuing public debt or equity to disclose in line

[1] In this report, the Task Force uses the term "companies" to refer to entities with public debt or equity as well as asset managers and asset owners, including public- and private-sector pension plans, endowments, and foundations.

[2] Financial Stability Board, "FSB to establish Task Force on Climate-related Financial Disclosures," December 4, 2015.

[3] Financial Stability Board, "Task Force on Climate-related Financial Disclosures: 2019 Status Report," June 5, 2019.

[4] See Section E.1. Implementation Initiatives for more information.

[5] See Climate Action 100+.

[6] For example, see BlackRock's Investment Stewardship Engagement Priorities for 2020 and CPP Investments' Policy on Sustainable Investing.

with the TCFD recommendations.[7] The Task Force is also seeing governments embed the recommendations in policy and guidance and move toward requiring TCFD disclosures through legislation and regulation.

- New Zealand's Ministry for the Environment announced that the government plans to make climate-related financial disclosures mandatory for certain publicly listed companies and large financial institutions and that reporting would be against a standard developed in line with the TCFD recommendations.[8]
- The European Commission incorporated the TCFD recommendations into its *Guidelines on Reporting Climate-Related Information* to support companies in disclosing climate-related information under the European Union's reporting requirements.[9]
- The United Kingdom's Financial Conduct Authority released a proposal for certain listed companies to state in their annual financial reports whether they made disclosures consistent with the TCFD recommendations.[10, 11]

As 120 countries and the European Union work toward achieving net-zero greenhouse gas emissions by 2050, many of these jurisdictions may legislate disclosure of climate-related financial information to support market transparency among other reasons.[12] The Task Force believes its recommendations can provide policy makers and regulators in these jurisdictions as well as other jurisdictions with the foundation for requiring climate-related financial disclosure, which could help avoid regulatory fragmentation. As noted by the International Financial Reporting Standards (IFRS) Foundation Trustees in their recent consultation paper on global sustainability standards, there is urgent demand for consistency and comparability in sustainability reporting, especially for climate-related information:

> ***"****Demand for better disclosure of sustainability information is urgent [and] delays to global coherence, most pressingly on climate-related disclosures, will increase the threat of fragmentation and consequently cause difficulties in engaging capital markets to smooth the transition to a low-carbon economy.****"***[13]

As the Task Force highlighted in its 2017 report, in most G20 jurisdictions, companies with public debt or equity have a legal obligation to disclose material information in their financial filings — including material climate-related financial information. The Task Force further noted it believes climate-related issues are or could be material for many companies, and its recommendations should be useful to companies in complying with such existing disclosure obligations. The Task Force believes this is especially true for companies in complying with or meeting new or revised legal or regulatory requirements specifically focused on the disclosure of climate-related financial information.

CLIMATE-RELATED FINANCIAL DISCLOSURES

Similar to previous status reports, this report provides an overview of current disclosure practices in terms of their alignment with the Task Force's recommendations. It also highlights specific climate-related information a group of expert users identified as the most useful for making financial decisions, addresses the top implementation issues identified by nearly 200 preparers, and includes case studies by financial sector preparers on implementing the recommendations.

To better understand current climate-related financial disclosure practices and how they have evolved, the Task Force reviewed — using artificial intelligence (AI) technology — reports for about 1,700 large companies in multiple

[7] Relatedly, in July 2020, the FSB published a stocktake of whether and how financial authorities incorporate climate-related risks into their financial stability monitoring and found some authorities explicitly refer to the TCFD recommendations in setting supervisory expectations for banks and insurance companies' disclosure of climate-related risks.

[8] New Zealand's Ministry for the Environment, "Mandatory Climate-Related Financial Disclosures," September 2020.

[9] European Commission, *Guidelines on Reporting Climate-Related Information*, June 2019.

[10] United Kingdom's Financial Conduct Authority, *Proposals to Enhance Climate-Related Disclosures by Listed Issuers and Clarification of Existing Disclosure Obligations, Consultation Paper*, March 2020.

[11] Other governmental authorities encouraging or calling for TCFD-aligned disclosures include the Australian Securities and Investment Commission, the Bank of England, the European Central Bank, the Hong Kong Monetary Authority, the Japanese Ministry of Economy, Trade and Industry, the Monetary Authority of Singapore, and the National Treasury of South Africa.

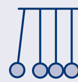
[12] COP25 Chile UN Climate Change Conference, *Climate Ambition Alliance: Nations Renew their Push to Upscale Action by 2020 and Achieve Net Zero CO2 Emissions by 2050*, December 11, 2019.

[13] IFRS Foundation, *Consultation Paper on Sustainability Reporting*, September 30, 2020, pp. 4 and 7.

sectors and regions over a three-year period. In addition, the Task Force consulted with a small group of expert users to gain insight on the types of information, for each of the Task Force's recommendations, users find the most useful for making investing and other financial decisions. Table ES1 summarizes the key takeaways and findings from the Task Force's review of company disclosures, insights from users, and other research.

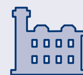
Table ES1

Key Takeaways and Findings



Nearly 60% of the world's 100 largest public companies support the TCFD, report in line with the TCFD recommendations, or both.[14] In addition, nearly 700 organizations have become TCFD supporters since the Task Force issued its 2019 status report, an increase of over 85%.[15] The Task Force is encouraged by the growing support for its recommendations and hopes to see similar growth in the percentage of companies disclosing TCFD-aligned information going forward.

Disclosure of climate-related financial information has increased since 2017, but continuing progress is needed. Disclosure of TCFD-aligned information increased by six percentage points, on average, between 2017 and 2019; and the Task Force applauds the improvements made — both in terms of the number of companies reporting and the quality of such reporting. However, companies' disclosure of the potential *financial* impact of climate change on their businesses and strategies remains low. The Task Force recognizes the challenges associated with making such disclosures but encourages continued efforts and faster progress.



Energy companies and materials and buildings companies lead on disclosure. For fiscal year 2019 reporting, the average level of disclosure across the Task Force's 11 recommended disclosures was 40% for energy companies and 30% for materials and buildings companies.

One in 15 companies reviewed disclosed information on the resilience of its strategy. The AI review found that the percentage of companies disclosing the resilience of their strategies, taking into consideration different climate-related scenarios, was significantly lower than that of any other recommended disclosure.

Asset manager and asset owner reporting to their clients and beneficiaries, respectively, is likely insufficient. While TCFD-aligned reporting by a sample of asset managers and asset owners increased over the past three years, the Task Force believes reporting by these organizations to their clients and beneficiaries may not be sufficient and that more progress may be needed to ensure clients and beneficiaries have the right information to make financial decisions.[16]

Expert users find the impact of climate change on a company's business and strategy as the "most useful" for decision-making. Expert users also identified information about a company's material climate-related issues for each *sector* and *geography* and its key metrics as extremely useful for financial decision-making.

Expert users' insights on the most useful information for decision-making may provide a road map for preparers. Companies already disclosing their governance and risk management processes for climate-related issues and working toward full TCFD implementation might consider expert users' relative ranking of specific types of climate-related information — from most useful to least useful — as one factor to consider in prioritizing their efforts.

[14] Forbes, *The World's Largest Public Companies*, May 13, 2020. In reviewing the 100 largest public companies, the Task Force did not evaluate the extent or quality of a company's TCFD reporting but rather identified whether the company indicated it reported in line with the TCFD recommendations or planned to.

[15] Importantly, not all organizations that support the TCFD recommendations implement them. Some organizations express support by convening their members and facilitating consistency in implementation, while others — such as governments and regulators — express support by encouraging or requiring companies and other organizations to implement the recommendations.

[16] The sample of asset managers and asset owners are signatories to the Principles for Responsible Investment. See Section A.2. TCFD-Aligned Reporting by Asset Managers and Asset Owners for more information.

TASK FORCE INITIATIVES TO SUPPORT IMPLEMENTATION

Concurrent with the release of this status report, the Task Force is also issuing guidance on two topics — conducting climate-related scenario analysis and integrating climate-related risks into existing risk management processes and disclosing those processes — as well as a consultation document on forward-looking metrics for the financial sector.[17] As described in its 2019 status report, the Task Force identified specific areas it intended to explore to support implementation of the recommendations. In particular, the Task Force highlighted the following:

- developing guidance on how to conduct climate-related scenario analysis and
- clarifying elements of the Task Force's supplemental guidance issued with its 2017 report.[18]

Over the past several months, the Task Force has worked on developing guidance and clarifying topics to address feedback received from companies and other organizations that are implementing the recommendations and to reflect market and industry developments. Brief descriptions of the guidance and consultation documents are provided below.

- **Scenario Analysis for Non-Financial Companies.** This guidance is intended to assist non-financial companies interested in using climate-related scenarios as part of their efforts to implement the Task Force's recommendations. It provides practical, process-oriented ways for companies to use climate-related scenario analysis and ideas for disclosing the resilience of their strategies under different climate-related scenarios.
- **Integration of Climate-Related Risks into Risk Management Processes.** This guidance is aimed at companies interested in integrating climate-related risks into their existing risk management processes and disclosing information on their risk management processes in alignment with the Task Force's recommendations.
- **Forward-Looking Financial Sector Metrics.** This consultation paper seeks views on decision-useful, forward-looking metrics for companies in the financial sector. Its publication launches a 90-day public consultation period until January 27, 2021.

NEXT STEPS AND CONCLUSION

Over the next several months, the Task Force will continue to promote and monitor adoption of its recommendations and will prepare a status report for the Financial Stability Board in September 2021. As part of its efforts, the Task Force will review and consider feedback received through public consultation on its consultation document and determine appropriate next steps based on the feedback and other analyses it undertakes. The Task Force continues to believe the success of its recommendations depends on continued, widespread implementation by companies in the non-financial and financial sectors, including asset managers and asset owners, and views its guidance as a means of supporting widespread implementation — as well as helping improve the quality and consistency of climate-related financial disclosures.

[17] These documents are available on the TCFD's website: https://www.fsb-tcfd.org/publications/.

[18] TCFD, *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*, June 29, 2017.

Contents

Letter from Michael R. Bloomberg 1

Executive Summary 2

A. State of Climate-Related Financial Disclosures 7

1. TCFD-Aligned Reporting by Public Companies 8

2. TCFD-Aligned Reporting by Asset Managers and Asset Owners 18

B. Effective Climate-Related Financial Disclosures 26

1. Scope and Approach 28

2. Summary of Users' Feedback on Usefulness of Disclosure Elements 29

3. Examples of Effective Climate-Related Financial Disclosures 34

C. Addressing Implementation Issues 45

1. Governance and Risk Management 47

2. Strategy 50

3. Metrics and Targets 50

D. Case Studies on Implementation 52

1. Case Study by a Global Risk Assessment Firm 53

2. Case Study by an Asset Owner 59

3. Case Study by an Asset Manager 63

E. Initiatives Supporting TCFD 67

1. Implementation Initiatives 69

2. Investor Initiatives 70

3. Alignment of Reporting Frameworks 71

4. Government and Regulatory Efforts 71

Appendix 1. Task Force Members 75

Appendix 2. Company Selection and AI Review Methodology 77

Appendix 3. AI Review Results by Industry 81

Appendix 4. Additional Information on PRI Reporting 90

Appendix 5. User Feedback on Disclosure Elements 93

Appendix 6. Glossary and Abbreviations 104

Appendix 7. References 106

A.
State of Climate-Related Financial Disclosures

A. State of Climate-Related Financial Disclosures

Consistent with previous status reports, the Task Force undertook a review of hundreds of public companies' reports for climate-related financial information using artificial intelligence technology.[19, 20] The AI technology was used to determine whether the reports include information that appears to align with the Task Force's recommendations. The Task Force has received feedback that the baseline information on climate-related financial disclosures coming out of its AI reviews is helpful for companies implementing the TCFD recommendations in understanding current practices. In addition, users, preparers, and others have expressed interest in understanding changes in climate-related financial disclosures over time, particularly as many companies have now had three full reporting cycles to implement the TCFD recommendations since their release in June 2017. To assess the current state and evolution of climate-related financial disclosures, the Task Force reviewed the reports of just over 1,700 public companies for three years — 2017, 2018, and 2019, as described in Section A.1. TCFD-Aligned Reporting by Public Companies.

Also consistent with the approach used in developing the 2019 status report, asset managers and asset owners were excluded from the AI review because, in many cases, the types of reports needed for analysis are not publicly available. However, because asset managers and asset owners play an important role in the investment chain, the Task Force reviewed the aggregate responses of asset managers and asset owners to the Principles for Responsible Investment (PRI) 2018, 2019, and 2020 signatory assessments.[21] The results of this review are described in Section A.2. TCFD-Aligned Reporting by Asset Managers and Asset Owners.

1. TCFD-ALIGNED REPORTING BY PUBLIC COMPANIES

This sub-section summarizes the scope and approach used to review the alignment of public companies' reporting for fiscal years 2017, 2018, and 2019 with the Task Force's 11 recommended disclosures as well as the results and key findings from the review.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

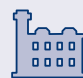
Key Takeaways

Disclosure of climate-related financial information has increased since 2017, but more progress is needed. Disclosure increased, on average, across the 11 recommended disclosures by six percentage points between 2017 and 2019. However, companies' disclosure of the potential financial impact of climate change on their businesses, strategies, and financial planning is low.

Disclosures are primarily made in sustainability reports. On average, information aligned with the recommended disclosures was over four times more likely to be disclosed in sustainability reports than in financial filings or annual reports.

One in 15 companies reviewed disclosed information on the resilience of its strategy under different climate-related scenarios. The percentage of companies disclosing strategy resilience was significantly lower than that of any other recommended disclosure.

Larger companies are more likely to disclose information aligned with the recommendations. On average, 42% of companies with a market capitalization (cap) of greater than $10 billion disclosed information aligned with the TCFD recommendations in 2019, while the average was 15% for companies with a market cap less than $2.8 billion.



Energy companies and materials and buildings companies lead on disclosure. The average level of disclosure across the 11 recommended disclosures for fiscal year 2019 was 40% for energy companies and 30% for materials and buildings companies.

[19] The Task Force gratefully acknowledges the work of Pearl Ho, Michel Kiffel, Niall McConville, Charlie Waller, Will Barnsley, Hannah Anscombe, Leena Kang, Frankie Howland, Liron Mannie, Devina Shah, and Leanne Bouvet from PricewaterhouseCoopers (PwC) on the AI technology review.

[20] PwC contributed to the contents of this report by developing the artificial intelligence component and providing its results, as described in Appendix 2: Company Selection and AI Review Methodology. PwC's contribution has been prepared only for the TCFD. PwC accepts no liability (including for negligence) to anyone else in connection with the PwC contents of this report.

[21] See the "climate-related indicators only" sections of the PRI's 2018, 2019, and 2020 Reporting Frameworks.

Scope and Approach

The Task Force reviewed financial filings, annual reports, integrated reports, and sustainability reports of 1,701 public companies from 69 countries in eight industries (Figure A1).[22] Six of the eight industries align with groups highlighted in the Task Force's 2017 report: Banking, Insurance, Energy, Materials and Buildings, Transportation, and Agriculture, Food, and Forest Products.[23] To incorporate other types of companies that may be exposed to climate-related risks, two additional industries were added to the review in 2019 and retained for this year — Technology and Media and Consumer Goods.

Figure A1
AI Review Population Size

Industry	Number
Banking	286
Insurance	138
Energy	274
Materials and Buildings	414
Transportation	162
Ag., Food, and Forest Products	147
Technology and Media	113
Consumer Goods	167
Total	**1,701**

The Task Force identified an initial review population of nearly 4,500 public companies across the eight industries based on company size thresholds.[24] Banks and insurance companies were selected for the initial population if their assets totaled $10 billion or more or $1 billion or more, respectively, for the 2019 fiscal year. Companies in all other groups were selected if their annual revenue totaled $1 billion or more for the 2019 fiscal year.

Once the initial population was identified, companies that did not have annual reports available for review in all three years were removed from the population to ensure a consistent population of companies and their reporting could be reviewed across all three years. Companies were also removed from the initial population if they did not have annual reports available in English in all three years. This approach resulted in a final review population of 1,701 companies.[25] Importantly, the companies included in the AI review population for this year's status report are different from the companies reviewed in the 2019 status report; therefore, the AI review results in the two status reports are not directly comparable. More information on the Task Force's methodology is provided in Appendix 2: Company Selection and AI Review Methodology.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[22] The Task Force used revenue to identify the largest public companies in non-financial industries and total assets for banks and insurance companies.

[23] TCFD, *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures*, June 29, 2017.

[24] Companies were also removed from the initial population if they were a subsidiary of a larger company that had already been included in the population.

[25] Because the AI technology cannot process reports in languages other than English, the AI review population has a higher representation of international companies and companies with large English-speaking populations than it would if non-English reports could be assessed. The regional distribution of companies in the AI review population is provided in Figure A4 (p. 14).

Similar to the approach used to review climate-related financial disclosures for the 2018 and 2019 status reports, the Task Force again used AI technology to review companies' reports.[26, 27] The AI technology was used to review over 17,300 reports from the 1,701 companies and determine whether the reports included information that appeared to align with one or more of the Task Force's 11 recommended disclosures (see Table A1). Importantly, this approach was *not* designed to assess the quality of companies' climate-related financial disclosures, but rather to provide an indication of the alignment of existing disclosures with the Task Force's 11 recommended disclosures.[28]

Table A1

TCFD Recommendations and Supporting Recommended Disclosures

Governance	Strategy	Risk Management	Metrics and Targets
Disclose the company's governance around climate-related risks and opportunities.	**Disclose the actual and potential impacts of climate-related risks and opportunities on the company's businesses, strategy, and financial planning where such information is material.**	**Disclose how the company identifies, assesses, and manages climate-related risks.**	**Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.**
a) Describe the board's oversight of climate-related risks and opportunities.	a) Describe the climate-related risks and opportunities the company has identified over the short, medium, and long term.	a) Describe the company's processes for identifying and assessing climate-related risks.	a) Disclose the metrics used by the company to assess climate-related risks and opportunities in line with its strategy and risk management process.
b) Describe management's role in assessing and managing climate-related risks and opportunities.	b) Describe the impact of climate-related risks and opportunities on the company's businesses, strategy, and financial planning.	b) Describe the company's processes for managing climate-related risks.	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
	c) Describe the resilience of the company's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the company's overall risk management.	c) Describe the targets used by the company to manage climate-related risks and opportunities and performance against targets.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[26] TCFD, *2018 Status Report*, September 26, 2018 and TCFD, *2019 Status Report*, June 5, 2019.

[27] The Task Force used AI technology to perform an automated review of several hundred companies' public reports. Performing such a review "manually" or through human reviewers would take thousands of hours, which would not be feasible for the Task Force. The AI technology is based on a set of statistical language models that were designed to answer 11 yes-no questions tied to the recommended disclosures for companies in the four non-financial groups and for banks and insurance companies.

[28] It is important to recognize the confidence of the AI technology in identifying disclosures that align with the Task Force's 11 recommended disclosures varies for each recommended disclosure, as described in Appendix 2: Company Selection and AI Review Methodology.

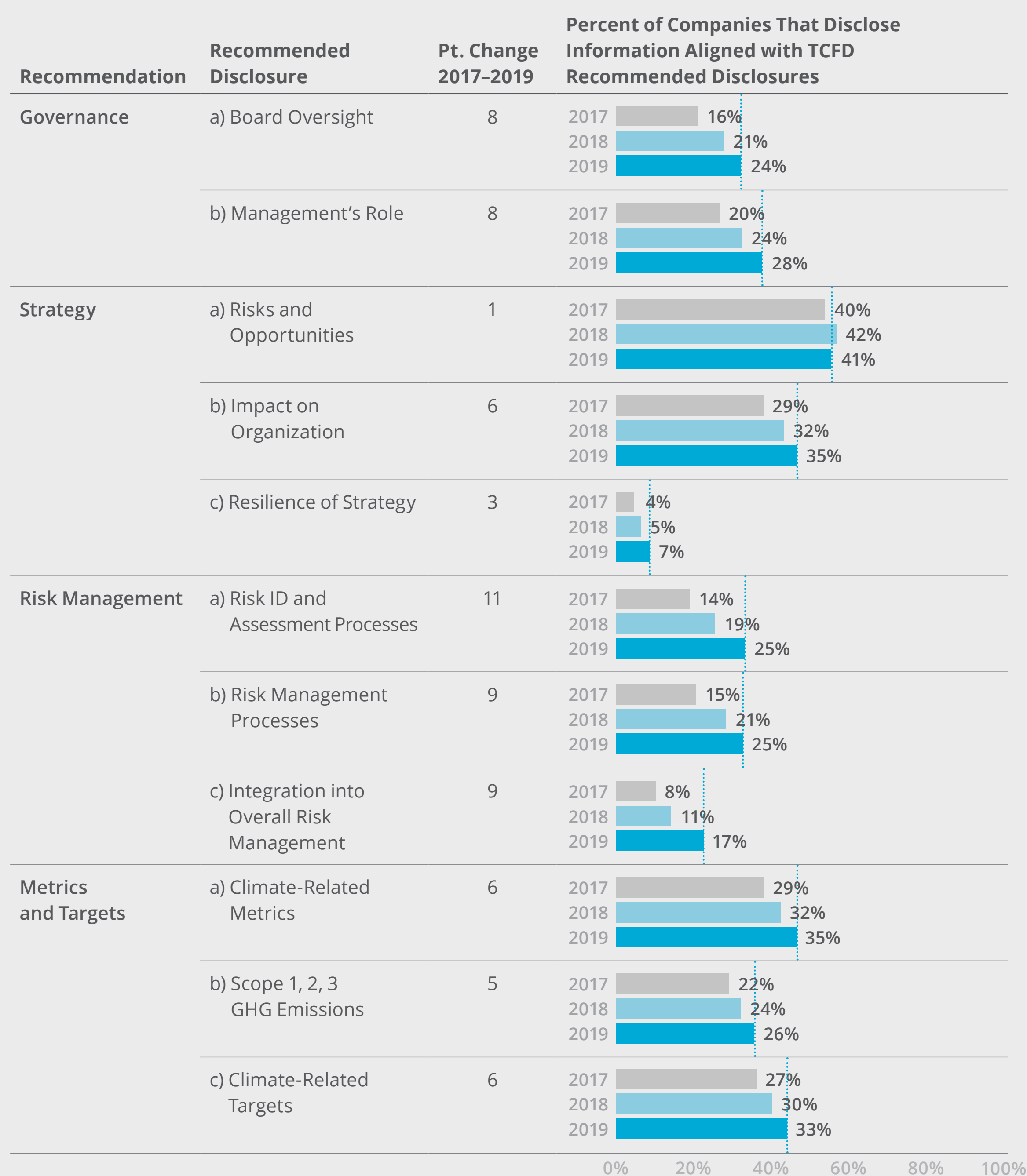
Key Findings

This sub-section summarizes the overall results and takeaways from the Task Force's AI review of companies' 2017, 2018, and 2019 reports for alignment with the Task Force's 11 recommended disclosures. Figure A2 shows the AI review results by year for each of the Task Force's recommended disclosures.

It is important to note that the results of the Task Force's AI review for the 2020 status report are not directly comparable to the AI review results provided in the Task Force's 2019 status report due to several methodological changes as described in Appendix 2: Company Selection and AI Review Methodology. Changes include a new methodology for selecting companies for review — intended to broaden coverage of the largest companies in each industry — and further validation of the AI technology model. However, the key findings and themes resulting from the AI review remain similar to previous years' findings and themes.

Figure A2

TCFD-Aligned Disclosures by Year



Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

A. State of Climate-Related Financial Disclosures

B. Effective Climate-Related Financial Disclosures

C. Addressing Implementation Issues

D. Case Studies on Implementation

E. Initiatives Supporting TCFD

Appendices

Disclosure of climate-related information has increased since 2017, but continuing progress is needed. The AI review found the disclosure of climate-related information aligned with the TCFD recommendations increased by six percentage points, on average, across the 11 recommended disclosures between 2017 and 2019; and the Task Force applauds the improvements made — both in terms of the number of companies reporting and the quality of such reporting. However, companies' disclosure of the potential financial impact of climate change on their businesses, strategies, and financial planning remains low. The Task Force recognizes the challenges associated with making such disclosures but encourages continued efforts and faster progress.

As shown in Figure A2 (p. 11), the greatest increase in the percentage of companies disclosing relevant information from 2017 to 2019 — 11 percentage points — was for the disclosure of processes for identifying and assessing climate-related risks (*Risk Management a*); while the smallest increase across the 11 recommended disclosures was for the disclosure of companies' climate-related risks and opportunities (*Strategy a*), which increased by only one percentage point over the same time period. In addition, while the percentage of disclosure for the five recommended disclosures related to governance and risk management is lower than most of the other recommended disclosures, the percentage point increases for those five recommended disclosures are higher than the increases for the recommended disclosures related to strategy and metrics and targets.

Disclosures are primarily made in sustainability reports. Companies disclosed information aligned with the TCFD recommendations in multiple types of reports (e.g., financial filings, annual reports, integrated reports, and sustainability reports), which is consistent with the Task Force's findings in its 2018 and 2019 status reports. The AI review found that, on average, information aligned with the recommended disclosures was over four times more likely to be disclosed in sustainability reports than in financial filings or annual reports. However, disclosure of climate-related risks and opportunities in alignment with recommended disclosure *Strategy a)* was nearly as likely to be found in financial filings or annual reports as it was in sustainability reports. The largest difference in the percentage of disclosure between annual reports and financial filings versus sustainability reports was for the metrics used by a company to assess climate-related risks and opportunities in line with its strategy and risk management process, (*Metrics and Targets a*), where the AI technology found 79% of sustainability reports included information aligned with *Metrics and Targets a)* compared to only 15% of annual reports and financial filings.

One in 15 companies reviewed disclosed information on the resilience of its strategy. The AI review found that the percentage of companies disclosing the resilience of their strategies, taking into consideration different climate-related scenarios, including a 2°C or lower scenario (*Strategy c*) was significantly lower than that of any other recommended disclosure in each year. At 7% in 2019, the level of disclosure was 10 percentage points lower than the next lowest recommended disclosure, *Risk Management c)*, which 17% of companies disclosed. These results are consistent with feedback the Task Force has received from companies on the challenges of disclosing such information.

Companies' disclosure of their specific climate-related issues held constant. The percentage of companies disclosing the specific climate-related risks and opportunities they have identified (*Strategy a*) did not increase materially in the years reviewed. Although the percentage of companies disclosing the specific climate-related risks and opportunities they identified was the highest of any recommended disclosure in all three years, it held relatively constant between 2017 and 2019 at around 40%. While reporting aligned with most other recommended disclosures increased between five and 11 percentage points, reporting aligned with *Strategy a)* saw the lowest increase at only one percentage point. The constant percentage of companies disclosing this information over the three-year period may indicate that few companies have revised their perspective on whether climate-related risks and opportunities are appropriate for inclusion in public reporting.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Larger companies are more likely to disclose TCFD-aligned information. The Task Force divided the AI review population into three categories to assess results by company size: those with a market capitalization of less than $2.8 billion, those with a market capitalization of $2.8 billion to $10 billion, and those with a market capitalization of more than $10 billion. While total annual revenue was used to categorize companies by size in previous years, the results of the assessment by company size for 2017, 2018, and 2019 based on market capitalization (Figure A3) are consistent with the Task Force's previous findings — the percentage of companies disclosing TCFD-aligned information tends to increase with company size.

The percentage of companies disclosing TCFD-aligned information in 2019 increased for each company size grouping. On average, 42% of companies with a market capitalization of greater than $10 billion disclosed information aligned with the TCFD recommendations in 2019, while the average was 15% for companies with a market capitalization less than $2.8 billion. When comparing average increases in the percentage of disclosure from 2017 to 2019 across all recommended disclosures, however, companies with a market capitalization of less than $2.8 billion nearly doubled their percentage of disclosure, while the percentage of disclosure for companies with a market capitalization of more than $2.8 billion increased by around half.

Figure A3

Disclosure by Company Size: 2019 Reporting

Recommendation	Recommended Disclosure	<$2.8B Market Capitalization (613)	$2.8–10B Market Capitalization (539)	>$10B Market Capitalization (549)
Governance	a) Board Oversight	11%	23%	39%
	b) Management's Role	15%	26%	43%
Strategy	a) Risks and Opportunities	31%	40%	53%
	b) Impact on Organization	20%	30%	55%
	c) Resilience of Strategy	2%	6%	12%
Risk Management	a) Risk ID and Assessment Processes	12%	24%	41%
	b) Risk Management Processes	13%	22%	40%
	c) Integration into Overall Risk Management	7%	16%	28%
Metrics and Targets	a) Climate-Related Metrics	20%	30%	56%
	b) Scope 1, 2, 3 GHG Emissions	16%	25%	40%
	c) Climate-Related Targets	19%	28%	52%

The numbers in parentheses represent the size of the review population

Legend: Low to high percentage of disclosure

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Disclosure varies across regions. Companies in the AI review population were categorized into five regions based on the location of their headquarters to consider potential regional differences: Asia Pacific, Europe, Middle East and Africa, North America, and Latin America. As shown in Figure A4, companies in Europe have the highest percentages of TCFD-aligned disclosures for ten of the 11 recommended disclosures. The higher percentages of TCFD-aligned reporting in Europe may, in part, be due to the European Commission's integration of the TCFD recommendations into its *Guidelines on Reporting Climate-Related Information*.[29] The Asia Pacific region follows Europe with the second highest percentage of disclosure for eight of the 11 recommended disclosures. While the North American region had the highest percentage of disclosure of climate-related risks and opportunities, *Strategy a)*, the Latin America, Middle East and Africa, and North American regions otherwise have broadly similar percentages of disclosure across the recommended disclosures. In the largest difference between regional results, European companies disclosed the impact of climate-related issues on the company, *Strategy b)*, at more than three times the rate of companies in Latin America. The lowest percentage of companies disclosed *Strategy c)* across all regions, followed by *Metrics and Targets c)*, consistent with the overall AI review results.

Figure A4

Disclosure by Region: 2019 Reporting

Recommendation	Recommended Disclosure	Asia Pacific (346)	Europe (441)	Middle East and Africa (83)	North America (779)	Latin America (52)
Governance	a) Board Oversight	22%	36%	17%	18%	21%
	b) Management's Role	26%	47%	14%	20%	15%
Strategy	a) Risks and Opportunities	24%	43%	22%	50%	38%
	b) Impact on Organization	29%	60%	27%	25%	13%
	c) Resilience of Strategy	7%	11%	4%	4%	10%
Risk Management	a) Risk ID and Assessment Processes	25%	43%	14%	15%	27%
	b) Risk Management Processes	25%	43%	18%	15%	15%
	c) Integration into Overall Risk Management	16%	30%	10%	10%	8%
Metrics and Targets	a) Climate-Related Metrics	31%	58%	23%	25%	25%
	b) Scope 1, 2, 3 GHG Emissions	29%	49%	17%	14%	12%
	c) Climate-Related Targets	27%	52%	17%	27%	15%

The numbers in parentheses represent the size of the review population

Legend: Low to high percentage of disclosure

[29] See Section E.4. Government and Regulatory Efforts for more information on the European Commission's *Guidelines on Reporting Climate-Related Information*.

Separate from the Task Force's AI review, Moody's Analytics and Vigeo Eiris, an affiliate of Moody's, conducted two independent studies using internally developed review methodologies to assess climate-related disclosures for thousands of companies from a wide range of regions and sectors. Moody's Analytics and Vigeo Eiris shared the results of the two studies with the Task Force (Box A1).

The studies' findings are broadly consistent with the Task Force's AI review findings. Both studies reinforce the Task Force's conclusion from its AI review that the disclosure of climate-related financial information is low in general. The Moody's Analytics study reviewed reporting from roughly 12,000 companies and found about 17% reported climate-related information. Similarly, the Vigeo Eiris analysts' study, which reviewed almost 3,000 companies across regions and sectors, found that most companies lag in terms of fully aligning with the TCFD's recommendations.

Box A1

Findings from Moody's Review of TCFD-Aligned Disclosures

Moody's Artificial Intelligence Study

Leveraging artificial intelligence algorithms, Moody's Analytics conducted a study of reporting from roughly 12,000 companies. The study yielded a large digitized and searchable repository of TCFD-related reports (e.g., sustainability reports) and applied machine learning techniques to analyze and score the collected reports for alignment with specific TCFD recommendations. The study found the following:

- Only a minority (<20%, roughly 2,000) of companies have reported climate-related information, whether specific to the TCFD or closely related.
- Of the collected climate-related disclosure reports, there is significant variation in terms of content, specific details and focus, and quality across regions and industries.
- Some companies have published informative and comprehensive reports, highlighting the growing recognition and effort spent by the private sector in addressing climate-related challenges.
- The AI analysis scored company reports against a number of objective criteria and yielded relatively higher scores on Governance, Climate Strategy, Risk Management, and Emission Targets and Metrics reporting.
- Scores were lower for the Financial Targets and Metrics and Product Strategy categories, revealing room for improvement on reporting in these areas.

Vigeo Eiris Analysts' Study

In a separate study, Vigeo Eiris applied its own unique assessment framework of the degree to which climate-related risks and opportunities have been incorporated into Governance, Strategy, and Risk Management structures for a given company and to see how they aligned with the TCFD recommendations. Each TCFD recommendation was integrated in Vigeo Eiris's environmental, social, and governance (ESG) rating framework in the form of a list to provide a granular view of companies' TCFD reporting. For this exercise, Vigeo Eiris ESG analysts reviewed almost 3,000 companies across all regions and sectors between April 2019 and June 2020. Primary findings of the Vigeo Eiris study include the following:

- About 20% of the companies identified at least one of the climate-related risks that may affect their business and strategy over the short, medium, and long term. Physical risk is the most common category of risks reported by companies, followed by policy and legal risk and market risk.
- Regarding Governance, only 11% of companies disclosed at least one element that is recommended by the TCFD in this pillar. Comparing across regions, a larger share of companies in Europe and North America disclosed on Governance.
- From a Strategy perspective, the development of low-carbon products or services that contribute to the low-carbon economy was the most common disclosure element, accounting for 12% of all companies assessed. Only 8% (out of a total of 811) of European and 7% (out of a total of 617) North American companies disclosed climate change as a factor in their financial planning.
- 30% of the energy companies reported using an internal carbon price as part of Risk Management. Enhanced due diligence applied to projects and transactions is not commonly disclosed, with only 3% of companies disclosing such information.

The results of the Vigeo Eiris study illustrate that most companies lag in terms of fully aligning with the TCFD's recommendations. At the same time, the study's findings indicate that the TCFD's recommendations have started to be integrated in companies' disclosure practices and that the framework has a global footprint.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

TCFD-Aligned Reporting in Select Industries
This section summarizes the results of the AI review of 2017, 2018, and 2019 disclosures for the industries shown in Figure A5. In comparing 2019 results across industries, the Energy industry had the highest percentages for nine

Figure A5
Disclosure by Industry: 2019 Reporting

Recommendation	Recommended Disclosure	Banking (236)	Insurance (138)	Energy (274)	Materials & Buildings (414)
Governance	a) Board Oversight	23%	24%	42%	26%
	b) Management's Role	24%	35%	45%	31%
Strategy	a) Risks and Opportunities	32%	49%	65%	39%
	b) Impact on Organization	27%	21%	54%	43%
	c) Resilience of Strategy	12%	8%	15%	4%
Risk Management	a) Risk ID and Assessment Processes	25%	36%	39%	26%
	b) Risk Management Processes	23%	28%	38%	26%
	c) Integration into Overall Risk Management	19%	26%	30%	14%
Metrics and Targets	a) Climate-Related Metrics	27%	26%	41%	43%
	b) Scope 1, 2, 3 GHG Emissions	21%	19%	27%	35%
	c) Climate-Related Targets	19%	22%	44%	41%

Recommendation	Recommended Disclosure	Trans-portation (162)	Ag., Food, & Forest (147)	Technology and Media (113)	Consumer Goods (167)
Governance	a) Board Oversight	16%	20%	6%	11%
	b) Management's Role	20%	21%	8%	17%
Strategy	a) Risks and Opportunities	38%	41%	27%	27%
	b) Impact on Organization	30%	35%	16%	25%
	c) Resilience of Strategy	2%	1%	0%	2%
Risk Management	a) Risk ID and Assessment Processes	15%	21%	7%	16%
	b) Risk Management Processes	18%	26%	11%	14%
	c) Integration into Overall Risk Management	10%	14%	4%	7%
Metrics and Targets	a) Climate-Related Metrics	37%	35%	23%	31%
	b) Scope 1, 2, 3 GHG Emissions	27%	28%	19%	24%
	c) Climate-Related Targets	35%	38%	19%	29%

The numbers in parentheses represent the size of the review population

Legend: Low to high percentage of disclosure

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

of the 11 recommended disclosures. Of the two industries added to the review population in 2019, Consumer Goods had levels of disclosure that were slightly higher than Technology and Media but still lower than the other six industries in most cases. An overview of AI review results for each industry is provided in Appendix 3: AI Review Results by Industry.

To better compare reporting across the eight industries, the Task Force averaged the percentage of disclosure in 2019 across the 11 recommended disclosures for each industry. The industries were then ranked from highest to lowest average percentage of disclosure. A higher average percentage of disclosure indicates that an industry generally disclosed at a higher rate across the 11 recommended disclosures.

As shown in Figure A6, Energy companies had the highest average at 40%. Energy companies had the highest percentage of disclosure for nine of the 11 recommended disclosures, while Materials and Buildings companies had the highest percentage for two of the 11. Consumer Goods and Technology and Media Companies had the lowest percentage of disclosure in several areas and had the lowest averages at 18% and 13%, respectively.

In addition, the percentage of companies disclosing information in line with each TCFD recommended disclosure can vary significantly across industries as shown in the two examples in Figure A7. The Task Force believes that companies in certain industries can learn from the disclosure practices of other industries, particularly for recommended disclosures under the Governance and Risk Management recommendations that are not subject to a materiality threshold.

Figure A6
Average Percentage of Disclosure by Industry

Industry	%
Energy	40%
Materials and Buildings	30%
Insurance Companies	27%
Ag., Food, and Forest Products	25%
Banks	23%
Transportation	23%
Consumer Goods	18%
Technology and Media	13%

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

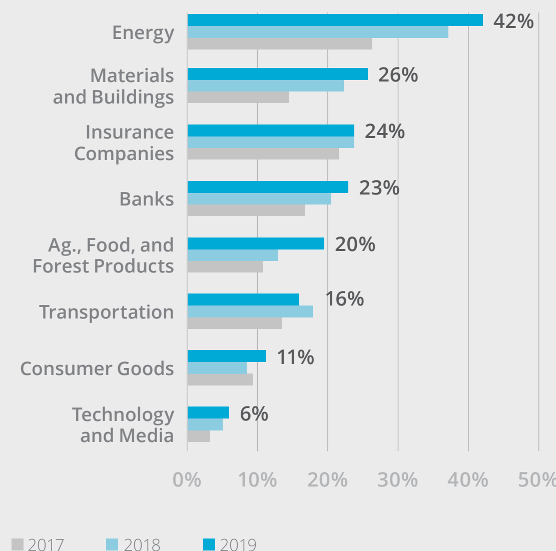
D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

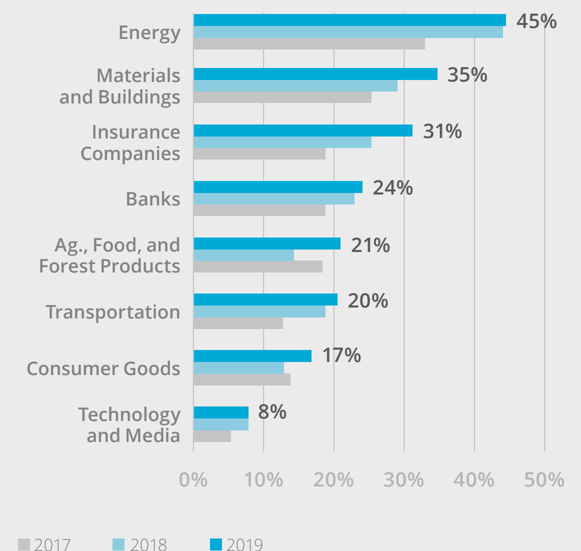
Appendices

Figure A7
Percentage of Disclosure by Industry for Recommended Disclosures

Recommended Disclosure: *Governance a)*



Recommended Disclosure: *Governance b)*



2017 2018 2019

2017 2018 2019

Note: Percentages of disclosure are included for only 2019.

2. TCFD-ALIGNED REPORTING BY ASSET MANAGERS AND ASSET OWNERS[30, 31]

As noted previously, asset managers and asset owners were excluded from the AI review because, in many cases, the types of reports needed for analysis are not publicly available. In its 2017 report, the Task Force recommended that companies provide climate-related financial disclosures in their public annual financial filings (or other publicly available corporate reporting). However, the Task Force recognized comparable reporting by asset managers and asset owners to their clients and beneficiaries, respectively, would usually occur in other types of financial reporting and may not be publicly available. For purposes of adopting the recommendations, the Task Force recommended asset managers and asset owners use their existing channels of financial reporting to their clients and beneficiaries, respectively, where relevant and feasible.

Given the wide range of reporting channels used by asset managers and asset owners (see Figure A8) and the lack of a consistent set of public reports in the two industries, the Task Force excluded asset managers and asset owners from the AI review. As a result, the Task Force explored other means of gaining insight on climate-related financial reporting by asset managers and asset owners and ultimately identified their reporting to the Principles for Responsible Investment as a possible means for gaining such insight.

The Task Force reviewed aggregated reporting results of asset manager and asset owner signatories to the PRI for the 2018, 2019, and 2020 reporting periods.[32, 33] PRI signatories are required to report on their responsible investment activities on an annual basis by responding to "indicators" in the PRI reporting framework; and a subset of those indicators are aligned with the Task Force's recommendations. Importantly, PRI signatories' responses to the indicators are self-reported; and a PRI signatory's responses to indicators aligned with the TCFD recommendations do not imply the signatory meets the recommendations or that the signatory provides TCFD-aligned information to its clients or beneficiaries.

Figure A8
Reporting by Asset Managers

Asset managers' reporting to clients takes different forms depending on a client's requirements and the types of investments made. For example, a mutual fund investor might receive (or download from a website) a "fund fact sheet" that reports, among other information, the top holdings by value, the top performers by returns, and the carbon footprint of the portfolio against a stated benchmark. An investor in a segregated account might receive more detailed climate-related information, including the aggregate carbon intensity of the portfolio compared with a benchmark and insight into portfolio positioning under different climate scenarios.

Reporting by Asset Owners

The financial reporting requirements and practices of asset owners vary widely and differ from what is required of companies with public debt or equity. Some asset owners have no public reporting, while others provide extensive public reporting.

A. State of Climate-Related Financial Disclosures

B. Effective Climate-Related Financial Disclosures

C. Addressing Implementation Issues

D. Case Studies on Implementation

E. Initiatives Supporting TCFD

Appendices

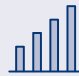
[30] The Task Force wishes to thank Ed Baker and Thalia Vounaki from the Principles for Responsible Investment for sharing aggregated reporting results of signatories to the PRI for the 2018, 2019, and 2020 reporting periods as well as additional information and insights.

[31] Throughout this sub-section, we use the phrase "TCFD-aligned reporting" to refer to asset manager and asset owner PRI signatories' reporting to the PRI on climate-related indicators mapped to the Task Force's 11 recommended disclosures.

[32] The PRI works with its international network of signatories to put its six Principles for Responsible Investment into practice. Its goals are to understand the investment implications of environmental, social, and governance issues and support signatories in integrating these issues into investment and ownership decisions. Currently there are over 3,030 PRI signatories representing $103 trillion in assets.

[33] The "reporting period" refers to the nearly three-month timeframe at the beginning of a given reporting framework year in which signatories provide information to the PRI. The "reporting year" is the 12-month period for which signatories provide information. The PRI recommends signatories provide information for the 12 months ending on or after March of the year prior to the reporting period. The PRI's *Reporting for Signatories* page provides more information on the reporting process.

Key Takeaways



TCFD-aligned reporting by asset managers and asset owners to the PRI increased significantly between 2019 and 2020, driven by the PRI's mandatory reporting requirements for specific climate-related indicators in 2020.

While reporting by asset managers and asset owners to the PRI increased over the reporting periods, the Task Force believes reporting by asset managers and asset owners to their *clients* and *beneficiaries*, respectively, may not be sufficient and that more progress may be needed to ensure those stakeholders have the right information to make financial decisions.

One of the lowest levels of reporting for both asset managers and asset owners relates to the weighted average carbon intensity metric (*Metrics and Targets b*), which is the carbon footprinting metric recommended by the Task Force.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Background and Approach

Shortly after the Task Force issued its final recommendations in June 2017, the PRI integrated several climate-related indicators based on the TCFD recommendations and the supplemental guidance for asset managers and asset owners into its 2018 reporting framework.[34] For its 2019 and 2020 reporting frameworks, the PRI made adjustments to some of its climate-related indicators.[35]

To use signatories' reporting to PRI as a proxy for asset managers' and asset owners' TCFD-aligned reporting, the Task Force mapped specific PRI climate-related indicators to its 11 recommended disclosures for each year — where possible — as shown in Appendix 4: Additional Information on PRI Reporting (Figure A4-1, p. 90). In mapping the PRI's climate-related indicators to the Task Force's recommended disclosures, we attempted to maintain consistency in the definition of the PRI indicator mapped to a given recommended disclosure across the three years. This was done to allow year-over-year comparisons in reporting levels for each recommended disclosure. We were able to map a single PRI indicator to each recommended disclosure with the exception of the following:

- For all three years, the Task Force mapped a single PRI indicator to the first two recommended disclosures under the Risk Management recommendation — *Risk Management a)* and *Risk Management b)*. As a result, those two recommended disclosures are combined in this section.[36]
- The Task Force did not map a PRI indicator to *Strategy b)* for 2019 or 2020 because the descriptions of the 2019 and 2020 PRI indicators that most closely align with the 2018 PRI indicator were modified and not directly comparable.[37]

Importantly, for the 2020 reporting period, the PRI made its governance and strategy climate-related indicators mandatory for signatories to report. For its remaining climate-related indicators, the PRI noted those "will stay voluntary with a view to becoming mandatory as good practice develops."[38] In the figures below on PRI signatories' 2020 response rates on indicators mapped to the TCFD's recommended disclosures, the Task Force distinguishes between those indicators that became mandatory to report and those that remained voluntary to report.

[34] See the Task Force's *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*, pp. 33–44.

[35] Adjustments refer to changes to the indicator name, its description, or the associated explanatory notes.

[36] For all three reporting periods, the relevant PRI indicator asks signatories to describe their risk management processes for identifying, assessing, and managing climate-related risks whereas *Risk Management a)* asks organizations to describe processes for identifying and assessing climate-related risks and *Risk Management b)* asks organizations to describe processes for managing climate-related risks.

[37] See Appendix 4: Additional Information on PRI Reporting for more information on the Task Force's decision not to map a PRI indicator to *Strategy b)* for the 2019 and 2020 reporting periods.

[38] PRI, "TCFD-Based Reporting to Become Mandatory for PRI Signatories In 2020," February 18, 2019.

Demographics of PRI Signatories

Figure A9 provides information on the number of asset manager and asset owner PRI signatories reporting in each reporting period reviewed as well as PRI signatories' assets under management (AUM). The chart on the upper left shows the total number of signatories reporting to the PRI for the 2018, 2019, and 2020 reporting periods; and the chart on the upper right shows the number of signatories reporting on the PRI's climate-related indicators for the same years. The 2020 numbers in the charts are the same given the mandatory reporting requirement. On assets under management, the chart on the lower left shows PRI signatories' total assets under management; and the chart on the lower right shows the assets under management for signatories that reported on the PRI's climate-related indicators. In terms of PRI signatories' market coverage, asset manager signatories cover almost 75% of global assets under management by asset managers, and asset owner signatories cover around 24% of global assets under management by corporate and non-corporate pensions, insurance companies, and reserve/sovereign wealth funds.[39]

Review of Asset Manager and Asset Owner Reporting to the PRI

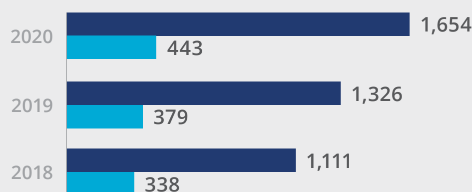
The Task Force reviewed PRI signatories' aggregated reporting results for each reporting period. The percentages shown in the figures below are based on the number of asset managers and asset owners that reported on each mapped indicator and the total number of asset managers and asset owners that reported in each reporting period (see chart on the upper left in Figure A9).[40]

As shown in Figure A10 (p. 21) for asset managers and Figure A11 (p. 22) for asset owners, response rates for most indicators mapped to the TCFD's recommended disclosures increased between 2018 and 2019, with the exception of *Governance b)* — management's role in assessing and managing climate-related issues. The response rate on this indicator decreased slightly from 20% to 19% for asset managers and stayed the same at 30% for asset owners. For asset managers, the largest increase in response rates between the 2018 and 2019 reporting periods — 200% — related to *Strategy c)* and may be attributable to the difference in descriptions of the 2018 and 2019 PRI indicators.

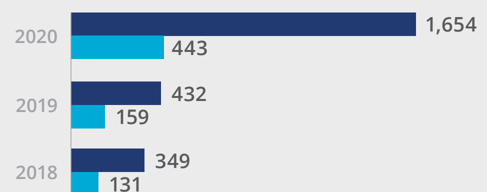
Figure A9

Demographics of PRI Signatories by Year

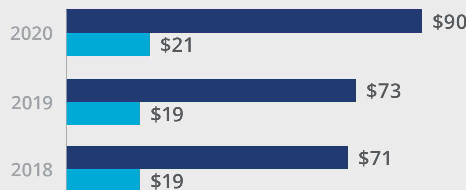
Total Number Reporting



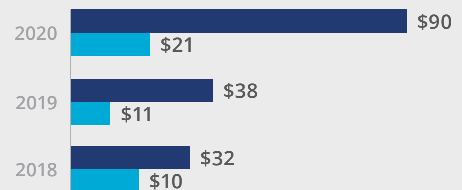
Number Reporting on Climate Indicators



Signatories' Total AUM*



AUM* for Signatories Reporting on Climate



Asset Managers Asset Owners

* AUM are in US$ trillions.

Source: Principles for Responsible Investment staff. AUM figures include double counting

[39] Boston Consulting Group, *Global Asset Management 2020: Protect, Adapt, and Innovate*, May 2020; Organisation for Economic Co-operation and Development (OECD), "Global Pension Statistics;" OECD, *OECD Insurance Statistics 2019*, 2020; and IE Foundation, *Sovereign Wealth Funds 2018*, 2019.

[40] For climate-related indicators mapped to *Governance a)* and *Governance b)*, the PRI adjusts the total number of asset manager and asset owner signatories reporting in a given year (the denominator) based on whether the signatories have roles for board oversight (*Governance a*) and senior management (*Governance b*). Please see Appendix 4: Additional Information on PRI Reporting for the denominators used.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

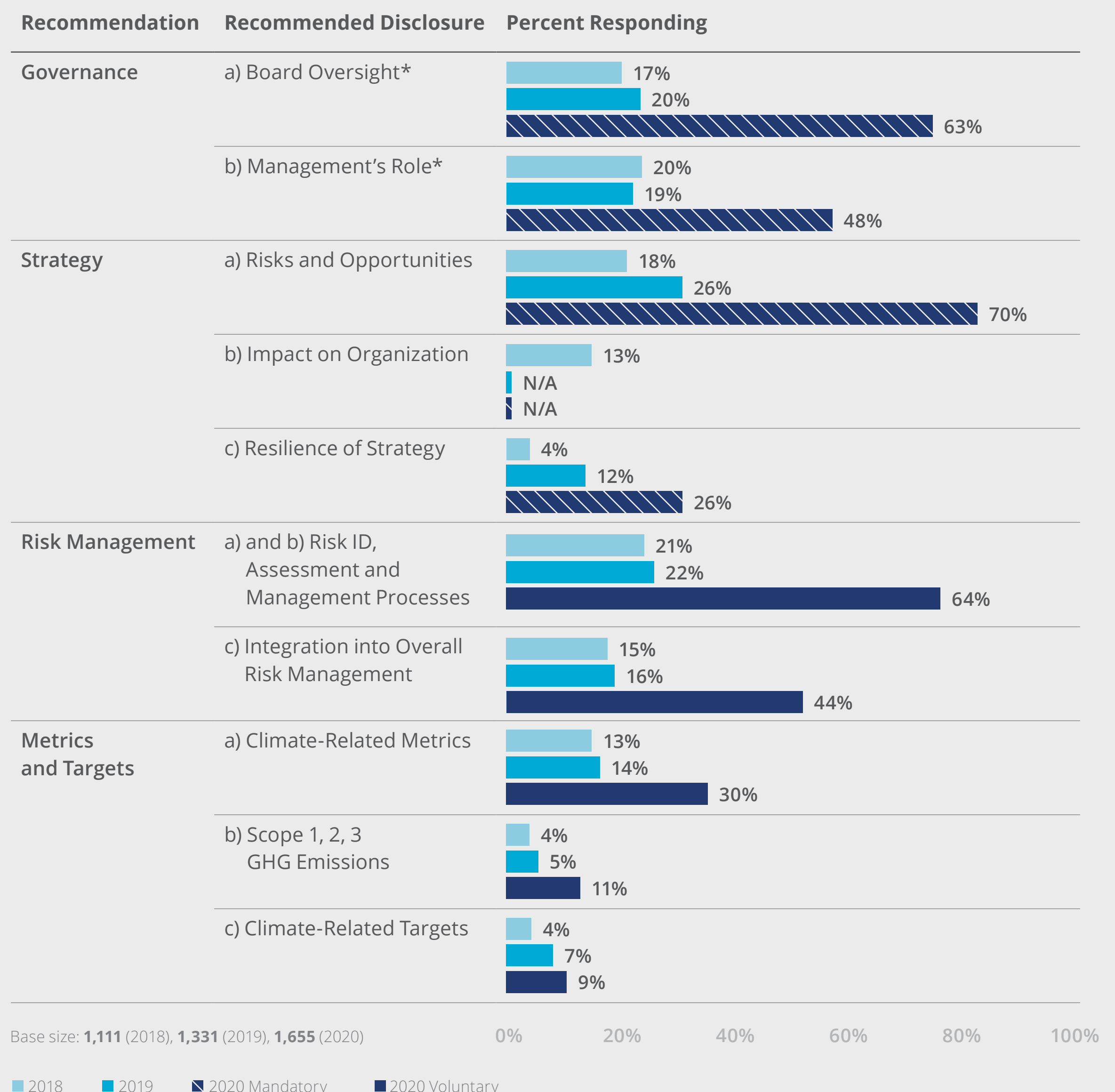
Appendices

The 2018 PRI indicator for *Strategy c)* asked signatories to describe the resilience of their strategies considering different future climate scenarios, whereas the 2019 PRI indicator asked signatories to describe how they are using scenario analysis. Presumably, more signatories would be able to describe how they use scenario analysis than describe the resilience of their strategies under different climate-related scenarios. For asset owners during this same timeframe, the largest increase in response rates — over 200% — related to *Metrics and Targets c)*, which increased from 4% to 13%.

As also shown in Figure A10 for asset managers and Figure A11 (p. 22) for asset owners, there was significant growth in the response rates for all the "mandatory-to-report" indicators mapped to the TCFD's recommended disclosures, as anticipated. The Task Force recognizes the increase in response rates between 2019 and 2020 should not be viewed as an increase in *underlying practices* as only 35% of signatories opted into climate change reporting in 2019.

Figure A10

Asset Managers' TCFD-Aligned Reporting to PRI



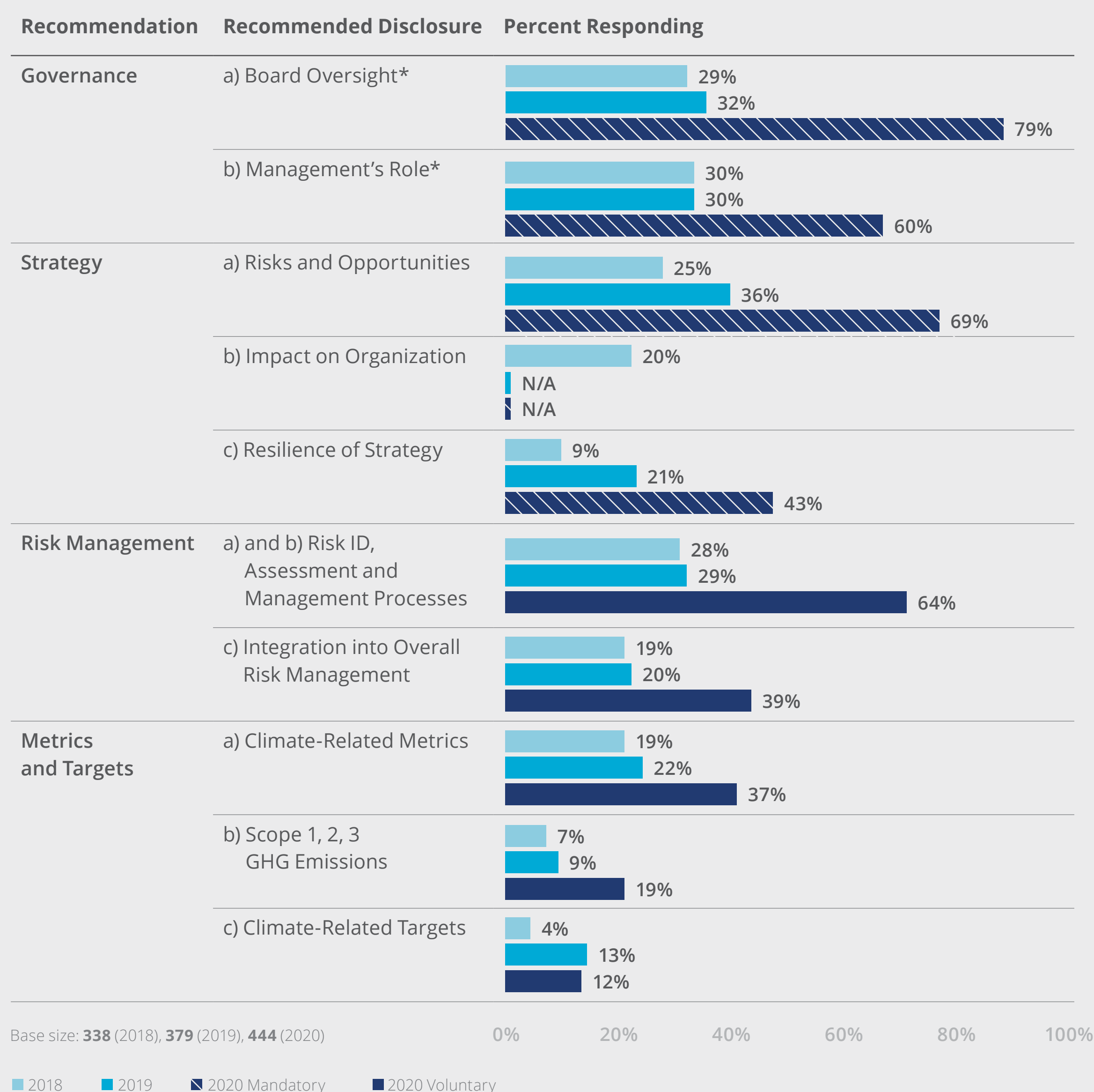
* Please see Appendix 4: Additional Information on PRI Reporting for information on the base sizes used for *Governance a)* and *Governance b)*.

Interestingly, there were also significant increases in the response rates on the "voluntary-to-report" indicators mapped to the TCFD's recommended disclosures, which relate to the Risk Management and Metrics and Targets recommendations. For example, the *average* increase in the response rates between 2019 and 2020 for the indicators mapped to the Risk Management recommendation was 183% for asset managers and 108% for asset owners.

For those same indicators, the *average* increase in the response rates between 2018 and 2019 was around 6% for asset managers and a bit over 4% for asset owners. Based on PRI staff's analysis, many of the asset managers and asset owners reporting on the "mandatory-to-report" indicators also reported on the "voluntary-to-report" indicators, resulting in significant increases in the response rates on climate-related indicators overall in 2020.[41]

Figure A11

Asset Owners' TCFD-Aligned Reporting to PRI



* Please see Appendix 4: Additional Information on PRI Reporting for information on the base sizes used for *Governance a)* and *Governance b).*

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[41] While the PRI does not assess signatories' responses to climate-related indicators, it does group signatories — based on their responses — into four categories that may provide an indication of the level of maturity of TCFD-aligned reporting as shown in Figure A4-3 (p. 92).

Of particular interest to the Task Force is asset manager and asset owner reporting on the weighted average carbon intensity (WACI) metric, which the Task Force recommends these organizations disclose to their clients and beneficiaries, respectively. Response rates on this metric are reflected in the percentages for *Metrics and Targets b)* and are the second lowest for both asset managers and asset owners across the three years. Furthermore, as described in Box A2, the WACI metric has the lowest percentage of responses across a range of carbon footprinting and exposure metrics. The Task Force is interested in understanding asset managers' and asset owners' views on the benefits and drawbacks of using the WACI metric as well as other metrics and plans to explore this further.

Box A2

Reporting on Weighted Average Carbon Intensity

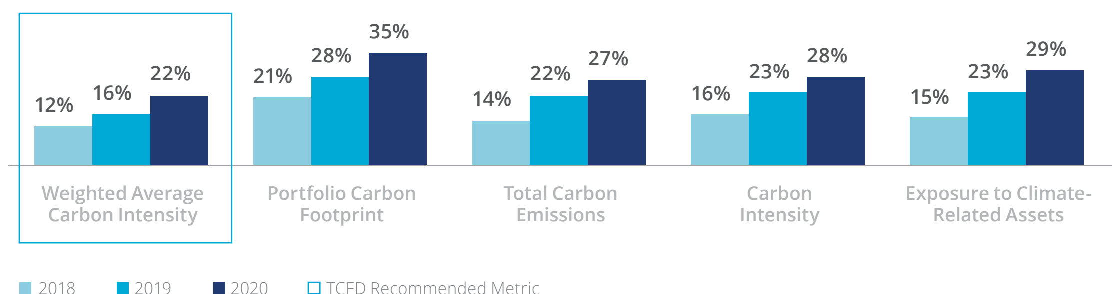
In the annex to its 2017 report, the Task Force recommends asset managers and asset owners disclose the weighted average carbon intensity metric, where data are available or can be reasonably estimated, for each product, fund, and investment strategy. The annex also describes four other metrics asset managers and asset owners should consider reporting. All five metrics are summarized in the table below.

Common Carbon Footprinting and Exposure Metrics

Metric	Description
Weighted Average Carbon Intensity	**Portfolio's exposure to carbon-intensive companies, expressed in tons CO_2e/$M revenue. *Metric recommended by the Task Force.***
Portfolio Carbon Footprint	Total carbon emissions for a portfolio normalized by the market value of the portfolio, expressed in tons CO_2e/$M invested.
Total Carbon Emissions	The absolute greenhouse gas emissions associated with a portfolio, expressed in tons CO_2e.
Carbon Intensity	Volume of carbon emissions per million dollars of revenue (carbon efficiency of a portfolio), expressed in tons CO_2e/$M revenue.
Exposure to Carbon-Related Assets	The amount or percentage of carbon-related assets in the portfolio, expressed in $M or percentage of the current portfolio value.

To gauge asset managers' and asset owners' reporting on the WACI metric relative to the four other carbon footprinting and exposure metrics the Task Force highlighted in 2017, the Task Force reviewed PRI signatories' responses on all five metrics. As the chart below shows, the WACI metric has the lowest percentage of responses across all five metrics for each of the three reporting periods shown.

Percentage of Signatories Indicating Use of Metrics to Manage Climate-Related Issues*



* This indicator was mandatory to report for all three reporting periods reviewed.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Asset Manager and Asset Owner Reporting to Clients and Beneficiaries

The appropriate pricing of risks and efficient allocation of capital depends on all parties in the investment chain providing sufficient decision-useful information to one another. Large asset managers and asset owners sit at the top of the investment chain and, therefore, have an important role to play in the allocation of capital and improving disclosures. Asset owners manage large pools of capital in-house and through their external asset managers. Investors with long-term liabilities — such as pension funds and those with implicit obligations for intergenerational wealth transfers such as sovereign wealth funds — have the capacity to invest over long-term horizons and consider the potential impact climate change may have on such investments. Long-term investors have been among the first movers in influencing the companies in which they invest to provide better climate-related financial disclosures and integrating climate-related risks and opportunities into their investment strategies and processes.

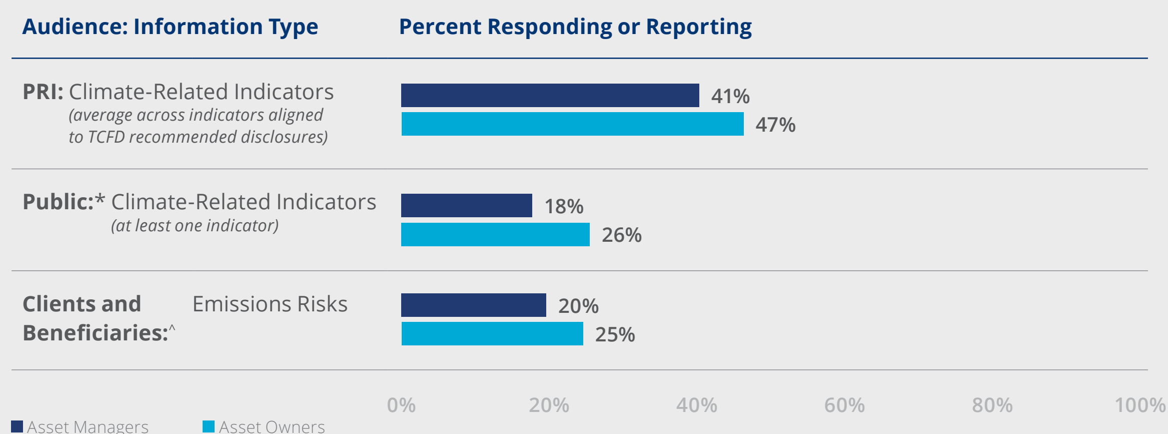
Reporting of climate-related risks and opportunities by asset managers and asset owners to their respective stakeholders (i.e., clients and beneficiaries) allows those stakeholders to better understand climate-related issues and factor them into their investment decisions. Where asset managers' and asset owners' stakeholders better understand climate-related financial exposures, this may prompt additional demand for such reporting and further standard setting for disclosures in this area. Increasing the level of climate-related financial disclosures by asset managers and asset owners may encourage better disclosures across the investment chain — from asset owners to asset managers to underlying companies — enabling better-informed investment decisions.

Given the important role of asset manager and asset owner reporting to their stakeholders, the Task Force sought to better understand the level of such reporting. To do this, the Task Force considered responses on three specific PRI indicators, as shown in Figure A12. These indicators describe reporting on climate-related indicators to three distinct audiences, as follows:

- average response rate of asset managers and asset owners *to the PRI* on climate-related indicators mapped to the Task Force's recommended disclosures (e.g., on average, asset managers responded to the PRI on 41% of the TCFD-aligned climate-related indicators);
- the percent of asset managers and asset owners that made at least one TCFD-aligned climate-related indicator in its PRI report *public*; and
- the percent of asset managers and asset owners that responded to the PRI that they report emissions risk information (which generally aligns with *Metrics and Targets b*) to their *clients, trustees, management, or beneficiaries*, as appropriate.

Figure A12

PRI Signatories' 2020 Reporting on Climate-Related Information



* PRI, *PRI Climate Snapshot 2020*, 2020, p. 4.

^ PRI, *PRI Climate Snapshot 2020*, 2020, p. 14.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Assuming reporting by asset managers and asset owners to their clients and beneficiaries, respectively, falls within the bounds of the percentages shown in Figure A12 (p. 24) — 18% to 41% for asset managers and 25% to 47% for asset owners — the Task Force believes reporting by asset managers and asset owners to their clients and beneficiaries, respectively, may not be sufficient. In this regard, the Task Force encourages asset managers and asset owners to explore resources — such as those on the TCFD Knowledge Hub — aimed at supporting organizations in implementing and disclosing information in alignment with the Task Force's recommendations. Resources for asset managers and asset owners on the TCFD Knowledge Hub include, but are not limited to, the following:[42]

- The Institutional Investors Group on Climate Change's *Addressing Physical Climate Risks: Key Steps for Asset Owners and Asset Managers* and *Addressing Climate Risks and Opportunities in the Investment Process;*[43]
- The Investor Leadership Network's *TCFD Implementation, Practical Insights and Perspectives from Behind the Scenes for Institutional Investors;*[44] and
- PRI's *Implementing the Task Force on Climate-related Financial Disclosures (TCFD) Recommendations: A Guide for Asset Owners.*[45]

In addition, the Task Force believes an important aspect of asset manager and asset owner reporting to their clients and beneficiaries, respectively, relates to the metrics and targets they provide on each product, fund, and investment strategy. Such metrics, ideally, would provide an indication of the level of climate-related risk associated with the products, funds, and investment strategies to support financial decisions. When the Task Force issued its 2017 report, it acknowledged the challenges and limitations of existing metrics and encouraged asset managers and asset owners to advance the development of decision-useful, climate-related risk metrics. The Task Force acknowledges asset managers and asset owners have undertaken useful work in this regard and continues to recognize the challenges associated with identifying decision-useful metrics, including rolling up climate-related metrics and targets at the total portfolio level.

Conclusion

Overall, the Task Force is generally encouraged by the increase in asset manager and asset owner reporting on TCFD-aligned information to the PRI between the 2018 and 2020 reporting periods, particularly in the context of this increase potentially indicating an increase in asset manager and asset owner reporting to their clients and beneficiaries, respectively. However, the Task Force believes reporting by asset managers and asset owners to their clients and beneficiaries, respectively, may not be sufficient and that more progress may be needed to ensure those stakeholders have the right information to make financial decisions.

Although there are encouraging indications of progress in reporting, given that much of the financial reporting by asset managers and asset owners is not in the public domain, the Task Force has not completed a full assessment of the extent and quality of TCFD-aligned reporting at this time. In advance of its next status report, the Task Force will consider ways to gain more direct information on reporting practices by asset managers and asset owners, such as a survey of reporting practices, a comprehensive review of the largest asset managers' and asset owners' reporting to their clients and beneficiaries, respectively, and other possible approaches.

[42] See "Case Studies" on the TCFD Knowledge Hub.

[43] The Institutional Investors Group on Climate Change, *Addressing Physical Climate Risks: Key Steps for Asset Owners and Asset Managers*, May 27, 2020 and *Addressing Climate Risks and Opportunities in the Investment Process*, June 11, 2018.

[44] Investor Leadership Network, *TCFD Implementation, Practical Insights and Perspectives from Behind the Scenes for Institutional Investors*, September 26, 2019.

[45] PRI, *Implementing the Task Force on Climate-related Financial Disclosures (TCFD) Recommendations: A Guide for Asset Owners*, May 11, 2018.

B.
Effective Climate-Related Financial Disclosures

B. Effective Climate-Related Financial Disclosures

In this section, the Task Force highlights specific types of climate-related information that investors, lenders, and others (collectively referred to as users) find the *most* useful for decision-making and includes examples of disclosure of the most useful types of information identified.

This work expands upon the Task Force's two previous status reports, which included several examples of disclosure aligned with the Task Force's 11 recommended disclosures.[46, 47] Those examples were provided to help companies generate ideas for their own disclosures, whereas the examples of disclosure included in this section are intended to help preparers develop more *effective* climate-related financial disclosures.

The Task Force wishes to emphasize there are several characteristics of *effective* climate-related financial disclosures, and ensuring disclosures contain decision-useful (or relevant) information is just one. In fact, in its 2017 report, the Task Force identified seven principles for effective disclosure — which are summarized in Figure B1 — and encouraged companies implementing its recommendations to consider the principles when developing climate-related financial disclosures. The analysis in this section relates to the first principle listed in Figure B1 — represents relevant (or decision-useful) information — and is not meant to diminish the importance of the other six principles.

Figure B1
Principles for Effective Disclosure

Effective disclosures are those with the following characteristics:

1. Represent relevant information
2. Are specific and complete
3. Are clear, balanced, and understandable
4. Are consistent over time
5. Are comparable
6. Are reliable, verifiable, and objective
7. Are provided on a timely basis

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Key Takeaways

Expert users were nearly unanimous in rating a company's description of how climate-related issues have affected its business and strategy as extremely useful, making it the "most useful" piece of information for financial decision-making.

In addition to the impact of climate change on a company's business and strategy, expert users also identified information about a company's material climate-related issues for each *sector* and *geography* and its key metrics as extremely useful for financial decision-making.

Expert users' insights on the most useful information for decision-making may provide a road map for preparers. Companies already disclosing their governance and risk management processes for climate-related issues and working toward full TCFD implementation might consider expert users' relative ranking of specific types of climate-related information — from most useful to least useful — as one factor to consider in prioritizing their efforts.

[46] See Section B.4. Observations by Group and Disclosure Examples in the Task Force's 2018 status report and Section B.3. Climate-Related Financial Disclosures for Select Industries 2016–2018 in the Task Force's 2019 status report.

[47] As noted in the previous two status reports, the examples of disclosure were not intended to represent "best practice" nor demonstrate disclosures that fully meet the associated recommended disclosure. Instead, the examples were provided to help companies generate ideas for their own disclosures.

1. SCOPE AND APPROACH

To identify specific climate-related information that users find the most useful when making financial decisions, the Task Force developed a questionnaire and asked a group of expert users to rate the usefulness of specific types of information. The Task Force organized the questionnaire by its 11 recommended disclosures (see Table A1, p. 10) and then identified specific types of climate-related information — referred to as disclosure elements — for each recommended disclosure. The disclosure elements were drawn from the guidance for all sectors included in the Task Force's 2017 report.[48]

The disclosure elements cover baseline information the Task Force believes is decision-useful and generally applicable to different types of companies across industries and regions. Importantly, disclosure elements range from very specific information, such as how a company defines short-, medium-, and long-term timeframes, to broad concepts like management's role in assessing and managing climate-related issues.

Because the Task Force sought practical insight on the usefulness of nearly 60 specific disclosure elements from investors and other users, it solicited feedback from a small group of *expert* users. Users were considered expert if they were well versed in the TCFD recommendations and regularly use climate-related information in making financial decisions.[49] The expert users that provided feedback came from several of the largest financial institutions, including investors from organizations with over $5 trillion in assets under management, lenders from banks with more than $9 trillion in total assets, and experienced analysts from the major credit rating agencies and their subsidiaries.

To obtain feedback from users in a consistent and measurable form, the Task Force asked expert users to rate the usefulness of specific disclosure elements associated with the 11 recommended disclosures using a five-point scale, with a rating of 1 representing the most useful information and a rating of 5 representing the least useful information, as shown in Figure B2. For purposes of analyzing and summarizing users' feedback on the usefulness of specific types of information for financial decision-making, the Task Force considered the average rating across users for each disclosure element (referred to as a score).[50] The Task Force also looked at the amount of dispersion or variance in users' ratings to understand how aligned users were in their views on the usefulness of the disclosure elements.[51] Information on the score and variance for each of the disclosure elements is provided and discussed in Appendix 5: User Feedback on Disclosure Elements; and a summary of users' feedback and key findings are provided below.

Figure B2

Scale for Rating Usefulness of Information for Decision-Making

Extremely Useful	Very Useful	Somewhat Useful	Slightly Useful	Not Useful
1	2	3	4	5

[48] See Section C.3 Guidance for All Sectors in the Task Force's 2017 report.

[49] To ensure users met these conditions, we solicited feedback from Task Force members in the financial sector and their colleagues as well as other users who provided meaningful feedback on decision-useful information to industry-level groups working on TCFD implementation.

[50] When evaluating a disclosure element's score in terms of how useful it is for decision-making, the Task Force used the scale in Figure A5-2 (p. 95).

[51] Variance represents the measure of variability of users' ratings for a given disclosure element. For example, if five users rated a disclosure element as very useful (2) and another five rated the same disclosure element as somewhat useful (3), the score for that disclosure element would be 2.5 and the variance would be 0.3, indicating users were fairly aligned in their views. In comparison, if five users rated a disclosure element as extremely useful (1) and another five rated the same disclosure element as slightly useful (4), the score for that disclosure element would also be 2.5, but the variance would be 2.3, indicating users differed quite a bit in their views.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

2. SUMMARY OF USERS' FEEDBACK ON USEFULNESS OF DISCLOSURE ELEMENTS

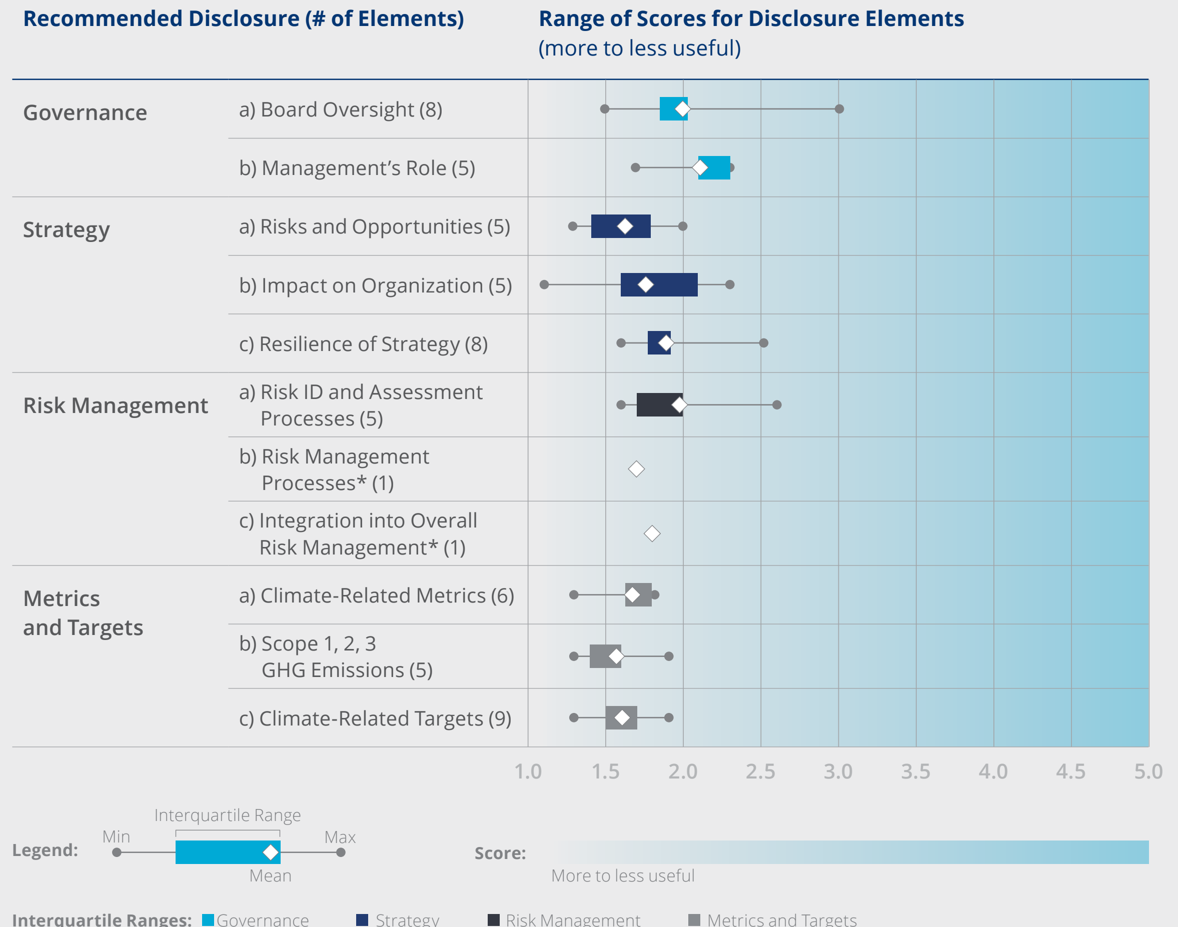
A key goal in seeking expert users' feedback on the disclosure elements was to understand which disclosure elements are viewed as the most useful for financial decision-making to help preparers develop more effective climate-related financial disclosures. To provide an overview of users' feedback across the 11 recommended disclosures, Figure B3 shows the distribution or range of scores for the disclosure elements associated with each recommended disclosure. For a given recommended disclosure, the disclosure element with the lowest score (min) is represented by the leftmost gray circle, and the disclosure element with the highest score (max) is represented by the rightmost gray circle.

The rectangular, colored box between the gray circles represents the interquartile range — which indicates where the middle 50% of the scores fall, and the white diamond represents the mean (or average) of the scores. Importantly, Figure B3 also shows expert users view *all the disclosure elements* as useful for decision-making. In particular, the average rating across users (the score) for the "least useful" disclosure element is 3.0 (see *Governance a*), indicating the disclosure element is considered somewhat useful.[52] All but one of the other disclosure elements have a score between 1.1 (see *Strategy b*) and 2.5 (see *Strategy c*), indicating users consider them extremely useful or very useful. As a result, comparing the usefulness of disclosure elements is a *relative* comparison of usefulness rather than an absolute comparison of useful versus not useful.

Figure B3

Users' Average Ratings on Usefulness of Information

Range of Average Ratings (Scores) for Disclosure Elements by Recommended Disclosure



* *Risk Management b)* and *Risk Management c)* each have only one disclosure element, so there is no interquartile range.

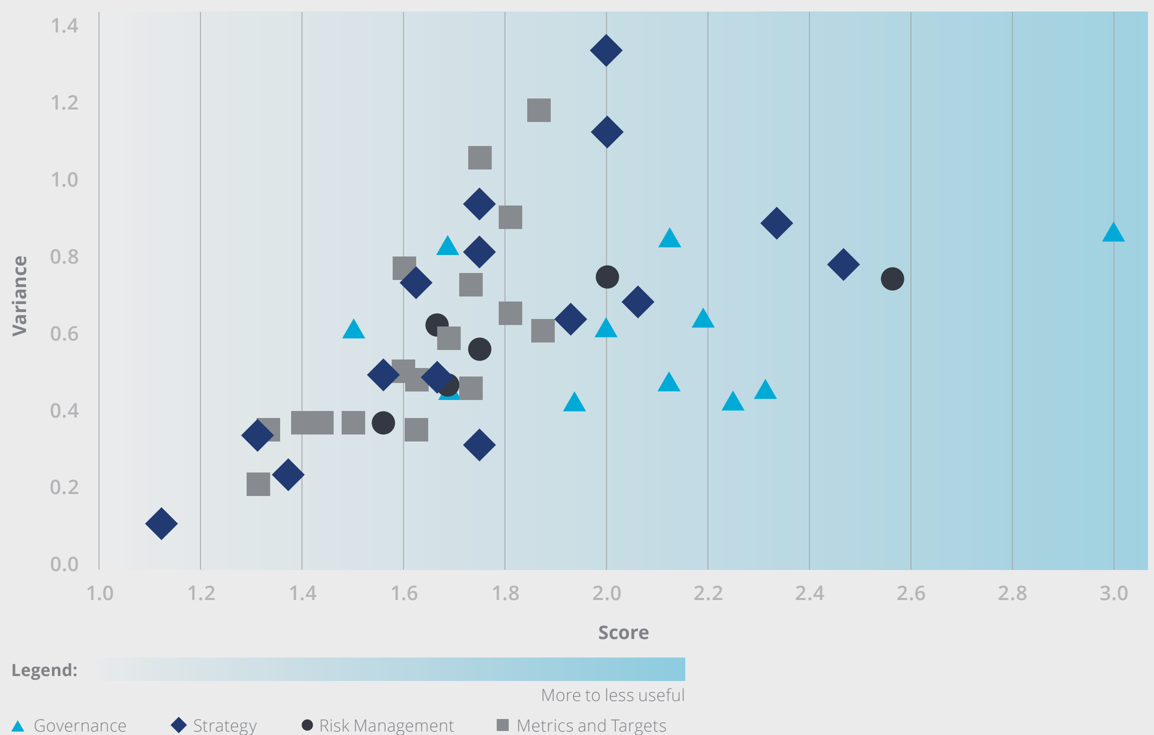
[52] The least useful disclosure element relates to describing the profile and capabilities of the Board on climate-related issues.

Figure B4 also provides an overview of users' feedback across the 11 recommended disclosures.[53] This figure plots the score (horizontal axis) and variance (vertical axis) of each disclosure element to show how the disclosure elements rated the most useful by users also have the lowest variances (highest alignment in ratings). Given that a rating of 1 indicates a disclosure element is extremely useful and a rating of 5 indicates the element is not useful, the closer a disclosure element's score is to 1, the more useful it is for decision-making — based on the expert users' ratings.

The most useful disclosure elements are located in the lower left corner of Figure B4 and the least useful in the lower right corner. The disclosure elements are color-coded according to the recommendation to which they relate. As noted above, all but one of the disclosure elements that the expert users, on average, found extremely useful for decision-making (score of 1.5 or less) are associated with the Strategy and Metrics and Targets recommendations — as indicated by the dark blue circles and gray diamonds shown in the lower left corner of the figure.

Figure B4

Disclosure Elements Plotted by Score and Variance*



* The horizontal axis is truncated at 3 (the outer bound of the disclosure element scores) to improve readability of the figure.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[53] This figure is meant to show the relationship between the score and variance for all disclosure elements by recommendation. Please refer to Appendix 5: User Feedback on Disclosure Elements to see the score and variance for each disclosure element.

To better understand the specific information expert users find the most useful for making financial decisions, the Task Force rank-ordered the disclosure elements from most useful to "least" useful. Figure B5 lists the top ten most useful disclosure elements. Notably, the top ten disclosure elements all have a score of 1.5 or less, indicating users find them extremely useful for decision-making.

Figure B5

Top Ten Most Useful Disclosure Elements by Score and Variance

Recommended Disclosure	Disclosure Element	Score	Var*	Rank
Strategy b)	How climate-related issues have **affected business and strategy**	1.1	0.1	1
Metrics and Targets a)	**Key metrics on climate-related issues** for most recent period and historical periods	1.3	0.2	2
Strategy a)	The **material climate-related issues** identified for **each sector and geography**	1.3	0.3	3
Metrics and Targets b)	**Scope 1 GHG emissions** for the most recent period and historical periods	1.3	0.4	4
Metrics and Targets c)	Climate-related **targets related to GHG emissions**	1.3	0.4	5
Strategy a)	The **material climate-related issues identified**	1.4	0.2	6
Metrics and Targets b)	**Scope 2 GHG emissions** for the most recent period and historical periods	1.4	0.4	7
Metrics and Targets c)	The **timeframes** over which climate-related **targets** apply	1.4	0.4	8
Metrics and Targets c)	**Key performance indicators** used to assess progress against **climate-related targets**	1.5	0.4	9
Governance a)	Board consideration of climate-related issues for **major capital expenditures, acquisitions, and divestitures**	1.5	0.6	10

* Var. refers to variance.

Overall, expert users identified the single most useful disclosure element as a company's description of how its climate-related risks and opportunities have affected its business and strategy (Figure B5). Other disclosure elements included in the top ten are information about a company's specific material climate-related risks and opportunities, a range of climate-related metrics and targets — including Scope 1 and Scope 2 GHG emissions, and whether a company's board considers climate-related issues for major capital expenditures, acquisitions, and divestitures.

In terms of information about a company's material climate-related risks and opportunities, expert users are interested in this information being broken down by sector and geography. Such information is often needed by users to appropriately assess the risks to a company. Sector-level information may be used to evaluate how government policy actions aimed at constraining GHG emissions could affect different aspects of a company's business activities — as emission-intensive sectors would likely be more affected than others. Geographic information may be used to evaluate the potential impact of climate-related physical risks on a company and its operations since such risks can vary greatly depending on location. In addition, such information may also be relevant for climate-related transition risks, as government policies such as carbon pricing differ by jurisdiction.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

A.
State of Climate-Related Financial Disclosures

**B.
Effective Climate-Related Financial Disclosures**

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

As noted previously, Appendix 5: User Feedback on Disclosure Elements contains information on all the disclosure elements rated by the group of expert users. The Task Force believes the scores associated with the various disclosure elements, when ordered from low to high (or most useful to least useful), may provide valuable insight for companies interested in prioritizing their implementation efforts. For example, if a company has implemented the Governance and Risk Management recommendations — which are often a starting point for TCFD implementation — and recently determined climate-related risks are material to the company, that company may find the relative ranking of the disclosure elements associated with the Strategy and Metrics and Targets recommendations useful as it develops a plan for reporting.[54] The Task Force encourages companies to use its Strategy and Metrics and Targets recommendations for disclosing the actual and potential impacts of climate-related issues on the company and the metrics and targets the company uses to assess and manage relevant climate-related issues *where such information is material*. In addition, companies interested in enhancing their existing climate-related financial disclosures may find the relative ranking of the disclosure elements across *all four* recommendations useful in prioritizing enhancements. Figure B6 (p. 33) shows a possible prioritization of information to disclose for a hypothetical company that wants to enhance its existing reporting and expand reporting to cover the Strategy and Metrics and Targets recommendations.

The first phase of the illustrative implementation plan shown in Figure B6 (p. 33) describes the starting point for many companies in implementing the TCFD recommendations, which is disclosing information on their governance and risk management practices. For purposes of the illustrative implementation plan, we assume our hypothetical company has established this foundation for disclosure before implementing the elements outlined in the second phase. In the second phase, our hypothetical company focuses on the top ten disclosure elements shown in Figure B5 (p. 31) to prioritize the disclosure of

[54] Since it issued its recommendations, the Task Force has consistently encouraged companies in early stages of evaluating the impact of climate change on their businesses and strategies and those that have determined climate-related issues are not material to disclose information related to the Governance and Risk Management recommendations. For companies with material climate-related risks, the Task Force recommends they disclose information related to the Strategy and Metrics and Targets recommendations.

Figure B6

Illustrative Implementation Plan Based on Expert Users' Ratings

Phase 1: Foundation for TCFD Disclosures

The Task Force encourages companies to disclose information related to its Governance and Risk Management recommendations to provide investors and others with the context in which financial and operating results are achieved. The Task Force views such information as the foundation for effective climate-related financial disclosure.

For purposes of this illustrative implementation plan, we assume a company is disclosing the foundational elements and wants to ***enhance*** its existing reporting on Governance and Risk Management and ***expand*** reporting to cover Strategy and Metrics and Targets.

Governance

- a Board's oversight of climate-related issues
- b Management's role in assessing and managing climate-related issues

Risk Management

- a Processes for identifying and assessing climate-related risks
- b Processes for managing climate-related risks
- c How these processes are integrated into overall risk management

Phase 2: Enhancements and Additions

A company interested in enhancing or expanding its climate-related financial disclosures may find expert users' views on the most useful disclosure elements useful in prioritizing its implementation efforts. Once the foundation is laid, a company could focus on the "top ten" disclosure elements, which expert users, on average, rated as Extremely Useful.*

Governance

- a How the board considers climate-related issues in reviewing major capital expenditures, acquisitions, and divestitures

Strategy

- a Material climate-related issues by sector and geography
- b How these issues have affected business and strategy

Metrics and Targets

- a Key metrics used to measure and manage climate-related issues for past three+ years
- b Scope 1 and Scope 2 GHG emissions for past three+ years
- c Climate-related targets related to GHG emissions, associated timeframes, and base year
- c Key performance indicators used to assess progress against climate-related targets

** Three of the top ten disclosure elements have been combined with a related disclosure element, resulting in the seven items noted here.*

Phase 3: Enhancements and Addition of Strategy Resilience

Once a company discloses information aligned with the TCFD's four recommendations and has had time to explore the use of climate-related scenario analysis, it may be ready to disclose the resilience of its strategy under different climate-related scenarios and make further enhancements to existing areas of disclosure. A possible path forward, using the next most useful disclosure elements based on expert users' average ratings, is outlined below.

Governance

- a How the board considers climate-related issues when reviewing and guiding strategy

Risk Management

- a Whether company considers existing and emerging regulatory requirements related to climate change

Metrics and Targets

- a How climate-related performance metrics are incorporated into remuneration policies
- b Methodologies used to calculate or estimate climate-related metrics
- c Scope 3 GHG emissions for past three+ years
- c Identification of climate-related targets as absolute or intensity based
- c Methodologies used to calculate or estimate climate-related targets

Strategy

- a Timeframes (short, medium, or long term) associated with material climate-related issues and definitions of timeframes
- b How material climate-related issues have affected financial planning
- b How climate-related scenarios inform strategy/financial planning
- c Resilience of strategy to climate-related issues, including an indication of direction or range of potential financial implications
- c Climate-related scenarios and associated time horizon(s) used
- c Sensitivity to carbon pricing, if applicable

Further Enhancements

A company should also consider disclosing other elements that expert users identified as Very Useful (see Appendix 5).

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

information identified as extremely useful for financial decisions.[55] Now that our hypothetical company has disclosed information associated with ten of the TCFD's 11 recommended disclosures, it is ready to enhance its existing disclosures and begin disclosing information on the resilience of its strategy under different climate-related scenarios as shown in the third phase. The Task Force recognizes companies may need time internally to work through using scenario analysis and determining whether the results of such analyses warrant disclosure.

3. EXAMPLES OF EFFECTIVE CLIMATE-RELATED FINANCIAL DISCLOSURES

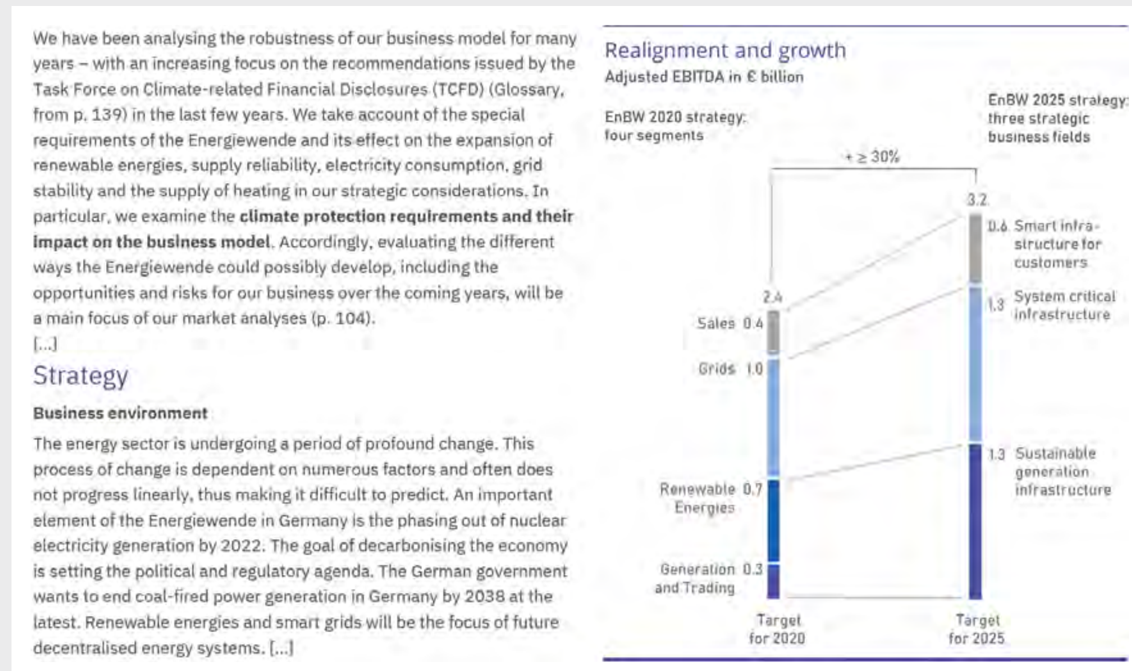
In this section, the Task Force provides examples of climate-related financial disclosures that address the top ten most useful disclosure elements based on expert users' feedback. The sub-headings below indicate the specific disclosure element that each example (or examples) represents, and the order of the examples is based on the rank of the disclosure elements shown in Figure B5 (p. 31), beginning with the most useful element (rank of 1). In addition, the examples included below may not be applicable in all sectors and should be considered within the context of the sector in which the company operates.

1. IMPACT OF MATERIAL CLIMATE-RELATED ISSUES ON BUSINESS AND STRATEGY

The most useful disclosure element identified by users relates to information on how climate-related issues have affected a company's business and strategy. Figure B7 provides an electric utilities company's description of its analysis of climate requirements and their impact on the business model.

Figure B7

Impact on Business and Strategy



We have been analysing the robustness of our business model for many years – with an increasing focus on the recommendations issued by the Task Force on Climate-related Financial Disclosures (TCFD) (Glossary, from p. 139) in the last few years. We take account of the special requirements of the Energiewende and its effect on the expansion of renewable energies, supply reliability, electricity consumption, grid stability and the supply of heating in our strategic considerations. In particular, we examine the **climate protection requirements and their impact on the business model**. Accordingly, evaluating the different ways the Energiewende could possibly develop, including the opportunities and risks for our business over the coming years, will be a main focus of our market analyses (p. 104).

[...]

Strategy

Business environment

The energy sector is undergoing a period of profound change. This process of change is dependent on numerous factors and often does not progress linearly, thus making it difficult to predict. An important element of the Energiewende in Germany is the phasing out of nuclear electricity generation by 2022. The goal of decarbonising the economy is setting the political and regulatory agenda. The German government wants to end coal-fired power generation in Germany by 2038 at the latest. Renewable energies and smart grids will be the focus of future decentralised energy systems. [...]

EnBW, Integrated Annual Report 2019, pp. 33, 41, and 43

Note: Some content was reformatted in order to fit the page; and some content was removed, denoted by [...].

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[55] Three of the top ten disclosure elements have been combined with a related disclosure element, resulting in the seven items listed under *Phase 2: Enhancements and Additions* in Figure B6 (p. 33).

2. KEY METRICS ON CLIMATE-RELATED ISSUES

The second most useful disclosure element identified by users relates to key metrics on climate-related issues for the most recent period and historical periods. Figure B8 provides a description of why water preservation is important for a fertilizer company along with its water usage metrics.

Figure B8

Key Climate-Related Metrics

Why is this topic relevant to our business?

Water is an essential input to our operations, especially in mining and fertilizer production. It is also a resource that we share with surrounding communities. Using water efficiently and protecting water quality helps us maintain positive relationships with stakeholders and ensures operational stability.

Our approach

We focus on reducing freshwater use, increasing the amount of water we recycle, and protecting water quality.

Water use

Our primary uses of water are for raw material transportation and milling in our mining operations, and for steam generation and process cooling at our fertilizer production facilities. A smaller volume of water is used to produce some of our liquid products. Water availability is crucial for our two phosphate and six potash mining operations. At each mine site, the ore is mixed with recycled water to form a slurry, which is pumped from the mine site to our processing facilities. The ore is then screened, washed and floated, using large volumes of water, to produce potash and phosphate rock.

The majority of our fertilizer production facilities use freshwater resources (for example, rivers or groundwater) to supply the water needed for operations. To minimize this impact, we seek to use alternative water sources where feasible, including gray water, ocean water, or recycled water within our own facilities. Most of our production locations recycle water numerous times in a closed-loop system, which helps us reduce our freshwater usage.

Environmental Impacts of Products and Services

[...]

Our Approach

[...]

Water use: Water is required for crop irrigation in many arid growing environments. Given climate change and growing competition for water resources amid increasing water scarcity, finding opportunities to make agriculture more water efficient is key.

Performance Table

[...]

Environment (continued)	Units	2019	2018
[...]			
Water			
Total water intake, by source	million m^3	217	208
Groundwater	million m^3	48	33
Mine dewatering/depressurization	million m^3	47	48
Surface water	million m^3	106	109
Industrial/municipal water	million m^3	16	18
Water intake in regions with High or Extremely High Baseline Water Stress	million m^3	3.4	3.8
Percentage water intake in regions with High or Extremely High Baseline Water Stress	percent	1.6	1.8
Total water discharge, by destination	million m3	224	262
Surface water	million m^3	223	261
Municipal treatment	million m^3	1	1

Nutrien, 2020 Environmental, Social and Governance (ESG) Report, pp. 21, 24, and 55

Note: Some content was reformatted in order to fit the page.; and some content was removed, denoted by [...].

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

3. MATERIAL CLIMATE-RELATED ISSUES IDENTIFIED FOR EACH SECTOR AND GEOGRAPHY

Closely following the second most useful disclosure element identified by users is information on the material climate-related issues identified for *each sector* (see Figure B9) *and geography* (see Figure B10, p. 37). The example shown in Figure B9 provides information on a bank's climate-related risks for specific sectors, including how sensitive each sector is to transition and physical climate-related risks.

Figure B9

Climate-Related Risks by Sector

Climate-sensitive sectors are those most impacted by the transition risks and physical risks of climate change. The factors that drive transition risk and physical risk are defined by the TCFD recommendations. In 2019, we assessed the relative sensitivity of sectors to these climate risk drivers to inform our risk management approach. Sector sensitivity to climate risk drivers does not mean that those risks will be realized for all clients in that sector. The impact at a client-level will depend on factors such as geography, location of assets and mitigation strategies.

Table 1: Client sectors most sensitive to transition risk

Sectors	Credit risk[9]		Climate risk drivers[10]				
	$bn	% of total exposure	Technology	Policy	Markets	Legal	Reputation
Wholesale							
Automotive	$17.0	1.5%					
Oil & gas	$20.2	1.8%					
Industrial products	$16.6	1.5%					
Mining & metals	$6.8	0.7%					
Transportation	$14.1	1.3%					
Utilities	$32.7	3.0%					
Sub-total	**$107.4**	**9.8%**					

Examples of potential impacts for clients in these sectors may include

- Changes in demand for goods/ services
- Reduced revenue
- Increased operating and production costs
- Asset devaluation
- Difficulty accessing financing
- Increased capital costs
- Business model failures
- Reputational damage
- Legal fines or judgments

Table 2: Client sectors most sensitive to physical risk

Sectors	Credit risk[9]		Climate risk drivers[10]	
	$bn	% of total exposure	Chronic[11]	Acute[11]
Wholesale				
Agriculture	$10.9	1.0%		
Forest products	$2.3	0.2%		
Industrial products	$16.6	1.5%		
Mining & metals	$6.8	0.6%		
Real estate & related	$74.9	6.8%		
Retail				
Residential mortgages & home equity lines of credit	$380.9	34.6%		
Sub-total	**$492.3**	**44.8%**		

Examples of potential impacts for clients in these sectors may include

- Change in asset valuation
- Impaired assets, write-offs and early retirement of existing assets
- Lower property values
- Increased capital costs and operating costs
- Reduced or disrupted production capacity
- Reduced revenue from lower sales or output
- Increased insurance premiums or inability to insure

Legend

More sensitive — Less sensitive

9 Amounts are derived from the Credit risk exposure by portfolio, sector and geography table for the year ended October 31, 2019 as provided in our 2019 Annual Report. The amounts present credit risk exposures under the Basel regulatory defined classes and reflects exposures at default. The classification of our sectos aligns with our view of credit risk by industry. These amounts represent our total on- and off-balance sheet credit risk exposure for each sector as at October 31, 2019. These amounts do not include counterparty credit risk. The proportion of credit exposure by sector and relative sensitivity to the climate risk factors is indeterminable and may vary based on several factors such asgeography.

10 The climate risk drivers are defined in the final TCFD Recommendations (June 2017), p. 56. The relative sensitivity of sectors to transition and physical risk drivers in Tables 1 & 2 is based on our judgement informed by resources that include third party publications, engagement with external experts and participation inindustry working groups, including the Canadian Bankers Association TCFD Working Group and UN Environment Programme – Finance Initiative's TCFD pilot project (2018).

11 Physical risk includes both chronic and acute risks. Chronic refers to longterm changes in climate patterns (e.g., higher temperatures, increased precipitation) and acute refers to extreme weather events (e.g., increased intensity and frequency of storms).

Royal Bank of Canada, Task Force on Climate-related Financial Disclosures Report 2019, pp. 10 and 16

Note: Some content was reformatted in order to fit the page.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

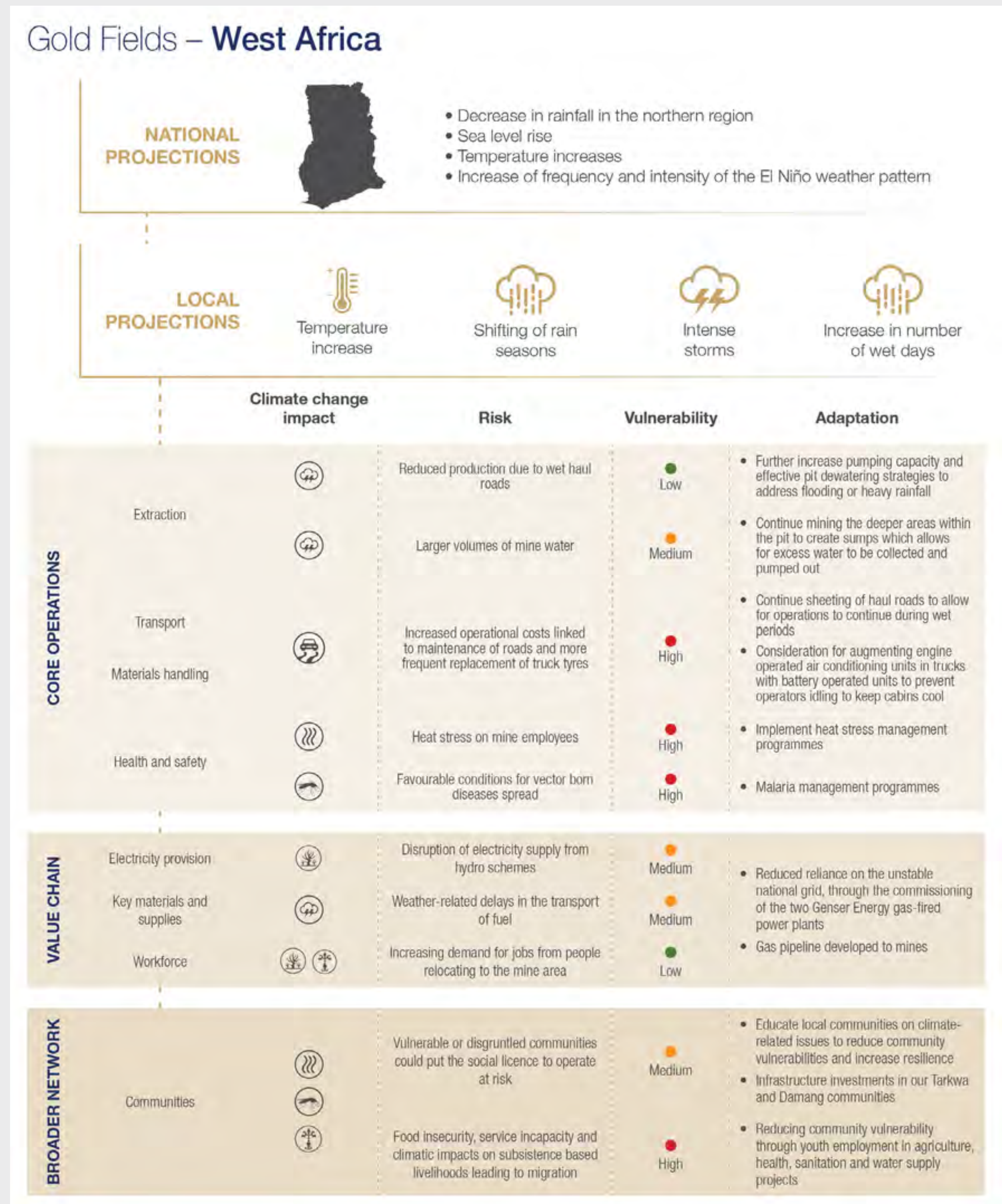
E.
Initiatives Supporting TCFD

Appendices

The example shown in Figure B10 provides a metals and mining company's description of its key climate-related risks for a specific region. The company's report also includes similar information for three other regions — Australia, South Africa, and Peru (not included below).

Figure B10

Climate-Related Risks by Region



Gold Fields, Our 2019 Climate Change Report, p. 6

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

4. SCOPE 1 GHG EMISSIONS FOR MOST RECENT AND HISTORICAL PERIODS

The next most useful disclosure element relates to the Metrics and Targets recommendation and is the reporting of a company's Scope 1 GHG emissions for the most recent period and historical periods. The example included in Figure B11 is from a multinational aerospace and defense company. In its 2019 annual report, the company provides its Scope 1 GHG emissions (and Scope 2 GHG emissions) for the past five years. In addition, the company mentions it uses the GHG Protocol using the operational control approach and emission factors from the Government of the United Kingdom.

Figure B11

Scope 1 (and Scope 2) GHG Emissions

Greenhouse gas emissions

In 2019, our total net greenhouse gas (GHG) emissions were 586 kilotonnes carbon dioxide equivalent (ktCO_2e). This represents a decrease of 3% compared with 602 ktCO_2e in 2018.

Aspect	Tonnes CO_2e	2015	2016	2017	2018	2019
Emissions from activities for which the Company owns or controls including the combustion of fuel and operation of facilities. Direct GHG emissions (Scope 1)	Global (excluding UK)	209,302	229,691	254,032	250,237	**247,159**
	UK	108,325	103,581	99,918	85,120	**91,396**
Emissions from the purchase of electricity, heat, steam and cooling purchased for our use. Indirect GHG Emissions (Scope 2) location-based	Global (excluding UK)	170,276	168,849	161,115	166,199	**161,035**
	UK	173,535	144,334	122,657	100,827	**86,548**
Total gross GHG emissions	Global (excluding UK)	379,578	398,540	415,147	416,436	**408,193**
	UK	281,861	247,915	222,575	185,947	**177,944**
Energy consumption used to calculate emissions – kWh	Global (excluding UK)	1,538,198,000	1,639,939,000	1,694,823,000	1,707,642,000	**1,648,572,000**
	UK	885,952,000	832,549,000	811,948,000	762,917,000	**767,701,000**
Intensity Ratio (total GHG emissions per £m revenue)	Total	0.054	0.047	0.046	0.040	**0.038**
Emissions from the purchase of electricity, heat, steam and cooling purchased for our use. Indirect GHG emissions (Scope 2) market-based	Global (excluding UK)	–	–	–	–	**–**
	UK	–	–	–	–	**874**
Outside of Scopes	Global (excluding UK)	–	–	–	–	**–**
	UK	–	–	–	–	**19,336**

The above figures include 230,972,000 kWh of renewable energy purchased via a long-term Power Purchase Agreement (PPA) for use by our facilities based in the UK, supplied through a third party. The source includes a proportion of electricity that was generated by the combustion of biofuel. The associated emissions are included above under the location-based Scope 2 emissions (using grid average emission factors). They are also reported separately as market-based Scope 2 emissions (covering the emissions of nitrous oxide and methane) and Outside of Scopes (covering the emissions of carbon dioxide). This has resulted in a net reduction of 39 kilotonnes from our total GHG emissions.

In addition, the above figures include 7,354,000 kWh of electricity generated on-site from renewable energy sources.

The figures for 2015 through to 2018 inclusive have been restated to remove emissions associated with the Commercial Marine business sold on 1 April 2019. Figures for 2015 exclude emissions associated with ITP Aero (which became a wholly owned subsidiary on 19 December 2017). We have included the reporting of fugitive emissions of hydrofluorocarbons (HFCs), associated with air conditioning equipment, into our GHG emissions figures from 2016. These include emissions from our facilities in the UK, US, Canada and France only. We do not anticipate that emissions from other facilities will have a material impact.

With the exceptions noted above, we have reported on the underlying energy use and emission sources required under the Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018. All these sources fall within the scope of our Consolidated Financial Statements.

We have used the GHG Protocol Corporate Accounting and Reporting Standard (revised edition) as of 31 December 2014 utilising the operational control approach and emission factors from the UK Government's GHG Conversion Factors for Company Reporting 2019. We report our emissions of: carbon dioxide; methane; nitrous oxide; hydrofluorocarbons; and perfluorocarbons on a carbon dioxide equivalent basis. We have no emissions of sulphur hexafluoride or nitrogen trifluoride.

Rolls-Royce Holdings plc, Annual Report 2019, p. 209

Note: Some content was reformatted in order to fit the page.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

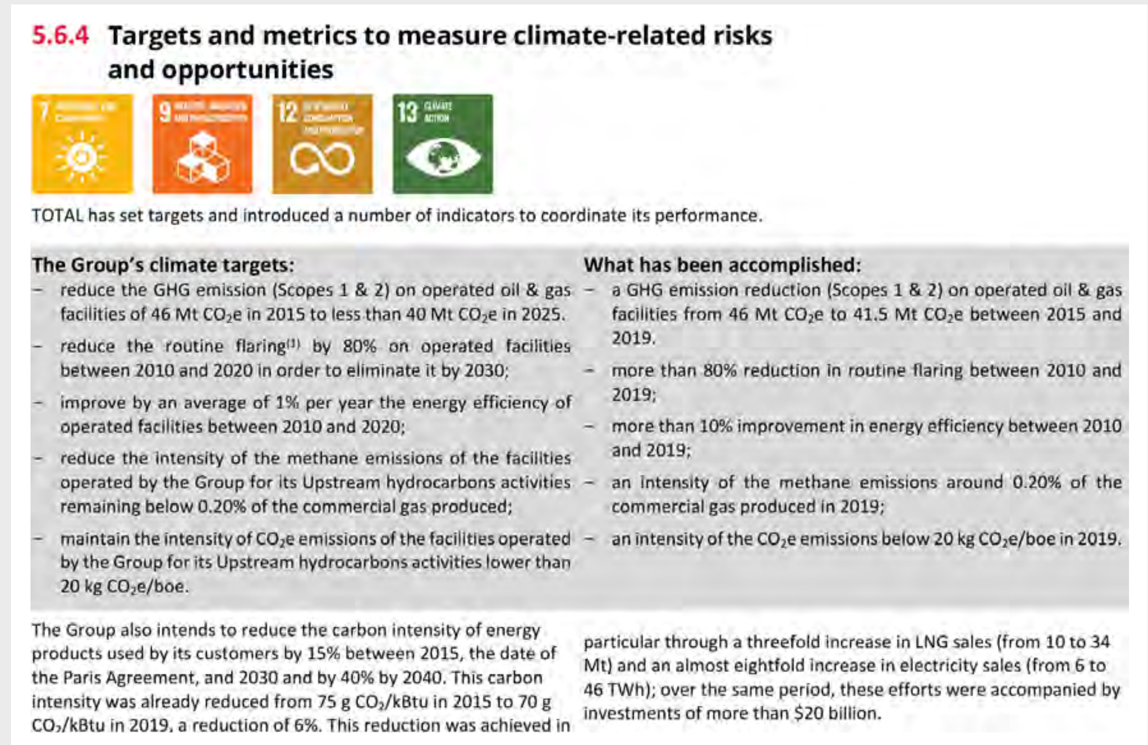
Appendices

5. CLIMATE-RELATED TARGETS RELATED TO GHG EMISSIONS

The next most useful disclosure element also falls under the Metrics and Targets recommendation: climate-related targets related to GHG emissions. The example included in Figure B12 is from the financial filing of a multinational integrated oil and gas company. The company has set specific targets for reducing carbon dioxide equivalent (CO_2e) emissions and outlines how it has performed against its goals.

Figure B12

Targets Related to GHG Emissions



5.6.4 Targets and metrics to measure climate-related risks and opportunities

TOTAL has set targets and introduced a number of indicators to coordinate its performance.

The Group's climate targets:

- reduce the GHG emission (Scopes 1 & 2) on operated oil & gas facilities of 46 Mt CO_2e in 2015 to less than 40 Mt CO_2e in 2025.
- reduce the routine flaring[1] by 80% on operated facilities between 2010 and 2020 in order to eliminate it by 2030;
- improve by an average of 1% per year the energy efficiency of operated facilities between 2010 and 2020;
- reduce the intensity of the methane emissions of the facilities operated by the Group for its Upstream hydrocarbons activities remaining below 0.20% of the commercial gas produced;
- maintain the intensity of CO_2e emissions of the facilities operated by the Group for its Upstream hydrocarbons activities lower than 20 kg CO_2e/boe.

What has been accomplished:

- a GHG emission reduction (Scopes 1 & 2) on operated oil & gas facilities from 46 Mt CO_2e to 41.5 Mt CO_2e between 2015 and 2019.
- more than 80% reduction in routine flaring between 2010 and 2019;
- more than 10% improvement in energy efficiency between 2010 and 2019;
- an intensity of the methane emissions around 0.20% of the commercial gas produced in 2019;
- an intensity of the CO_2e emissions below 20 kg CO_2e/boe in 2019.

The Group also intends to reduce the carbon intensity of energy products used by its customers by 15% between 2015, the date of the Paris Agreement, and 2030 and by 40% by 2040. This carbon intensity was already reduced from 75 g CO_2/kBtu in 2015 to 70 g CO_2/kBtu in 2019, a reduction of 6%. This reduction was achieved in particular through a threefold increase in LNG sales (from 10 to 34 Mt) and an almost eightfold increase in electricity sales (from 6 to 46 TWh); over the same period, these efforts were accompanied by investments of more than $20 billion.

Total, Universal Registration Document 2019, p. 232

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

6. MATERIAL CLIMATE-RELATED RISKS AND OPPORTUNITIES IDENTIFIED

Expert users also identified information on a company's material climate-related issues — *even* in the absence of such information being provided by sector or geography — as one of the top ten most useful disclosure elements (see 3. Material Climate-Related Issues Identified for Each Sector and Geography, p. 36). Figure B13 provides a financial institution's description of its material climate-related transition risks and opportunities. The financial institution's report includes additional climate-related transition and physical risks and opportunities, which are not included in the figure below.

Figure B13

Material Climate-Related Risks and Opportunities

3.1.3 Climate-related credit risks identified

Risks associated with climate change, both physical (increased frequency of extreme weather events) and transition-related (new carbon regulations, technological and market changes), have been identified as factors that could aggravate the Group's existing risks.

[...]

Table 3: Climate-related credit risks identified

	Risk driver	Financial impact identified	Horizon
Transition	**Policy and regulation** Increased pricing of GHG emissions Enhanced emissions- reporting obligations Mandates on and regulation of existing products and services	• Higher operating costs for most carbon intensive customers • Article 173 of the French Energy Transition for Green Growth Act requires greenhouse gas emissions generated by the company's businesses, particularly using the goods and services that it produces, to be reported via significant balance sheet items. This is expected to impact Societe Generale's customers & direct operations in the transport, metals & mining, power generation and oil & gas globally.	MT-LT
Transition	**Technology** Substitution of existing products and services with lower GHG options Unsuccessful investment in new technologies Costs to transition to lower emissions technology	• Capital investments in technology development: Power generators customers with a high share of fossil fuel generation are expected to experience high capital expenditure requirements to decarbonize their mixes. • Write-offs and early retirement of existing assets due to technology changes: Decommissioning costs and stranded assets in the power sector and oil & gas sector. This is expected to impact Societe Generale's customers in transport, metals & mining, power generation and oil & gas globally.	MT-LT

[...]

3.2.2 Climate-related opportunities identified

Sector-wise, Societe Generale sees a wide range of opportunities arising from the energy transition across all sectors in the economy. Annex B offers an overview of opportunities in these sectors. Sectors that will require the most financing include:

Table 4: Climate-related opportunities identified

Sector	Opportunities	Horizon
Construction	Refurbishment of old buildings	ST
Power	Deployment of renewable capacity, electricity storage Energy efficiency services and CCS in the longer term	ST-LT
Oil & Gas	Carbon Capture & Storage Liquefied Natural Gas	ST-LT
Chemistry	Manufacturing of biodegradable and recyclable plastic	MT-LT

[...]

Société Générale, Societe Generale's Task Force on Climate-related Financial Disclosures Report, pp. 11 and 13

Note: Some content was reformatted in order to fit the page; and some content was removed, denoted by [...].

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

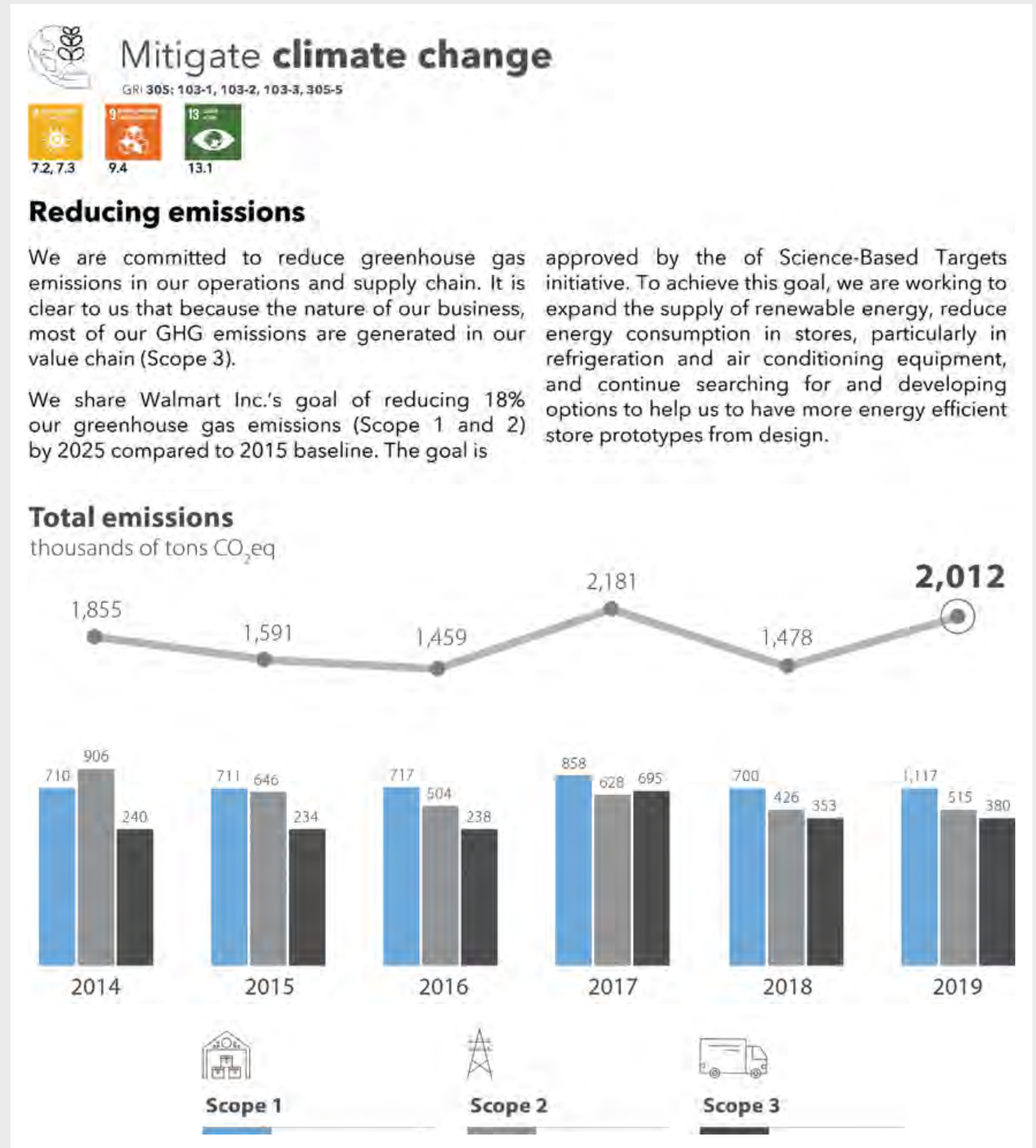
Appendices

7. SCOPE 2 GHG EMISSIONS FOR MOST RECENT AND HISTORICAL PERIODS

The next most useful disclosure element users identified is Scope 2 GHG emissions for the most recent period and historical periods. The example shown in Figure B14 provides a food and staples retailing company's reporting of its Scope 2 GHG emissions (as well as Scope 1 and Scope 3 GHG emissions) since 2014.

Figure B14

Scope 2 GHG Emissions (and Scope 1 and Scope 3)



Walmart de México y Centroamérica, Financial and Corporate Responsibility Report 2019, p. 96

Note: Some content was reformatted in order to fit the page.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

8. TIMEFRAMES OVER WHICH CLIMATE-RELATED TARGETS APPLY

The next most useful disclosure element identified by users is related to the timeframes over which climate-related targets apply. Figure B15 provides an example of the timeframes a technology hardware, storage, and peripherals company has set around its targets to reduce water use.

Figure B15

Climate-Related Targets and Timeframes

3.3.2 Response to Water Risks

In the production of the motion picture and photographic film that had formed the mainstay of its business operations since its foundation, the Fujifilm Group had made extravagant use of clean water. For this reason, the Group has taken early steps in reducing water use and in water recycling. In face of the recent growth in the interest focused on water risks as an important international issue, the Group is implementing further steps for the reduction and efficient use of water resources. Due to the concern over the possible expansion of areas stricken by water shortage issues, the Group created a matrix system for water risk evaluation in 2014 that uses conditions in "water stress regions" and "impact on businesses based on water usage" as its two indicators, and has engaged in continual evaluation of water risks for all business operations under the Group. At the same time, Fujifilm contributes to issues on water treatment in society by providing its product and services, including filtration materials.

Targets and Progresses on Water

Long-term target:	Reduce the amount of water the Fujifilm Group uses for production by 30% by FY2030 (compared to the FY2013 level) Progress: 15% reduction at the end of FY2018 (compared to the FY2013 level)
Mid-term target:	Reduce the amount of water the Fujifilm Group uses for production by 15% by FY2020 (compared to the FY2013 level) Progress: 15% reduction at the end of FY2018 (compared to the FY2013 level)
Short-term Target:	Reduce the amount of water the Fujifilm Group uses for production by 1% by FY2019 (compared to the FY2018 level)

Fujifilm Group, Sustainability Report 2019, p. 54

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

9. KEY PERFORMANCE INDICATORS USED TO ASSESS PROGRESS AGAINST CLIMATE-RELATED TARGETS

The group of expert users identified key performance indicators (KPIs) as the ninth most useful disclosure element. Figure B16 provides an insurance company's reporting of its climate-related targets as well as its progress toward fulfilling those targets. The last column in the top half of the figure provides references to the data tables in the company's report where additional information (i.e., key performance indicators) can be found for each topic. The table in the bottom half of the figure shows the KPIs used to measure progress of investments in renewable energy relative to the target.

Figure B16

KPIs Used to Assess Progress Against Climate-Related Targets

DATA AND PERFORMANCE:

06.1 OUR TARGETS AND ACHIEVEMENTS

CLIMATE INTEGRATION

Topic	Targets 2019	Progress and Achievements 2019	Targets 2020 and beyond	[Ref.]
CLIMATE STRATEGY	• Set long-term climate targets for our proprietary investments and business operations in line with the Paris Climate Agreement's goal to limit global warming to well below 2°C. • In the first half of 2019, we will run pilot portfolios on climate-related target-setting and steering which will ideally allow us to identify data gaps, derive monitoring and steering approaches and metrics as well as potential investment management actions.	• Actively contributed to setting up the UN-convened Net-Zero Asset Owner Alliance, a group of asset owners committed to reduce the GHG emissions of their investment portfolios to net-zero by 2050, consistent with a maximum temperature rise of 1.5°C. • In the first half of 2019, we ran pilot portfolios on climate-related target-setting and steering which allowed us to identify data gaps, derive monitoring and steering approaches and metrics as well as potential investment management actions. The results of this will now be used in the operationalization of the Asset Owner Alliance commitment.	• Set long-term and intermediary climate targets for our proprietary investments and business operations in 2020 in line with the Paris Climate Agreement's goal to limit global warming to 1.5°C. • Reduce GHG emissions of proprietary investment portfolio to net-zero by 2050.	Sections 02.2; 05
[...]	[...]	[...]	[...]	[...]
RENEWABLE ENERGY	• Increase debt and equity investments in renewable energy in the mid-term.	• Investments of 7.2 billion Euro (2018: 6.8 billion Euro) in renewable energy.	•	Section 03.2.2 Table ESG–8
	• Achieve 100% green electricity for our operations by 2023 within Allianz Group.	• Achieved a share of 49% green electricity of total electricity used (2018: 45%) within Allianz Group.	• Achieve 100% green electricity for our operations by 2023 within Allianz Group.	Section 04.7 Table ENV–5
[...]	[...]	[...]	[...]	[...]

DATA AND PERFORMANCE:

06.3 ESG PERFORMANCE DATA

Table ESG–8

SUSTAINABILITY INVESTMENTS

Proprietary Investments € bn

As of December 31	2019	2018	2017[6]
Renewable Energy Investments	7.2	6.8	5.6
thereof: Infrastructure Equity	4.3	3.8	3.7
thereof: Infrastructure Debt	2.9	3.0	1.9
Certified Green Buildings	14.6	13.3	11.4
thereof: Equity Investments	11.7	10.9	8.8
thereof: Debt Investments	2.9	2.4	2.6
Green Bonds	5.6	3.6	2.5
Sustainability bonds	1.0	0.4	n/a
Social bonds	0.8	0.8	n/a
Other	0.2	0.2	0.2
Total	29.4	25.1	19.7

[...]

[6] 2017 data has not been part of the assurance scope.

Allianz Group, Sustainability Report 2019, pp. 82 and 88

Note: Some content was reformatted in order to fit the page; and some content was removed, denoted by [...].

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

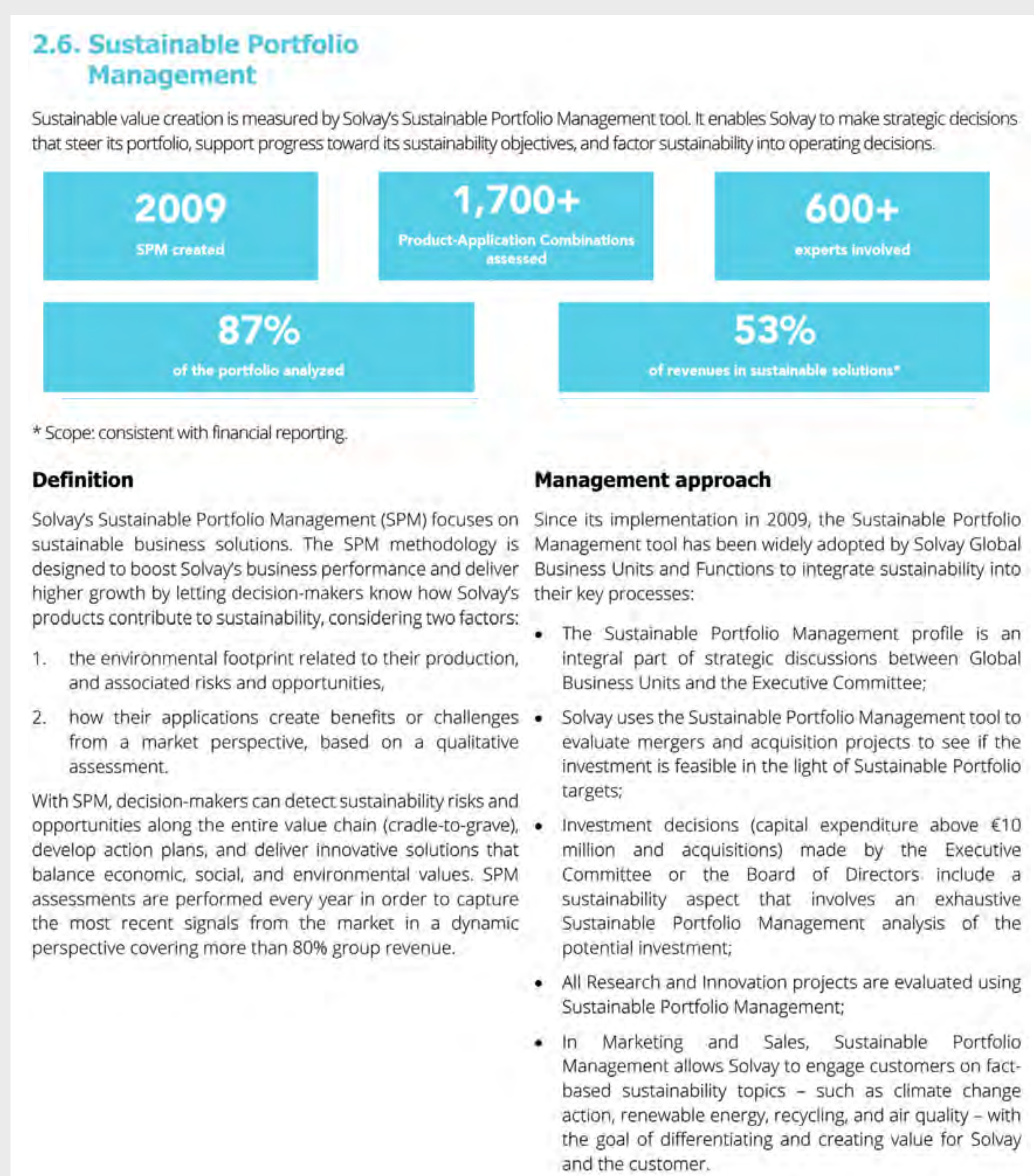
Appendices

10. BOARD CONSIDERATION OF CLIMATE-RELATED EXPENDITURES, ACQUISITIONS, AND DIVESTITURES

On the Governance recommendation, users indicated that information on how the board or its committees consider climate-related issues when overseeing major capital expenditures, acquisitions, and divestitures is extremely useful. Figure B17 provides a global chemical company's description of how investment decisions — capital expenditure above €10 million and acquisitions — made by the Executive Committee or the Board of Directors include a Sustainable Portfolio Management (SPM) analysis of the potential investment. Earlier in the report referenced in Figure B17, the company explains the SPM tool is used to review climate-related risks and opportunities for each product in each market and includes climate-related criteria aligned to 2°C scenarios.[56]

Figure B17

Board Consideration of Expenditures, Acquisitions, and Divestitures



2.6. Sustainable Portfolio Management

Sustainable value creation is measured by Solvay's Sustainable Portfolio Management tool. It enables Solvay to make strategic decisions that steer its portfolio, support progress toward its sustainability objectives, and factor sustainability into operating decisions.

2009 SPM created

1,700+ Product-Application Combinations assessed

600+ experts involved

87% of the portfolio analyzed

53% of revenues in sustainable solutions*

* Scope: consistent with financial reporting.

Definition

Solvay's Sustainable Portfolio Management (SPM) focuses on sustainable business solutions. The SPM methodology is designed to boost Solvay's business performance and deliver higher growth by letting decision-makers know how Solvay's products contribute to sustainability, considering two factors:

1. the environmental footprint related to their production, and associated risks and opportunities,
2. how their applications create benefits or challenges from a market perspective, based on a qualitative assessment.

With SPM, decision-makers can detect sustainability risks and opportunities along the entire value chain (cradle-to-grave), develop action plans, and deliver innovative solutions that balance economic, social, and environmental values. SPM assessments are performed every year in order to capture the most recent signals from the market in a dynamic perspective covering more than 80% group revenue.

Management approach

Since its implementation in 2009, the Sustainable Portfolio Management tool has been widely adopted by Solvay Global Business Units and Functions to integrate sustainability into their key processes:

- The Sustainable Portfolio Management profile is an integral part of strategic discussions between Global Business Units and the Executive Committee;
- Solvay uses the Sustainable Portfolio Management tool to evaluate mergers and acquisition projects to see if the investment is feasible in the light of Sustainable Portfolio targets;
- Investment decisions (capital expenditure above €10 million and acquisitions) made by the Executive Committee or the Board of Directors include a sustainability aspect that involves an exhaustive Sustainable Portfolio Management analysis of the potential investment;
- All Research and Innovation projects are evaluated using Sustainable Portfolio Management;
- In Marketing and Sales, Sustainable Portfolio Management allows Solvay to engage customers on fact-based sustainability topics – such as climate change action, renewable energy, recycling, and air quality – with the goal of differentiating and creating value for Solvay and the customer.

Solvay, 2019 Annual Integrated Report, p. 114

[56] Solvay, *2019 Annual Integrated Report*, March 31, 2020, p. 71.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

C. Addressing Implementation Issues

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

C. Addressing Implementation Issues

For its 2019 status report, the Task Force issued a comprehensive survey to better understand the status of implementation of its recommendations and associated challenges and to obtain views from users of climate-related financial disclosures and others on the usefulness, availability, and quality of such disclosures. The Task Force distributed the survey to over 3,000 companies and other organizations, resulting in 485 responses.[57, 58] Nearly 200 responses came from preparers, about 50 responses came from users of disclosures, and the remainder came from other interested parties, including non-governmental organizations, consultants, industry associations, academia, the public sector, and stock exchanges.

A key area of interest for the Task Force in conducting the survey was to better understand issues companies face in implementing the recommendations. Figure C1 describes the top reported implementation issues for each recommendation. Of note, the top cited issue for both the Governance and Risk Management recommendations was that for preparers with climate-related issues integrated into existing governance and risk management processes, making a separate or explicit climate-related financial disclosure is challenging.

Figure C1

Top Implementation Issues Identified

Governance	Strategy	Risk Management	Metrics and Targets
Climate is embedded in our processes so it is challenging to discuss separately in our governance disclosures. *(49%, 89)*	Disclosing scenario analysis assumptions is difficult because they include confidential business information. *(46%, 83)*	Climate is integrated into our risk management processes and, therefore, does not require separate disclosure. *(36%, 65)*	There is a lack of standardized metrics for our industry. *(42%, 75)*

Base size: 180

Percent and Number of Responses

In this section, the Task Force provides additional information on the implementation issues noted above, clarifies the intent of its recommendations as they relate to these issues, and describes work undertaken by the Task Force to address these and related issues, where applicable.

Key Takeaways

Companies with enterprise-wide governance or risk management processes that include climate-related issues may find it helpful to provide a mapping of sections in their report where the reader can find information that addresses the Task Force's recommended disclosures, as shown in Figure C3 (p. 49).

Companies concerned about disclosing certain information related to their scenario analysis assumptions or resilience of their strategies should consider a stepwise approach to disclosure (Please see TCFD, *Guidance on Scenario Analysis for Non-Financial Companies*, October 29, 2020).

Companies seeking standardized, industry metrics should look to industry associations, standard setters, and similar organizations as they may have published useful information in this regard.

[57] See Section C. Adoption and Use of the TCFD Recommendations in the Task Force's 2019 status report for more information on the survey.

[58] The Task Force uses the term "organizations" when referring to a broad range of entity types.

1. GOVERNANCE AND RISK MANAGEMENT

To better understand preparers' challenges with disclosing information on their governance and risk management practices for climate-related issues, the TCFD Secretariat reached out to nearly 30 respondents who selected the governance issue, the risk management issue, or both issues in the survey and agreed to be contacted in the event the TCFD Secretariat had follow-up questions.

Of the nearly 30 survey respondents (or preparers) contacted by the TCFD Secretariat, 13 agreed to discuss their responses with us. Twelve of the 13 preparers discussed issues related to the Governance recommendation, and nine of the 13 preparers discussed issues related to the Risk Management recommendation, with eight of the 13 discussing issues related to both recommendations. Interviewees were nearly equally split between the financial sector and non-financial sectors and spanned the globe as shown in Figure C2.

Themes from Interviews

A few key themes emerged from the discussions with preparers on issues related to implementing the Governance and Risk Management recommendations. First, over 80% of the preparers interviewed were just beginning to implement the TCFD recommendations and in the process of figuring out how to disclose information consistent with the recommendations when they completed the survey in late 2018. Since our follow-up discussions were held 12–14 months later, most of those preparers indicated they had resolved their issues. Some of them emphasized the importance of educating board and senior management on climate-related issues and gaining their support as critical for implementing the recommendations.

The second theme related to a misinterpretation or misunderstanding of the Governance and Risk Management recommendations. Over half of the preparers interviewed interpreted the recommendations as indicating that companies should have separate processes for governance and risk management of climate-related issues or that disclosure of these processes should be separate from disclosure of broader governance and risk management processes of which they are a part. Some preparers indicated examples of disclosure where a company's governance or risk management of climate-related issues are embedded or integrated into overall governance or risk management processes would be helpful.

Clarifying the Recommendations

To address preparers' concerns that implementing the TCFD recommendations requires separate governance and risk management processes for climate-related issues or the development of "standalone" disclosures, the Task Force emphasizes it did not intend for companies with comprehensive governance and risk management processes that include climate-related issues to create separate processes or duplicate existing disclosures. If a company's disclosures clearly describe its governance and risk management processes and it is clear those processes cover climate-related issues, then no further disclosure may be needed.

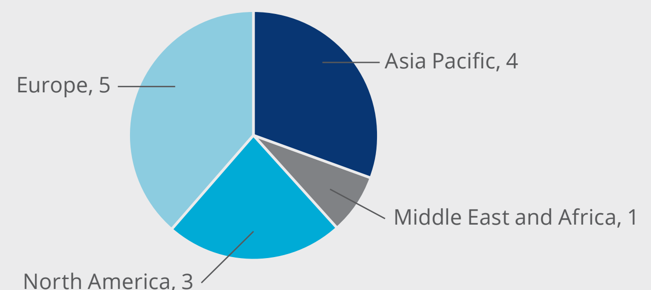
Figure C2

Number of Interviewees by Sector and Region

Number of Interviewees by Sector

$	6	Financial
	2	Materials
	2	Industrials
	2	Energy
	1	Consumer Discretionary

Number of Interviewees by Region



Total number of interviewees: 13

A.
State of Climate-Related Financial Disclosures
B.
Effective Climate-Related Financial Disclosures
C.
Addressing Implementation Issues
D.
Case Studies on Implementation
E.
Initiatives Supporting TCFD
Appendices

Figure C3 (p. 49) provides an example of how a company with comprehensive governance and risk management processes that address climate-related issues as well as a wide range of other issues discloses information in alignment with the TCFD recommendations. The example shows how BHP includes a mapping of sections in its annual report where the reader can find information aligned with the Task Force's 11 recommended disclosures. We have included the mapping of the recommended disclosures under the Risk Management recommendation (only) as well as an excerpt of one of the sections referenced. The Task Force provides additional examples in its guidance on *Risk Management Integration and Disclosure*.[59]

Task Force Member's Experience

"By acknowledging that climate change is a potential strategic risk to our company, we decided to systematically address climate-related risks and opportunities in our management and supervisory board."

– Thomas Kusterer, Chief Financial Officer, EnBW AG

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[59] TCFD, *Guidance on Risk Management Integration and Disclosure*, October 29, 2020.

Figure C3

Example of Mapping Information to TCFD Recommendations

Location of TCFD-aligned disclosures

TCFD recommendation	BHP disclosure	Reference
Risk management – Disclose how the organisation identifies, assesses, and manages climate-related risks		
a) Describe the organisation's processes for identifying and assessing climate-related risks.	Risk management	1.6.4
b) Describe the organisation's processes for managing climate-related risks.	Risk management – Risk factors (climate change, greenhouse gas emissions and energy)	1.6.4
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management.	Risk management	1.6.4
	Non-financial KPIs – sustainability KPIs	1.5.2
	Risk management – Risk factors (climate change, greenhouse gas emissions and energy)	1.6.4

Risk process

Our Risk Framework requires identification and management of risks to be embedded in business activities through the following processes:

- **Risk identification**
  New and emerging risks are identified and owned where they occur within BHP.
- **Risk assessments**
  Risks are assessed with the most appropriate technique and results are translated for BHP to understand and appetite to be considered.
- **Risk treatment**
  Risks are prevented, reduced or mitigated with controls.
- **Monitoring and review**
  Risks and controls are reviewed periodically and on an adhoc basis to evaluate performance.

Our Risk Framework includes requirements and guidance on the tools and process to manage all risk types (current, strategy and emerging).

Current risk

Current risks may have their origin inside BHP or originate as a result of BHP's activities. These may be strategic or operational in nature and include material and non-material risks.

The materiality of our current risks is determined by calculating an estimate of the maximum foreseeable loss (MFL). The MFL is the estimated impact sustained by BHP in the 'worst case' scenario for that risk. The 'worst case' scenario considers all potential impacts without regard to probability and assumes all risk controls, including insurance and hedging contracts, are ineffective. For example, when calculating the number of fatalities to assess MFL in an underground explosion, we might assume the maximum number of people who are allowed to enter the underground mine.

Our focus for current risks is to prevent their occurrence or minimise their impact should they occur. Current material risks are required to be evaluated once a year at a minimum to determine whether the risk exposure is within our risk appetite.

Strategy risk

Strategy risks inform, are created, or are affected by business strategy decisions or pursuit of strategic objectives. They represent opportunities as well as threats. The Risk Appetite Statement and KRIs are available to assist in determining whether a proposed course of action is within BHP's appetite. Once a decision has been made, our risk process as described above applies. In addition to calculating the MFL, another tool available to inform decision-making is the Maximum Foreseeable Gain (MFG). The MFG is the 'best case' scenario that should be articulated when seeking to take risk for strategic returns. It represents the optimum return.

Our focus for strategy risks is to enable the pursuit of high-reward strategies. Therefore, as well as having controls to protect BHP from the downside risk, we will implement controls to increase the likelihood of the opportunity being realised. For example, we might establish additional governance, oversight or reporting to ensure new initiatives remain on track.

Emerging risk

Emerging risks typically have their origin outside BHP. There is often insufficient information for these risks to be fully understood and they cannot be prevented by BHP. Effective management of emerging risks is critical to strengthening our resilience to foreseeable changes and our ability to capture competitive advantages. We assess and manage emerging risks based on the expected consequence, timing and speed of the risk event, as well as the capacity for BHP to respond.

Emerging risks are identified and initially monitored by subject matter experts. Ongoing management is handed over to risk owners when the impact and our response is defined. For example, BHP has a dedicated climate change team that monitors and manages the emerging risks relating to climate change as they evolve. However, operational aspects (such as managing the increased risk of extreme weather events) are managed by our operations.

Our focus for emerging risks is on reducing the impact should an event occur, and on advocacy efforts to reduce the likelihood of the risk manifesting. Our approach is to apply contingency controls, such as response plans, to emerging risks that are outside our appetite. These controls increase the resilience of BHP to shocks from the external environment. Emerging risks are evaluated annually to determine whether the risk remains emerging and if the exposure is within our risk appetite.

Our emerging risk process was formalised during FY2019 and in FY2020, emerging risks will be included in our Group-wide risk register.

BHP, Annual Report 2019, pp. 65 and 31

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

2. STRATEGY

The top-cited issue on implementing the Strategy recommendation was concern about disclosing scenario analysis assumptions because such assumptions include confidential business information (Figure C1, p. 46).[60] For context, this issue relates to the Task Force's recommended disclosure c) under the Strategy recommendation (or *Strategy c*), which asks companies to describe the resilience of their strategies, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. The Task Force briefly discusses companies' concerns about disclosing confidential business information in its guidance on *Scenario Analysis for Non-Financial Companies*, and the key points are summarized below.[61]

The Task Force's guidance on *Scenario Analysis for Non-Financial Companies* emphasizes a company should not assume scenario analysis assumptions contain confidential business information that would harm the company if publicly disclosed. When evaluating whether particular aspects of a company's intended disclosure around scenario analysis assumptions or the resilience of its strategy contain confidential business information, the company should consider the following:

- whether the information provides the company with an economic benefit that translates into a competitive advantage because the information is unknown to its competitors and
- whether making such information public may cause a considerable economic loss for the company.[62]

In situations where a company is not certain information related to its scenario analysis assumptions or the resilience of its strategy contains confidential business information, the Task Force encourages the company to consider a stepwise approach to disclosure — rather than decide not to disclose. For example, a company might start by disclosing broader, qualitative information and move to more specific, quantitative data and information over time.

Task Force Member's Experience

"**Disclosing our scenario analysis assumptions has given us an opportunity to be a market leader in our sector and to act as a catalyst to others in similar industries as many of the companies in our industry face the same risks from climate change as we do. We want our peers to outline their assumptions so we can also develop our scenario analysis further and continually drive for greater understanding of the implications of climate change.**"

– Graeme Pitkethly, Chief Financial Officer, Unilever

3. METRICS AND TARGETS

The top-cited issue by preparers on implementing the Metrics and Targets recommendation was the lack of standardized, industry metrics (Figure C1, p. 46). Over 60% of the preparers selecting this issue in the survey were from the financial sector; and several of them provided written comments to elaborate on their specific concerns. The primary concern raised related to the availability of reliable and consistent data on which metrics could be calculated. For the preparers from non-financial sectors, only a few provided written comments. Those comments were consistently focused on the difficulty in identifying appropriate metrics to disclose.

[60] Confidential business information may include trade secrets, business plans, new product plans, product pricing, investments, divestments, notes associated with patentable inventions, customer and supplier information, and financial data, as well as other information.

[61] TCFD, *Guidance on Scenario Analysis for Non-Financial Companies*, October 29, 2020.

[62] IPR, *Fact Sheet: How to Manage Confidential Business Information*, June 2015, pp. 2–3.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

In its 2017 report, the Task Force highlighted improving data quality and developing standardized metrics as a key area for further work. The Task Force also encouraged — and continues to encourage — sector and industry experts to improve understanding and measurement of how climate-related issues translate into potential financial impacts and develop standardized metrics.

Since the 2017 report was released, there have been several initiatives undertaken by industry associations and similar organizations to support their member companies in implementing the TCFD recommendations, including addressing data issues and identifying useful metrics for measuring and managing climate-related risks and opportunities. Many of these initiatives — which span the financial and non-financial sectors — are described in the Task Force's past two status reports as well as this report.[63]

Since the Task Force's recommendations were developed to apply broadly across sectors and jurisdictions and to be flexible enough to accommodate evolving practices, implementing the Metrics and Targets recommendation requires companies to identify those metrics and targets most relevant to their specific products or services, operations, and climate-related risks and opportunities. Furthermore, for metrics and targets to be useful for investors and other users, they should be defined and calculated consistently within an industry to ensure comparability.

As described in Section E. Initiatives Supporting TCFD, several organizations have undertaken efforts to help companies implement the TCFD recommendations, including efforts to identify relevant industry metrics. For example, the World Business Council for Sustainable Development has led several "preparer forums," which bring together peer companies in specific industries who are implementing the TCFD recommendations to discuss disclosure practices and work that is needed to enhance the effectiveness of disclosures. Each preparer forum issues a report that includes a section on metrics the forum members consider relevant for their industry.

The Task Force recognizes industry associations, standard setters, and similar organizations are best positioned to undertake this work and would like to emphasize the importance of — and its appreciation for — their support of companies implementing the Metrics and Targets recommendation, which are fundamental inputs for investors and other users to evaluate companies' material climate-related risks and opportunities. The Task Force encourages such organizations to solicit and incorporate feedback from investors and other users when identifying or developing metrics and targets for a given industry to help ensure those metrics and targets will be useful for financial decision-making.

Task Force Member Organization's Experience

"*Leveraging a comprehensive, facility-level physical risk assessment in our scenario analysis enabled Moody's to disclose metrics for physical climate risk more in line with those included in the European Bank for Reconstruction and Development's 2018 report* "Advancing TCFD Guidance on Physical Climate Risks and Opportunities"*, reflecting Moody's efforts to be responsive to calls for more granular, quantitative reporting on physical risk exposure.***"**

– Mark Kaye, Chief Financial Officer, Moody's Corporation

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[63] See Section E. Initiatives Supporting TCFD in the Task Force's 2018 status report and Section F. Initiatives Supporting TCFD in the Task Force's 2019 status report.

D.
Case Studies on Implementation

D. Case Studies on Implementation

This section includes case studies from three financial sector organizations — a global risk assessment firm, an asset owner, and an asset manager. The case studies describe the organizations' respective experiences in implementing the TCFD recommendations, which are intended to provide practical insights on and considerations for implementing the recommendations.

1. CASE STUDY BY A GLOBAL RISK ASSESSMENT FIRM

Part one of this section provides a summary of a global risk assessment firm's — Moody's — experience implementing the TCFD recommendations, including some of the challenges faced and lessons learned.

Introduction

Moody's (NYSE:MCO) is a global integrated risk assessment firm that empowers organizations to make better decisions.[64] Our data, analytical solutions, and insights help decision-makers identify opportunities and manage the risks of doing business with others. We believe that greater transparency, more-informed decisions, and fair access to information open the door to shared progress. With over 11,300 employees in more than 40 countries, Moody's combines international presence with local expertise and over a century of experience in financial markets.

Moody's response to the TCFD recommendations followed the initial confirmation of support signed by our Chief Executive Officer (CEO) and Chief Financial Officer in June 2017 and our ongoing annual disclosure commitment of the organization's greenhouse gas inventory and climate-related issues through CDP.[65] Richard Cantor, Chief Credit Officer of Moody's, serves as a member of the Task Force. We published our third TCFD report in April 2020 as part of our *2019 Corporate Social Responsibility Report* alongside other reporting frameworks including the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB).[66] Our TCFD report addresses the 11 recommendations the organization has set forth and builds upon past risk disclosure through CDP and interviews with key internal risk personnel.

Moody's Investors Service (MIS) — the credit rating agency — has undertaken extensive reviews to integrate scenario analysis into its credit impact assessments. MIS incorporates a forward-looking view of issues that can materially impact the credit quality of a given sector or debt issuer, including those related to environmental, social, and governance (ESG). As a company, Moody's firmly believes in promoting global ESG and climate risk measurement standards for use by market participants and enhancing transparency in ESG and climate risk.

The content below details insights from our experience in enhancing our response to the TCFD recommendations over the prior three years. We aim to provide other preparers with a better understanding of the challenges they may face in implementation efforts and how they might address them based on our own learnings.

[64] Moody's, "Moody's."

[65] CDP, "CDP."

[66] Moody's, *Better Decisions, Brighter Futures: 2019 Corporate Social Responsibility Report*, April 2020.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

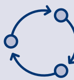
Appendices

Key Takeaways

Approach the process as a marathon, not a sprint. Implementing the TCFD recommendations will be an ongoing effort. As new data are produced over time and science and research continue to evolve, we will work to integrate this information into our strategy. Tracking and monitoring our progress against our proposed science-based targets will also serve as an important element in our future TCFD responses.

Organize for success. Successful implementation requires alignment among multiple company functions. Establishing and enhancing our governance and strategies covering ESG and climate-related risks and opportunities has strengthened our understanding, management, and reporting on these considerations.

Anticipate and prepare for situational challenges. Companies that operate globally, like Moody's, should expect to encounter hurdles aggregating the results of physical climate-related risks due to the geographic variability in costs and acceptable operating limits. However, we found facility-specific data necessary for informing our contingency planning, resilience building, and longer-term property management, as it improved our understanding of where risks are concentrated.



Adapt existing Enterprise Risk Management (ERM) frameworks. To properly assess the risks and opportunities associated with environmental factors, we employed a model where current operational risks are considered on a prospective basis over a long-term horizon. In addition, our ERM program is designed to prepare for events such as a natural disaster or a severe weather event, so that our business units can continue essential business operations as well as recover associated systems and technology.

Our Journey

Moody's was an early adopter of the TCFD recommendations beginning with our 2017 report, which we enhanced in 2019. This year, following our regular engagement with stakeholders, including members of the Corporate Reporting Dialogue (CRD), we streamlined our various disclosures and reporting efforts into one publication.[67] Our annual Corporate Social Responsibility (CSR) report now includes our response to GRI and SASB standards, as well as the TCFD recommendations. This provides our stakeholders with one consolidated point of reference that exemplifies the spirit of the Better Alignment Project.[68]

Scenario Analysis

The key enhancement of our TCFD response in 2020 was the inclusion of scenario analysis, which assessed the material impacts of climate-related physical and transition risks across our global offices and operations. Comparing the resiliency of our business strategy against feasible alternate strategies helped us to better prioritize our ESG investments and inform planning, as well as enabled us to better respond to new investor disclosure requests.

We began our journey to full implementation by assessing exposure under two scenarios to understand the financial impact of transition and physical risks: 1) high emissions scenario (up to 5°C of warming) associated with major physical climate impacts and 2) low emissions scenario (below 2°C of warming). Our transition analysis focused on applying carbon pricing to various elements of our greenhouse gas inventory to determine the long-term financial impact of this pricing. The International Energy Agency, World Energy Outlook Sustainable Development Scenario specifies carbon pricing across various timeframes, scaling up to a price of $140 per tonne for advanced economies in 2040.[69]

Further, we evaluated physical risk under the Intergovernmental Panel on Climate Change's (IPCC's) Representative Concentration Pathway (RCP) 8.5.[70] This scenario assumes that there will be few policy changes, resulting in high levels of greenhouse gas emissions by the end of the century and significant associated physical impacts. Understanding our physical risk exposure over the long term (20–30 years) and under the RCP8.5 provides insight into the severity of risks we are likely to experience by midcentury and informs our resilience planning.

[67] CRD, "Corporate Reporting Dialogue."

[68] CRD, "Better Alignment Project."

[69] International Energy Agency, *World Energy Model, Scenario Analysis of Future Energy Trends*, November 2019.

[70] Intergovernmental Panel on Climate Change, *RCP 8.5 — A scenario of comparatively high greenhouse gas emissions*, August 13, 2011.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Additional details on scenario analysis for physical climate risk can be found in Four Twenty Seven's paper, *Demystifying Climate Scenario Analysis for Financial Stakeholders*.[71]

We engaged Four Twenty Seven, a Moody's affiliate and leading provider of data on physical climate and environmental risks, to evaluate the physical climate risks for our global office locations.[72] Using its proprietary physical climate risk scoring methodology, we assessed the risk of each property against heat and water stress, sea level rise and flooding, and exposure to hurricanes and typhoons. Four Twenty Seven's analysis leverages peer-reviewed climate models and environmental datasets from the IPCC, the U.S. National Aeronautics and Space Administration, and the National Oceanic and Atmospheric Administration, among others, and is supplemented by commercially available data sources. The output includes hazard risk scores and risk thresholds for each facility globally. Hazard risk scores are comprised of several science-driven indicators meant to capture different dimensions of business risk presented by each hazard, including both relative and absolute risk. Risk thresholds indicate whether an asset's risk level is "no risk, low, medium, high or red flag (highest risk)," based on its score. The detail helps us understand how Moody's operations are exposed to changing climate conditions and informs our risk management.

Challenges and Lessons Learned

Our preparation of the current TCFD response coincided with an internal review of our environmental strategy, making it a favorable time to improve both our strategy and disclosure process. This review prioritized collaboration between multiple internal stakeholders through workshops that addressed various topics across the TCFD's 11 recommended disclosures. These workshops enabled us to share the strategy elements of the TCFD recommendations with members of the Reporting & Messaging workstream of our CSR Working Group, as well as helped members to interpret the scenario analysis results. While challenges were faced in coordinating the workshops, our TCFD response was strengthened by input from a wide range of internal stakeholders.

Governance and Strategy: Organizing for Success

In 2017, we established the Moody's CSR Council, which convenes senior management team members and helps shape our overall CSR strategy. The CSR Council also appoints members to the CSR Working Group, which helps hone and implement our strategy. In 2019, we adjusted our Enterprise Risk Management governance structure, which enhanced our enterprise-level approach to climate-related risks and opportunities. During this period, we also updated the Moody's Board of Directors Audit Committee charter to include oversight of financial, risk, and other disclosures made in the company's annual and quarterly reports related to sustainability as the Governance & Nominating Committee continues to have oversight more broadly over sustainability issues. Additionally, we added sustainability language to our Form 10-K and enhanced our business continuity risk factor to add interruptions caused by weather events, including due to climate change.

Establishing and enhancing our governance and strategies covering ESG and climate-related risks and opportunities has strengthened our understanding, management, and reporting on these considerations.

Risk Management: Adapting Existing ERM Frameworks

To properly assess the risks and opportunities associated with environmental factors, we employed the principles of Moody's Enterprise Risk Management — which is based on the 2017 Committee of Sponsoring Organizations of the Treadway Commission framework, *Enterprise Risk Management — Integrating with Strategy and Performance*.[73] In this model, current operational risks are considered on a prospective basis over a long-term (three-to-five-year) horizon.

However, to assess climate-related risks, we extended the assessment timeframe to 20 years to capture potential cumulative impacts under alternate scenarios. In addition, Moody's business continuity management program is designed to prepare for events such as a natural disaster or severe weather event, so that our business units can continue essential business operations as well as recover associated systems and technology.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

**D.
Case Studies on Implementation**

E.
Initiatives Supporting TCFD

Appendices

[71] Four Twenty Seven, *Demystifying Climate Scenario Analysis for Financial Stakeholders*, December 2019.

[72] Four Twenty Seven, "Four Twenty Seven."

[73] Committee of Sponsoring Organizations of the Treadway Commission, *Enterprise Risk Management — Integrating with Strategy and Performance*, June 2017.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Scenario Analysis: Quantifying Financial Impacts

Moody's operates in over 100 facilities around the world. Therefore, we needed to understand the unique physical risks at each facility to assess how our overall operations may be affected by climate change. Our risk assessment identified the level of risk exposure at each facility to each climate hazard, based on the facility's precise geographic location.

While we strongly believe these results can help to guide our ongoing allocation of capital investment, aggregating the results of the physical climate risks proved to be challenging due to the geographic variability in costs and acceptable operating limits. However, this facility-specific information improves our understanding of potential operation disruptions, increased repair costs, and assets that are likely to become stranded, as well as which facility's exposure could increase over time due to climate hazards such as rising sea levels. Reviewing this data by region informs our contingency planning, resilience building, and longer-term property management by improving our understanding of where risks are concentrated.

We faced a similar challenge in reaching more specific financial impacts of transition risks and opportunities, particularly in the medium and long term. We also were challenged by how best to report the results of our scenario analysis in an easily digestible and decision-useful way for stakeholders. After reviewing several other reports and considering our own analysis, we felt the tables shown in Figure D1 and Figure D2 (p. 57) were effective communication of the results to our stakeholders. More detail can be found in our full 2020 TCFD report, and we welcome feedback.[74]

Figure D1

Results of Scenario Analysis: Physical Risks

PHYSICAL RISKS		Long-term risk level	Risk mitigation
Acute Sudden and severe natural events	Floods	Low	In a high-temperature-rise scenario, risk of flood was low across Moody's rental portfolio, with 9% of sites at risk. Sites at higher risk will be evaluated.
	Hurricanes and typhoons	Low	Sites with historical exposure to severe weather events are monitored and assessed for resiliency investment. Overall, 9% of our sites are at risk to hurricanes and typhoons; most of these sites are at low risk. Those identified as higher risk are monitored for resiliency investment and potential relocation.
Chronic Risks due to long-term shifts in climate or weather patterns	Heat stress	Medium	A significant proportion (33%) of our sites is expected to experience a high level of heat stress due to climate change. We expect operation costs of comfort cooling at these sites to increase and will monitor them to ensure we can continue to source 100% renewable electricity.
	Water stress	Medium	In 4% of sites, Moody's operations are expected to experience water stress due to climate change. Each site identified at risk of water stress will be evaluated for resiliency investments and monitored, along with its water levels. Water stress tends to be one of the less relevant risks for offices, which make up all of Moody's rental portfolio that was screened for physical climate risk exposure.
	Sea level rise	Low	Overall, the risk to Moody's from sea level rise is 1% of the sites. To improve resiliency, the affected sites will be monitored in terms of contingency planning and adaptation measures installed at the citywide level.

[74] Moody's, *TCFD Report*, April 2020.

Figure D2

Results of Scenario Analysis: Transition Risks and Opportunities

TRANSITION RISKS AND OPPORTUNITIES			Short term (2025)	Medium term (2030)	Long term (2040)
Policy and legal	Increased pricing of GHG emissions	Introduction of mandatory carbon pricing would increase costs for direct operations and increase costs indirectly via the purchase of goods and services.	LOW RISK	LOW RISK <0.5% impact on operating income	LOW RISK <1% impact on operating income
	Mandates and regulations on existing products and services	Mandates and regulations on high-carbon products give way to increased opportunities for the growth of Moody's ESG-related rating products.	OPPORTUNITY	OPPORTUNITY Market growth opportunity	OPPORTUNITY Market growth opportunity
Technology	Costs to transition to lower-emission technology	The World Energy Outlook Sustainable Development Scenario shows a significant continued reduction in the pricing of renewable technologies; therefore, we will benefit from avoided costs in the continued procurement of renewable electricity.	OPPORTUNITY	OPPORTUNITY Avoided costs	OPPORTUNITY Avoided costs
Market	Changing customer behavior	Moody's is unlikely to experience reduced demand for goods and services due to increased input prices, but we likely will realize opportunities from the growth of our ESG-related products.	OPPORTUNITY	OPPORTUNITY Market growth opportunity	OPPORTUNITY Market growth opportunity
	Shifts in consumer preferences	Shifting of customer preferences is unlikely to weaken our reputation if we keep responding to market demand for more climate leadership.	OPPORTUNITY	OPPORTUNITY Market growth opportunity	OPPORTUNITY Market growth opportunity
	Climate-related risk analytics in ratings	Potential poor ratings performance due to an ineffective implementation of climate-related risk analytics in ratings could damage the MIS reputation.	LOW RISK	LOW RISK No discernible quantified impact	LOW RISK No discernible quantified impact
	Stigmatization of sector	Moody's faces potential stigmatization from its association with high-carbon emitters.	LOW RISK	LOW RISK No discernible quantified impact	LOW RISK No discernible quantified impact
	Increased stakeholder concern or negative stakeholder feedback	Moody's strong push for increased disclosure on GHG inventory and implementation of science-based targets will likely meet stakeholder expectations.	OPPORTUNITY	OPPORTUNITY Market growth opportunity	OPPORTUNITY Market growth opportunity

LOW RISK OPPORTUNITY

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Metrics and Targets: Improving Methodologies and Reporting

While the TCFD recommendations do not call for specific metrics on physical climate risk, investors are increasingly demanding more granular, comparable disclosure of these metrics. The metrics we used to disclose climate risk are based on the percent of our global facilities exposed to each climate hazard. We also identified risk management strategies alongside these numbers to indicate how prepared we are to manage these impacts. These metrics are included in best practices outlined in the European Bank for Reconstruction and Development and Global Center on Adaptation's report, *Advancing TCFD Guidance on Physical Climate Risk and Opportunities*.[75]

In 2019, we also took tangible steps to outline empirical targets in our broader CSR strategy. This included signing the United Nations Global Compact's "Business Ambition for 1.5°C Pledge," for which we recently proposed science-based targets to reduce GHG emissions and reach net-zero emissions by no later than 2050.[76] We also improved our calculations for and reporting of our greenhouse gas inventory, as well as procured renewable energy for our global operations.

Additionally, we worked to independently verify our greenhouse gas inventory, which improved the accuracy of the scenario analysis. It expanded our accounting of indirect emissions (Scope 3) by allowing us to assess the impact of carbon pricing on purchased goods and services, which accounts for a large portion of our indirect emissions. Applying the scenario analysis alongside our internal environmental strategy review was logistically challenging but ultimately allowed us to better position our approach and maximize our resiliency to climate risk for the long term.

Future Opportunities

Implementing the TCFD recommendations will continue to be an ongoing process for Moody's. As we produce new data over time, and as science and research continue to evolve, we will work to integrate this information into our strategy. Tracking and monitoring our progress against our proposed science-based targets will also serve as an important element in our future TCFD responses.

Enhance Our Analysis by Expanding Potential Scenarios

As previously mentioned, one of the challenges in applying our scenario analysis was our ability to quantify the financial implications of the risk categories due to the interaction of direct and indirect climate change impacts. To overcome this, we attempted to evaluate the financial impact against direct elements such as our calculated greenhouse gas inventory, energy costs, business disruption costs, and relocation estimates. Our plan for future years is to increase the coverage of these impacts and the granularity of estimations used in the scenarios, as well as to attempt to incorporate a greater level of indirect impacts in our analysis.

During our first iteration of the scenario analysis, we focused on the expected extremes of physical and transition climate risks. Since future emissions and socioeconomic outcomes are uncertain, we believed providing an understanding of the extremes was fundamental to assessing the resiliency of our strategy. Going forward, we plan to include additional scenarios that will allow us to assess the impact of a mix of physical and transition impacts. Additionally, we intend to monitor the release of publicly available scenarios and shifts in global climate goals to examine if further scenarios will be needed.

Measure Our Progress against Science-Based Targets

As mentioned above, our proposed science-based targets cover our indirect emissions through the purchase of goods and services. We intend to have our targets formally validated against the Science Based Targets initiative's criteria and plan to expand our reporting to include the tracking of progress against these numbers.[77] We aim to lead by example through our reporting processes and hope to identify additional opportunities in the future.

Increase Tracking of Climate-Related Opportunities

Lastly, we plan to track the potential climate-related opportunities we identified during this process to produce more robust reporting on how these play out in the future. These opportunities included strategic investment in products and services; memberships and climate change commitments; and research and development.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

**D.
Case Studies on Implementation**

E.
Initiatives Supporting TCFD

Appendices

[75] European Bank for Reconstruction and Development, *Advancing TCFD Guidance on Physical Climate Risks and Opportunities*, May 2018.
[76] United Nations Global Compact, "Business Ambition for 1.5°C."
[77] Science Based Targets, "Science Based Targets."

2. CASE STUDY BY AN ASSET OWNER

Part two of this section provides a summary of an asset owner's — CPP Investments — approach to incorporating climate change into its investment decisions and how the TCFD recommendations have informed this process. CPP Investments has been a strong supporter of the TCFD and is one of two global pension plan investors represented on the TCFD. CPP Investments is aiming for full adoption of the TCFD recommendations by the end of fiscal year 2021.

> *"Our efforts to understand the implications of climate change on long-term investment values have accelerated. We continue to prioritize key advances to ensure we are a leader among asset owners in understanding the risks and opportunities presented by climate change."*
>
> **– Mark Machin, President and CEO, CPP Investments**

Introduction

CPP Investments is a professional investment management organization that invests the assets of the Canada Pension Plan not currently needed to pay pension, disability, and survivor benefits. As of March 31, 2020, total assets under management stood at C$409.6 billion. CPP Investments manages these assets in the best interests of more than 20 million contributors and beneficiaries.

CPP Investments views climate change as one of the world's most significant physical, social, technological, and economic challenges. The organization seeks to be a leader among asset owners and managers in understanding the investment risks and opportunities presented by climate change. This aligns with a legislative objective to maximize returns without undue risk of loss.

As a member of the TCFD, CPP Investments helped to both produce the recommendations and encourage their adoption. CPP Investments is committed to full adoption of the TCFD's recommendations by the end of fiscal 2021. In the following pages, we provide an overview of steps we are taking to implement the TCFD recommendations and our organization's efforts to actively address climate change to increase and preserve economic value, in accordance with our purpose.

Governance

CPP Investments' efforts to understand the financial impacts of climate change started more than a decade ago and will continue to accelerate in the coming years. The evolution of our journey toward better climate disclosure goes back to the strong tone from the top set by our CEO and Board more than two years ago. At that time, climate change was defined as a leading issue facing our organization as a long-term investor — one that must be considered and fully integrated into our investment decisions.

Our Board of Directors oversees enterprise-wide efforts to understand and manage climate-related risks and opportunities. At least once a year, Management provides a comprehensive report to the Board about our activities related to climate change, including the most material investment risks and opportunities. Our Chief Financial & Risk Officer and Risk group also report regularly to the Risk Committee of the Board on climate-related risks with updates that include carbon footprint metrics and scenario analysis results. The Board also reviews and approves our most significant investments. The investment recommendations the Board reviews on these investments include a mandatory comprehensive assessment of material climate change considerations completed by investment teams.

As well, in 2018, we launched the Climate Change Program, a cross-departmental, multiyear initiative designed to position us as a leader in understanding the investment risks and opportunities presented by climate change. The Program is overseen by the Climate Change Steering Committee (CCSC), which is mostly made up of Senior Managing Directors who lead our various investment and operations departments. The CCSC oversees our Climate Change Management Committee (CCMC), which in turn guides and supports the Program's six climate-related work streams. The CCMC is

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

comprised of managers from across investment and operations departments (see Figure D3).

The presence of a dedicated effort with a defined governance structure, coupled with having the investment and operations departments take the lead, supported by the tone and accountabilities set from the top, has helped us embed climate change deeper into our business.

Strategy: Integrating Climate Change into the Investment Process
CPP Investments has dedicated employee and other resources to understanding the risks and opportunities brought on by climate change from a financial point of view, both top-down and bottom-up. Our enterprise-wide approach integrates climate change considerations into our risk framework and across relevant investment activities to build and protect long-term investment values. Guided by the TCFD's recommendation on Strategy, we aim to disclose, where material, the actual and potential impacts of climate-related risks and opportunities on our portfolio design and investment selection process.

Portfolio Design
The Total Portfolio Management (TPM) department's top-down approach seeks to directly factor a full range of climate-related risks and opportunities into CPP Investments' investment strategy and total portfolio design. TPM works to understand potential climate change and energy transition pathways for various countries as well as the resulting economic and market impacts.

Security Selection Framework and Opportunities
From a bottom-up perspective, our security selection framework incorporates considerations of climate-related risks and opportunities into our most material individual investments. Launched in April 2019, and informed by the TCFD recommendations, the framework requires investment teams to include descriptions of relevant climate-related risks and opportunities that impact investment decisions at both the initial screening and final investment approval stages.

For CPP Investments, our climate change work aims to both address risks and identify opportunities. In 2017, CPP Investments created the Power & Renewables (P&R) group to better position the organization to invest in climate-related opportunities. Since then, the P&R group has made significant investments in renewable energy projects around the globe totaling more than C$6 billion as of June 30, 2020. Also, since 2019, we have been seeking to invest in early stage investments aligned with the energy transition through our Innovation, Technology, and Services strategy; and our Thematic

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Figure D3
Climate Change Program Framework

Investing team has launched a new climate change opportunities investing strategy.

Scenario Analysis

To better understand the risks posed and opportunities presented by climate change, CPP Investments is developing a climate-related scenario analysis framework.

Physical risks are captured using TPM's internally estimated damage function, which specifies how physical risks affect economic activity at various levels of warming. Transition risks arise from the potential shift to a low-carbon economy, which is dependent on factors including extensive changes in policy, technology, and the development of carbon markets. The range of uncertainty around transition risk is inherently wide. This year, we quantified this range using models and scenarios from the Intergovernmental Panel on Climate Change — the United Nations body for assessing the science related to climate change.

TPM is also working to assess risks and opportunities related to climate change and the energy transition using internally determined scenarios and signposts, with particular focus on the impact of long-term returns and asset allocation. These scenarios will also help each investment department determine the materiality of energy transition and climate change scenarios on its activities.

Our Risk Group uses stress testing to assess the impact and resilience of investments under a range of plausible scenarios including extreme and tail events. The global warming pathways assessed include an orderly and disorderly transition to a 1.5°C warmer world, an orderly transition to a 2°C warmer world, a gradual transition to a 4°C warmer world, and a transition to a 4°C warmer world with significant extreme weather events.

Risk Management

Given our legislative objectives, managing risk is central to all we do at CPP Investments. Climate change is a key risk in CPP Investments' Integrated Risk Framework (IRF). The IRF promotes clear lines of accountability across three complementary levels:

- **Front-line investment and operations management:** Our Security Selection framework (see p. 60) requires investment teams to include descriptions of relevant climate-related risks and opportunities at the initial screening and final investment approval stages.
- **Oversight functions, including Risk:** Our Risk Group is using climate change scenarios and "bow-tie" risk and control assessments to determine the risk of climate change on our portfolio.
- **Assurance and Advisory:** Our Assurance and Advisory Group has assessed our internally developed carbon footprint tool.

Disclosure by our portfolio companies plays a critical role in helping us assess climate-related risks. Because of this, we actively engage with companies to improve climate change-related disclosures. Since July 2015, CPP Investments has supported more than 130 climate change-related shareholder resolutions. The TCFD recommendations serve as a very useful framework in our engagement activities. These recommendations are proving to be instrumental in improving companies' climate change-related disclosure.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Metrics and Targets

CPP Investments developed an in-house methodology to estimate our carbon footprint metrics and published its first carbon footprint of its public equities portfolio in 2018, including metrics on total carbon emissions and carbon intensity. In 2019, we provided a more comprehensive metric that includes both our public and private investments.

We base our carbon footprint metrics on Scope 1 and Scope 2 GHG emissions, as we believe the dataset for Scope 1 and Scope 2 GHG emissions is currently the most complete and robust available (see Figure D4).

The Task Force's supplemental guidance notes that there are challenges and limitations with carbon footprinting metrics and that these should not necessarily be interpreted as risk metrics.[78] It also notes that the TCFD expects the disclosure of these metrics to prompt important advancements. We agree with this position.

Looking Ahead

At CPP Investments we view climate change as among the major challenges of our time. In the months ahead, we will continue to refine our tools and capabilities to assess climate change-related impacts and will remain focused on integrating them into our investment process. The TCFD recommendations will continue to inform this process. We believe our support of the TCFD recommendations will contribute to improved global disclosure of climate-related risks. This, in turn, should help asset owners, including CPP Investments, better assess these risks and make sounder investment decisions.

Figure D4

Portfolio Carbon Footprint Metrics*

METRIC	LONG-TERM CAPITAL OWNERSHIP	EQUITY OWNERSHIP	DESCRIPTION
Total Carbon Emissions (millions of tonnes of CO2e)	25.7	43.1	The absolute GHG emissions associated with a portfolio. This figure would typically rise as assets under management grow.
Carbon Footprint (tonnes of CO2e/$ million invested)	64	107	Total carbon emissions for a portfolio normalized by the market value of a portfolio.
Carbon Intensity (tonnes of CO2e/$ million revenue)	226	267	Volume of carbon emissions per million dollars revenue (carbon efficiency of a portfolio).
Weighted Average Carbon Intensity (tonnes of CO2e/$ million revenue)	195	195	Portfolio's exposure to carbon-intensive companies.

* as of June 30, 2019

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[78] TCFD, *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*, June 29, 2017, p. 37.

3. CASE STUDY BY AN ASSET MANAGER

Part three of this section provides a summary of an asset manager's — Generation Investment Management — approach to implementing the TCFD recommendations, especially the Metrics and Targets recommendation.

Introduction

Generation is a pure play sustainable investment manager. We see long-term investing as best practice and sustainability as the organizing construct of the global economy. We use ESG factors as tools to evaluate the quality of business and management. We believe this approach reveals important and relevant insights that other investment frameworks may miss, and which ultimately leads to superior, risk-adjusted investment results.[79] Consideration of climate change has always been integral to Generation's investment philosophy and process. Early in our journey, we recognized the need to build greater awareness of climate-related assessment among financial and non-financial companies alike. As such, we have helped launch and support several initiatives that accelerate the transition to a more sustainable economic system. In 2016, we were part of the founding membership of the TCFD.

In recent years, Generation has used the TCFD recommendations to refine its approach to evaluating climate-related risk and opportunity across our investments, and our key takeaways from those efforts are summarized below. The TCFD recommendations formed the basis for important dialogue across our firm on how to provide robust, best-in-class disclosure to our investors. We have incorporated TCFD guidance into our private equity impact reporting and reporting on overall firm alignment via the PRI Climate Transparency Report. We are also exploring forward-looking metrics such as Implied Temperature Rise to build upon our use of TCFD carbon footprinting metrics, to more deeply inform risk management and strategy.[80] Our reporting to investors in our public equity funds includes metrics on Scope 1, Scope 2, and Scope 3 GHG emissions as well as the number of firms committed to science-based targets.

Our approach will continue to develop over time, driven by insights from our investment practice and developments in climate science and modeling.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Key Takeaways

Start where you are, with what you have. Implementing the TCFD guidance is a process, and we started first with the Metrics and Targets recommendation. Over time, we have built up the additional in-house and external capability required to do additional analyses and integrate TCFD guidance more broadly.

The TCFD recommendations can form the basis for an ongoing dialogue. The TCFD framework helped drive a conversation at Generation, and sheds light on where we already have depth of climate consideration in our governance and strategy. It also highlighted gaps where we could build even greater nuance, particularly in metrics and target setting.

Build up the data and analytics underpinning the disclosure over time. For the richest and most relevant outputs, TCFD-aligned disclosures require time and myriad inputs from companies. We have improved the quality and depth of our assessment iteratively over time, with ongoing engagement of our public and private companies.

Consider your audience. TCFD guidance is designed to drive consistency of disclosure among companies, which enables the same among asset managers and ultimately among asset owners. We recognize TCFD recommendations do not require an extensive public report, but rather should shape our communications to our clients.

[79] Although Generation seeks to provide superior investment performance, this is an aspiration and there is no guarantee that this goal will be achieved. Similarly, while we naturally hope to provide "outstanding" results, this outcome is not guaranteed, and loss of capital may occur.

[80] Implied Temperature Rise is a forward-looking metric that indicates the global temperature rise associated with the greenhouse gas emissions of a single entity or a set of companies (i.e., in a portfolio or fund). The metric uses current emissions and other data to estimate expected future emissions from these entities and then translates these into a projected increase in global average temperature.

Implementing TCFD Guidance

We are conscious that the methods for evaluating climate exposure are still evolving, and we are always looking to use the most robust and forward-looking approaches. Incorporating TCFD's guidelines was a natural next step in our evolution toward best-in-class climate risk assessment and reporting.

Where We Started

While we have always evaluated companies with an environmental lens, we previously felt it was hard to capture our view of sustainability (i.e., companies run by long-term-oriented management teams making products society needs) in a score, and we felt such scoring might reward companies with the resources to invest in marketing. However, with the incredible growth in ESG data and emissions data in particular, beginning in 2018, we felt we could report specific carbon exposure metrics to give a directional sense of how sustainable the businesses in our portfolio are.

We first began incorporating TCFD guidance — specifically that around metrics and targets — in our quarterly letter to investors in the fourth quarter of 2018. In this letter, we reported our portfolio-level weighted average carbon intensity for our public equity funds relative to a benchmark. Our team elected to report this metric for several reasons: its relevance given the nature of our business; its availability from third-party providers for both our portfolio and the benchmark; and the availability of quality data to make an accurate assessment. We also report on the percentage of our companies that contribute to CDP and the Science Based Targets initiative. As this proportion continues to grow, we will be positioned to report on additional TCFD-recommended metrics such as exposure to carbon-related assets.

Broadening Our Disclosure

In the following months, we built upon our metrics disclosure by introducing TCFD principles to the disclosure activities of different Generation teams in parallel. We began an in-depth review of Scope 3 GHG emissions intensity of the companies held by our public equity portfolio; we introduced TCFD assessment alongside our Sustainability Report for our growth equity portfolio; and we documented our work in accordance to TCFD recommendations as part of our voluntary PRI Climate Transparency Report. To improve our ability to disclose how our investment strategies might be affected by a low-carbon transition and to build upon our current carbon footprinting, we have also begun evaluating the Implied Temperature Rise associated with our public equities portfolio. Ultimately, with the experience and processes built in the last two years, we believe we will be well positioned in 2021 to complete a rigorous, firm-level TCFD disclosure.

Resourcing and Education

To drive our portfolio-level ESG and climate risk assessment in 2018, we assembled a cross-functional group, comprised of professionals from our investment and client teams. This group identified metrics and standards against which Generation's strategies could be assessed, with an emphasis on how TCFD's guidance on metrics and targets might be incorporated into existing disclosures. This process was an important first step in building expertise and awareness around TCFD principles across the firm. Moving forward, we have designated a cross-functional team, which includes members of our Management Committee, to guide the overall implementation of TCFD recommendations, and we will continue to work to embed TCFD familiarity among all staff.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

**D.
Case Studies on Implementation**

E.
Initiatives Supporting TCFD

Appendices

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Our Design Choices and Challenges

As we develop comprehensive TCFD disclosure, we have made several key choices in our approach.

No "One Size Fits All" Approach

We manage four strategies across two asset classes. Teams share common principles but ultimately vary in their specific assessment of risks and opportunities — each strategy has different data sources and demands different approaches to analysis. As such, we vary our approach to disclosure across teams; for instance, we conducted portfolio-level analyses for our public equities funds, and currently track impacts and carbon emissions of our growth equity fund at the asset level. We will continue to evaluate these separately as appropriate as we move toward a firm-level disclosure.

Gap Between Asset- and Portfolio-Level Tools

There remains a gap between the fine-grained, context rich analyses we conduct at the company level and the portfolio-level tools required to fully characterize the resilience of our investment strategies to different climate scenarios. We already have robust documentation of climate-related risks and opportunities across sectors, geographies, and timeframes within our investment research roadmaps. However, further work is required to disclose portfolio-level impacts across all teams.

In-House Assessments vs. Working with a Vendor

For many dimensions of TCFD disclosure, we have the requisite expertise in-house: assessment of governance, strategy and risk, and climate-related issues are deeply integrated into our philosophy and process.

In disclosing metrics, we elected to work with vendors to assess portfolio-level carbon footprinting metrics and newer measures such as Implied Temperature Rise, a metric to help us better understand forward-looking risks and opportunities associated with our portfolio. To do so, we required portfolio-level data beyond what is easily accessible to our teams as well as access to expert modeling capabilities.[81] In each of our selections, we sought vendors who would be open to engaging in an ongoing dialogue. We recognize both the datasets and methods continue to evolve, and we sought partners with an appetite to engage on challenging analyses such as Scope 3 GHG emissions intensity and to continue pressure-testing their models.

Data Availability

Although data providers continue to improve quality and availability, data continues to be one of the largest barriers to robust climate exposure assessment. We used our assessment as an opportunity to engage our companies more deeply on sustainability reporting. Based on our analysts' knowledge and research on each asset in the portfolio, analysts engage and encourage companies to consider reporting against the TCFD framework if they are not already doing so, or to enhance the reporting they already provide. In addition, in 2018, we wrote to 44 of our Focus List companies who had not yet responded to the survey administered by CDP, and we were encouraged that several quickly responded with promises to do so in the following period.[82] In 2020, we wrote to portfolio companies asking them all to adopt Science Based Targets. We intend for TCFD-guided disclosures to continue to serve as an impetus to engage with our public and privately held companies alike on sustainability reporting.

Scope and Scenario Selection

The interpretation of portfolio climate risk exposure varies considerably with scenario selection and the GHG emissions scope included. For example, in our quarterly investor disclosures of portfolio carbon intensity, we did not limit our analysis to Scope 1 and Scope 2 GHG emissions. In our analysis of CDP data, we determined that Scope 3 GHG emissions are vastly larger than Scope 1 and Scope 2 GHG emissions for companies on our Focus List; indeed, Scope 3 GHG emissions accounts for more than 80% of total emissions. Engaging on Scope 3 GHG emissions is complex, but data availability continues to improve and there is a growing body of best practice.

[81] In particular, we require access to the Integrated Assessment Model's inputs that inform calculations of Implied Temperature Rise.

[82] Our Focus List companies are those that meet our business quality and management quality criteria and which we would like to own over the long term at the right price. There are about 125 companies on our Focus List as of May 31, 2020.

Our Next Chapter

Aligning our disclosure to TCFD guidance has provided an opportunity for us to reflect on and refine how we assess climate-related risks and opportunities. In the next phase of our disclosure, the work we conducted to date will form the foundation of an integrated, firm-level TCFD disclosure.

We must continue to refine our methods and data quality — across Scope 1 and Scope 2 GHG emissions but particularly Scope 3 GHG emissions impacts — and integrate this data into our Implied Temperature Rise assessment. We will also look to extend our portfolio-level analyses across all private and public strategies and to conduct portfolio-level scenarios modeling.

In addition, we are exploring how these outputs can inform our investing toolkit and engagement with companies beyond what we do already. However, there is also a need to adapt these tools to better capture the potential for value creation through alignment with net-zero pathways.

Our approach to investing has always explicitly integrated climate considerations, but consistent disclosure of this work is the key to enabling all companies, managers, and owners to assess their own exposure and opportunity. Our ambition is for our own disclosure to spur deeper and more robust adoption among our companies and clients. We look forward to continuing to support fellow stakeholders and aligned initiatives in accelerating a long-term, sustainable transition.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

E.
Initiatives Supporting TCFD

E. Initiatives Supporting TCFD

Amid growing momentum behind the Task Force and its recommendations, nearly 700 companies and other organizations have become supporters since the Task Force released its 2019 status report, bringing the total number of supporters to over 1,500.[83] Of these supporters, 1,344 are companies and 168 are other organizations (e.g., industry associations, governments). These supporters come from around the world, but the majority — 75% — come from Asia Pacific and European countries, as shown in Figure E1. Companies supporting the TCFD represent a broad range of sectors with a combined market capitalization of $12.6 trillion. This includes just over 700 financial firms, responsible for assets of $150 trillion. In addition, nearly 60% of the 100 largest public companies support the TCFD, report in line with the TCFD recommendations, or both.[84]

Support from market participants continues to play an important role in the adoption of the TCFD recommendations across industries and regions as does the work of various groups and organizations with initiatives that facilitate implementation of the recommendations. The Task Force's last two status reports have highlighted initiatives aimed at helping non-financial companies and financial institutions report in line with the TCFD recommendations, and many of these continue today. The global spread of these initiatives and wide range of organizations implementing the recommendations may indicate the Task Force's framework is driving meaningful change in the way companies think about and disclose information on their climate-related risks and opportunities.

This section provides updates on continuing initiatives and outlines some of the new initiatives that have been launched since the Task Force issued its previous status report in early June 2019.[85]

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

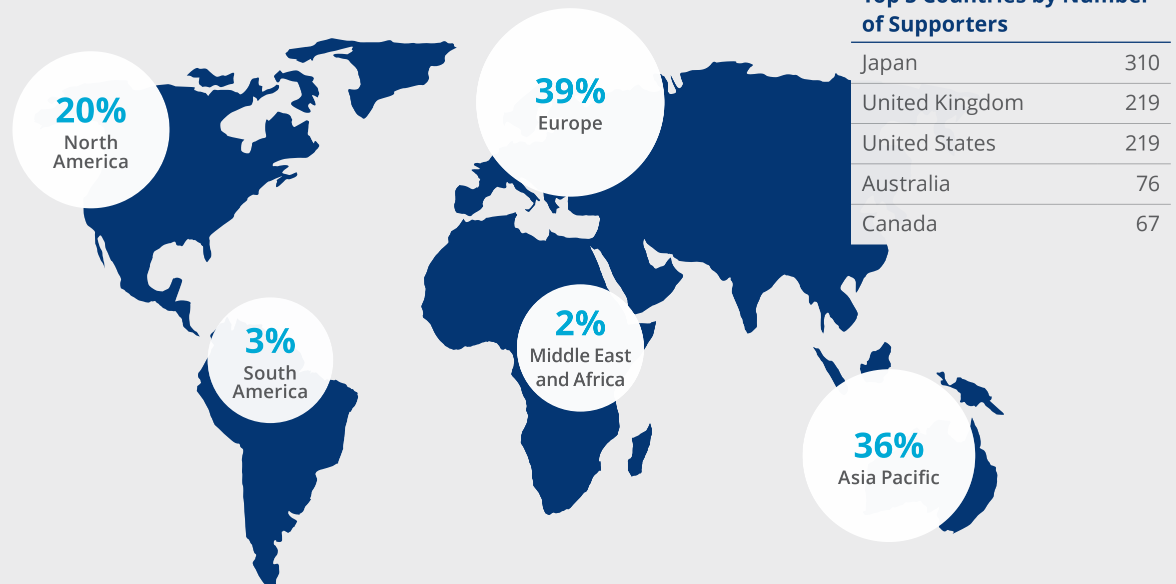
D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Figure E1

Geographic Distribution of TCFD Supporters



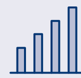
Top 5 Countries by Number of Supporters	
Japan	310
United Kingdom	219
United States	219
Australia	76
Canada	67

[83] Importantly, not all organizations that support the TCFD recommendations implement them. Some organizations express support by convening their members and facilitating consistency in implementation, while others — such as governments and regulators — express support by encouraging or requiring companies and other organizations to implement the recommendations.

[84] Forbes, *The World's Largest Public Companies*, May 13, 2020. In reviewing the 100 largest public companies, the Task Force identified whether a company indicated it reported in line with the TCFD recommendations or planned to.

[85] Given the significant number of references included in this section (denoted in light blue), footnote citations are not included. However, each of the references is included in Appendix 7: References.

Key Takeaways



Support for the TCFD has increased significantly since the June 2019 status report was issued — nearly 700 organizations have indicated their support for the TCFD, an increase of over 85%.

The Task Force sees increased interest by policy makers and regulators in specifically requiring disclosure of climate-related financial information, often with references to the TCFD.

Support for implementing the TCFD recommendations comes from a wide range of organizations — from investors to industry associations to regulators — and spans the globe — from Chile and Mexico to South Africa to Malaysia and New Zealand and multiple countries in between.

1. IMPLEMENTATION INITIATIVES

As support for the TCFD has grown, many organizations have continued their efforts to help companies implement the TCFD recommendations. For example, building on its previous work, such as guidance and implementation workshops, to support finance leaders in implementing the TCFD recommendations, Accounting for Sustainability published practical examples or case studies in July 2019 to show how two different companies used the results from scenario analysis to inform decisions within their respective organizations.

The World Business Council for Sustainable Development (WBCSD) has also continued to support TCFD implementation for specific industries through its TCFD Preparer Forums. Through these forums, the WBCSD brings together peer companies to implement the TCFD recommendations and discuss disclosure practices and work that is needed to enhance the effectiveness of disclosures. Each forum prepares a report highlighting examples of effective climate-related financial disclosures, perspectives from users of such disclosures, and challenges associated with implementing the recommendations. In July 2019, the WBCSD published reports on the electric utilities and chemical industries; in April 2020, it published a report on the food, agriculture, and forest products industry; and in July 2020, it published a report on the construction and building materials industry. In July 2020, the WBCSD also announced it is initiating a TCFD Preparer Forum for companies involved in the manufacture and leasing of automobiles. In addition, in October 2019, the WBCSD released a checklist with practical steps for companies to "future proof" their businesses, one of which was to implement the TCFD recommendations to provide investors with decision-useful information.

In the financial sector, the United Nations Environment Programme Finance Initiative (UNEP FI) continued its work with financial institutions on implementing the TCFD recommendations. In 2019, UNEP FI published two guides for investors on analyzing, evaluating, and testing methodologies to enable 1.5°C, 2°C, and 3°C scenario-based analysis of their portfolios in line with the TCFD recommendations. The first guide (May 2019) covers listed equities, corporate debt, and direct real estate portfolios, and the second guide (November 2019) builds on the first, focusing on modeling and analyses from the investigation into direct real estate investments. In addition, UNEP FI is working with insurers on developing analytical tools to support insurance industry disclosures that are in line with the TCFD recommendations.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Reports Referenced

Also supporting financial institutions' implementation efforts, the Institute of International Finance (IIF) released a report in August 2019 intended to provide insight on current leading practices among financial firms in implementing TCFD recommendations. The IIF noted this report will serve as a baseline for tracking improvements in climate-related financial disclosure through annual updates.

The Investor Leadership Network (ILN), launched in 2018, facilitates collaboration among leading global investors on key issues related to sustainability and long-term growth. In September 2019, the ILN published a report — *TCFD Implementation, Practical Insights and Perspectives from Behind the Scenes for Institutional Investors* — intended to assist asset owners and fund managers in making better choices to define their climate change strategies and disclosures. The report describes how a group of asset owners and asset managers approached implementing the TCFD recommendations and why they implemented them the way they did, including the process behind their choices, the challenges they faced, and the lessons learned.

New initiatives on implementing the TCFD recommendations have emerged as well. In November 2019, the Banking Association of South Africa hosted a workshop to provide South African banks with training on the relevance of climate risk management and disclosure and its integration into existing decision-making processes, in line with the TCFD recommendations.[86] In January 2020, FEBRABAN, the Brazilian Federation of Banks, published a progress report to follow up on its TCFD implementation road map for Brazilian banks. The report describes TCFD implementation progress in the Brazilian banking sector during 2019.

Additionally, in February 2020, the Governance Institute of Australia released practical guidance for Australian Securities Exchange (ASX)-listed companies reporting against the ASX Corporate Governance Council's *Corporate Governance Principles and Recommendations*. In February 2019, the Corporate Governance Council updated its Corporate Governance Principles and Recommendations to include climate change risk with the recommendation that organizations use the TCFD recommendations to help determine whether they are exposed to material risks from climate change. The Governance Institute of Australia's practical guidance assists companies with implementing the TCFD recommendations to comply with the *Corporate Governance Principles and Recommendations*.

On July 31, 2020, the industry-led TCFD Consortium in Japan released an update to guidance first released in December 2018, which provided detailed commentary on how to implement the TCFD recommendations for five industrial sectors. The updated guidance — *Guidance on Climate-Related Financial Disclosures 2.0* — incorporates the latest knowledge on TCFD disclosures and promotes TCFD disclosure in a broader range of industries.

2. INVESTOR INITIATIVES

Many investors are driving companies to implement the TCFD recommendations. For example, Climate Action 100+, comprised of over 500 investors with over $47 trillion in assets under management, is engaging the world's largest corporate greenhouse gas emitters to strengthen their climate-related disclosures by implementing the TCFD recommendations.

The Transition Pathway Initiative (TPI) — led by asset owners and supported by asset managers — uses public disclosures to assess the quality of companies' management of their carbon emissions and of risks and opportunities related to the low-carbon transition, in line with the TCFD recommendations.[87]

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Reports Referenced

[86] The Banking Association of South Africa hosted the workshop in collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit's (GIZ) Climate Support Programme (CSP). The GIZ implements the CSP as part of the International Climate Initiative. CSP supports the development of climate policy and governance, as well as the implementation thereof, in the areas of mitigation, adaptation, and monitoring and evaluation.

[87] Eighty investors globally have pledged their support to TPI, jointly representing $20.9 trillion combined assets under management and advice.

In March 2020, the TPI released its *State of Transition Report 2020* which describes the progress of the most emissions-intensive public companies on transitioning to a low-carbon economy.

In October 2019, the United Nations Secretary-General convened the Global Investors for Sustainable Development (GISD) Alliance to support the implementation of the Sustainable Development Goals (SDGs). In its July 2020 report to policy makers and other stakeholders, the GISD Alliance published recommendations and strategic considerations for the public and private sectors to collaboratively work to achieve the SDGs. The report emphasizes the importance of standardized disclosures and recommends policy makers "make sustainability reporting mandatory for financial and non-financial institutions, including TCFD disclosures."

In September 2020, the ILN published a report — *Climate Change Mitigation and Your Portfolio: Practical Tools for Investors*, which addresses some of the challenges associated with climate-related scenario analysis and offers a structured approach for investors to evaluate companies' scenario analysis disclosures, consistent with the Task Force's Strategy recommendation.

generally finding considerable alignment among the frameworks and with the TCFD recommendations.

Building on their May 2019 *TCFD Implementation Guide*, CDSB and SASB published a *TCFD Good Practice Handbook* (handbook) to provide companies with examples of TCFD-aligned disclosures. The handbook, published in September 2019, includes mock TCFD disclosures and accompanying narratives to enhance companies' understanding of methods for disclosing in line with the TCFD recommendations.

The global insurance companies that constitute ClimateWise updated the *ClimateWise Principles* to fully align with the TCFD recommendations in December 2018. The *ClimateWise Principles* are a reporting framework for the insurance industry through which ClimateWise members report and are benchmarked annually. Members began reporting against the updated principles in 2019; and in December 2019, ClimateWise released *The ClimateWise Principles Independent Review 2019*, which summarizes members' reporting and describes challenges and opportunities for the industry in implementing the TCFD recommendations.

3. ALIGNMENT OF REPORTING FRAMEWORKS

In its 2019 status report, the Task Force noted companies were increasingly reporting information aligned with the TCFD recommendations as a result of existing climate-related reporting frameworks' incorporation of the TCFD recommendations.[88] Many of the efforts to promote alignment between reporting frameworks mentioned in the 2019 status report have continued or expanded.

One such effort is the Corporate Reporting Dialogue's Better Alignment Project launched in November 2018 and undertaken by the International Integrated Reporting Council, CDP, the Climate Disclosure Standards Board (CDSB), the Global Reporting Initiative, and SASB, collectively referred to as participating organizations. The Better Alignment Project enables participating organizations to map their frameworks to the TCFD recommendations and where possible, align their climate-related metrics across all the reporting frameworks. The Better Alignment Project released its first progress report in September 2019,

4. GOVERNMENT AND REGULATORY EFFORTS

While the TCFD remains a voluntary, market-led initiative, many government organizations, including regulators, are taking steps to encourage or, in a few cases, mandate its adoption. Over 110 regulators and government organizations from around the world are TCFD supporters, including the governments of Belgium, Canada, Chile, France, Japan, New Zealand, Sweden, and the United Kingdom (UK).

On a global level, the 26th UN Climate Change Conference of the Parties (COP26) features TCFD implementation in its private finance agenda. In his speech at the February 2020 launch of the COP26 private finance agenda, Mark Carney — former Governor of the Bank of England and Finance Adviser to the Prime Minister for COP26 — encouraged companies to report a full set of TCFD disclosures in the 2021–2022 reporting cycle.

In June 2019, the European Commission (EC) published *Guidelines on Reporting Climate-Related Information*. The guidelines, which integrate the TCFD recommendations, are intended to support companies in disclosing climate-related information under the EC's Non-Financial Reporting Directive.

[88] See Section F.2. Alignment of Reporting Frameworks in the Task Force's 2019 status report.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

**E.
Initiatives Supporting TCFD**

Appendices

The Network for Greening the Financial System (NGFS), a group of 72 central banks and supervisors and 13 observers from international organizations, published *A Call for Action: Climate Change as a Source of Financial Risk* in April 2019. In the report, the NGFS encouraged all companies issuing public debt or equity as well as financial sector institutions to disclose in line with the TCFD recommendations. In July 2019, the NGFS released a technical supplement to the report in which it described quantitative methods for central banks and supervisors to assess climate-related risk and established key areas for further research. The NGFS expanded on its risk assessment guidance with the release of a set of climate scenarios in June 2020.

In July 2020, the Financial Stability Board published a stocktake of whether and how financial authorities incorporate climate-related risks into their financial stability monitoring. Among other findings, the FSB noted that in setting supervisory expectations for banks and insurance companies' disclosure of climate-related risks, some authorities explicitly refer to the TCFD recommendations. The FSB also mentioned some financial authorities have quantified or are working on quantifying climate-related risks, but that such efforts are hindered by a lack of consistent data on financial exposures to climate-related risks and the difficulties translating climate change outcomes into changes in financial exposure.

In June 2020, the Bank of England published its own climate-related financial disclosure in line with the TCFD recommendations. The report covers each of the TCFD recommendations, setting out how the Bank considers climate-related risks across its governance, strategy, and risk management activities and the metrics the Bank uses to monitor and manage climate-related risks. Also in June 2020, an industry forum jointly convened by the Bank of England's Prudential Regulation Authority (PRA) and the UK Financial Conduct Authority (FCA) — the Climate Financial Risk Forum (CFRF) — published a guide on climate-related financial risk management, using the TCFD recommendations as part of its foundation. The guide consists of a summary co-produced by the PRA and FCA and four industry-produced chapters on risk management, scenario analysis, disclosures, and innovation.

In June 2020, the Hong Kong Monetary Authority (HKMA) released a *White Paper on Green and Sustainable Banking* in which it suggests authorized institutions take steps to "build climate resilience." As part of its nine guiding principles, the HKMA recommended that authorized institutions "take the TCFD recommendations as the core reference" in developing an approach to disclose climate-related financial information to enhance transparency. Also in June 2020, the Monetary Authority of Singapore issued *Proposed Guidelines on Environmental Risk Management (Banks)* that indicate banks should reference international reporting frameworks, including the TCFD recommendations, to guide their environmental risk disclosure.

In May 2020, the European Central Bank (ECB) released non-binding supervisory expectations in its *Guide on Climate-Related and Environmental Risks: Supervisory Expectations Relating to Risk Management and Disclosure*. One of the ECB's expectations is for financial institutions to disclose climate-related risks in line with the EC's *Guidelines on Reporting Climate-Related Information*.

In May 2020, the National Treasury of South Africa published a draft technical paper — *Financing a Sustainable Economy*, which recommends regulators and the financial sector work together to establish standards on identifying, monitoring, and reporting environmental and social risks, including climate-related risks, that incorporate the TCFD recommendations.

In March 2020, Germany's Sustainable Finance Committee — which advises the German government on the development and implementation of a sustainable finance strategy — released an interim report. The interim report is intended to serve as a basis for discussion on the sustainable finance strategy and encourages the German federal government to introduce legislation requiring all listed companies in Germany to apply the TCFD recommendations beginning in 2022.

In March 2020, the UK's FCA released a consultation paper on enhancing climate-related disclosure, including a requirement for premium listed issuers to state in their annual financial reports whether they made disclosures consistent with the TCFD recommendations and, if so, where in the annual financial reports (or other relevant documents) the various disclosures can be found.[89] Also in March 2020, building on the *Green Finance Strategy* released in July 2019, the UK's Department for Work and Pensions released a guide for public consultation — developed by the Pensions Climate Risk Industry Group — for occupational pension schemes on assessing, managing, and reporting in line with the TCFD recommendations.

[89] A Premium Listing means that a company must meet standards that are over and above (often described as "super-equivalent") those set forth in the EU legislation, including the UK's corporate governance code.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

**E.
Initiatives Supporting TCFD**

Appendices

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

**E.
Initiatives Supporting TCFD**

Appendices

In February 2020, the Banco de México (the Central Bank of Mexico) released a report on strategies and methodologies to mitigate environmental and social risks in the Mexican financial sector. In the report, the Banco de México recommends providing a clear strategy on how regulation and supervision will promote disclosure of physical and transition risk analysis of financial institutions and corporations, following the TCFD recommendations. The Banco de México also mentions consideration of "issuing disclosure guidance to financial institutions in line with the TCFD recommendations" as part of a comprehensive strategy for sustainable finance.[90]

In February 2020, the International Association of Insurance Supervisors, a standards-setting organization of insurance supervisors and regulators, in partnership with the Sustainable Insurance Forum, issued an *Issues Paper on the Implementation of the Recommendations of the Task Force on Climate-related Financial Disclosures*. The issues paper provides an overview of practices that insurance supervisors have considered in the development of climate-related disclosure requirements within their jurisdictions.

The European Financial Reporting Advisory Group (EFRAG) launched its Project Task Force on Climate-related Reporting to assess the state of climate-related reporting, with a primary focus on the TCFD recommendations in February 2019. In February 2020, EFRAG published a report on improving climate-related reporting along with two supplemental documents. One of the supplemental documents — *Supplement 1: Climate-Related Reporting Practices* — identifies good reporting practices and assesses the level of maturity in the implementation of the TCFD recommendations, with a primary focus on European companies.

The Colombian Climate Asset Disclosure Initiative (CCADI) is a multiyear initiative to help Colombian investors incorporate climate risks and opportunities into their investment strategies. As part of the CCADI, 23 investors received climate assessments in line with the TCFD recommendations.

In December 2019, Malaysia's central bank, Bank Negara Malaysia (BNM), published a discussion paper in which BNM recognized climate change as a material source of risk and encouraged supervised financial institutions to promote transparency by disclosing in line with the TCFD recommendations.

In Japan, the Ministry of Economy, Trade, and Industry held the first TCFD Summit in October 2019, co-organizing the summit with the WBCSD and the TCFD Consortium. Japan hosted the summit during its G20 Presidency to advance TCFD implementation and dialogue around potential issues for companies implementing the recommendations and ideas for addressing identified challenges. Japan hosted the second annual TCFD Summit online on October 9, 2020.

In October 2019, the New Zealand Ministry for the Environment and the Ministry of Business, Innovation, and Employment (ministries) released a discussion paper that included a proposal to require financial firms and listed companies to report on their climate-related risks in line with the TCFD recommendations. In September 2020, the Ministry for the Environment announced that the government plans to make climate-related financial disclosures mandatory for certain publicly listed companies and large insurers, banks, and investment managers and that reporting would be against a standard developed in line with the TCFD recommendations.

In August 2019, the Australian Securities and Investment Commission (ASIC) updated its regulatory guide on *Prospectuses: Effective Disclosure for Retail Investors* to "incorporate the types of climate change risk developed by the G20 Financial Stability Board's [TCFD] into the list of examples of common risks that may need to be disclosed in a prospectus. In the accompanying press release, ASIC welcomed "the continuing emergence of the TCFD framework as the preferred market standard" and "strongly encourage[d] listed companies with material exposure to climate change to consider reporting voluntarily under the TCFD framework."

In June 2019, the Canadian Government's Expert Panel on Sustainable Finance released a report in which it recommends Canada's public and private sectors define and pursue a Canadian approach to implementing the TCFD recommendations. In May 2020, the Canadian government furthered TCFD implementation efforts through the Large Employer Emergency Financing Facility (LEEFF), which was established in response to economic strain from the COVID-19 pandemic. LEEFF provides bridge financing to Canada's largest employers; and to be eligible for LEEFF financing, companies are required to commit to publish annual climate-related disclosure reports consistent with the recommendations.

[90] Banco de México, *Climate and Environmental Risks and Opportunities in Mexico's Financial System: From Diagnosis to Action*, February 2020, pp. 14 and 52.

Appendices

Appendix 1: Task Force Members

CHAIRMAN AND VICE CHAIRS

Michael Bloomberg
Chair
Founder
Bloomberg LP and Bloomberg Philanthropies

Denise Pavarina
Vice Chair
Senior Advisor
Aggrego Consultores

Christian Thimann
Vice Chair
CEO and Chairman of the Management Board
Athora Germany

Graeme Pitkethly
Vice Chair
Chief Financial Officer
Unilever

Yeo Lian Sim
Vice Chair
Special Adviser, Diversity
Singapore Exchange

MEMBERS

Jane Ambachtsheer
Global Head of Sustainability
BNP Paribas Asset Management

Wim Bartels
Partner Corporate Value
KPMG

David Blood
Senior Partner
Generation Investment Management

Koushik Chatterjee
Executive Director & Chief Financial Officer
Tata Group

Mary Draves
Vice President, Environment, Health, Safety and Sustainability
Dow

Takehiro Fujimura
General Manager, Corporate Sustainability & CSR
Mitsubishi Corporation

Alan Gómez
Vice President, Sustainability
Citibanamex

Diane Larsen
Assurance Audit Partner,
Global Professional Practice
EY

Mark Lewis
Global Head of Sustainability Research
BNP Paribas Asset Management

Matt Arnold
Head of ESG & Corporate Responsibility Engagement
JPMorgan Chase & Co.

Bruno Bertocci
Managing Director, Head of Sustainable Equity Investors
UBS Asset Management

Richard Cantor
Chief Credit Officer
Moody's Corporation

Brian Deese
Managing Director, Global Head of Sustainable Investing
BlackRock

Eric Dugelay
Partner, Sustainability Services
Deloitte

Rosanna Fusco
Vice President Environment
Eni

Thomas Kusterer
Chief Financial Officer
EnBW Energie Baden-Württemberg AG

Stephanie Leaist
Senior Advisor
CPP Investments

Eloy Lindeijer
Chief Investment Management, Member Executive Committee
PGGM

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Ruixia Liu
General Manager, Risk Management Department
Industrial and Commercial Bank of China

Sylvain Vanston
Group Head, Climate & Environment
AXA

Martin Weymann
Head Sustainability, Emerging & Political Risk Management, Group Risk Management
Swiss Re

Michael Wilkins
Managing Director, Sustainable Finance
S&P Global Ratings

Martin Skancke
Chair, Risk Committee
Storebrand

Steve Waygood
Chief Responsible Investment Officer
Aviva Investors

Fiona Wild
Vice President, Sustainability and Climate Change
BHP

Jon Williams
Partner, Sustainability and Climate Change
PwC

SPECIAL ADVISOR

Russell Picot
Chair, Trustee Board
HSBC Bank (UK) Pension Scheme
Former Group Chief Accounting Officer, HSBC

SECRETARIAT

Mary Schapiro
Vice Chair for Global Public Policy and Special Advisor to the Founder and Chair
Bloomberg LP

Didem Nisanci
Global Head of Public Policy
Bloomberg LP

Mara Childress
Director, Global Public Policy
Bloomberg LP

Stacy Coleman
TCFD Secretariat

Curtis Ravenel
TCFD Secretariat

Jeff Stehm
TCFD Secretariat

Silvia Iancu
TCFD Secretariat

Julia Berthel
TCFD Secretariat

OBSERVERS

Joe Perry
Member of Secretariat
Financial Stability Board

Rupert Thorne
Deputy to the Secretary General
Financial Stability Board

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Appendix 2: Company Selection and AI Review Methodology

As summarized in Section A.1. TCFD-Aligned Reporting by Public Companies, the Task Force developed an approach using artificial intelligence (AI) technology to review the alignment of information included in fiscal year 2017, 2018, and 2019 public reports with the TCFD recommendations. This appendix describes the Task Force's process for selecting the companies included in the review, the types of documents reviewed, and the AI review methodology.

1. COMPANIES INCLUDED IN THE REVIEW

The Task Force reviewed financial filings, annual reports, integrated reports, and sustainability reports of 1,701 large companies from 69 countries in eight industries. Six of the eight industries align with groups highlighted in the Task Force's 2017 report — Banking; Insurance; Energy; Materials and Buildings; Transportation; and Agriculture, Food, and Forest Products. To incorporate additional companies that may be exposed to climate-related risks, two industries were added to the review for the 2019 status report and retained for this year's status report — Technology and Media and Consumer Goods. The Task Force selected companies included in the AI review using the following methodology:

- identified universe of public companies — companies with public debt or equity — in the eight selected industries using the 29 sub-industries listed in Figure A2-1 (p. 78). The 29 sub-industries are loosely based on the Global Industry Classification Standard sub-sectors and industries;
- removed subsidiaries to avoid double counting of companies. Identified companies that shared the same industry and ultimate parent for capital structure purposes and retained the company with the largest annual revenue (for non-financial industries) or the largest total assets (for financial industries). We followed this approach to avoid, as much as possible, removing companies that published annual reports separate from their parent company;
- removed smaller companies from the population to maintain focus on larger companies. We retained banks and insurance companies with total assets of at least $10 billion and $1 billion, respectively, and companies in the six non-financial industries with annual revenue of $1 billion or more. This resulted in 4,446 total companies; and the breakdown by industry and sub-industry is shown in Figure A2-1 (p. 78);
- removed companies that did not have reports available in English; and
- removed companies that did not have annual reports available for review in all three years. This was done to ensure a consistent population of companies and comparable reporting across all three years. Importantly, not all 2019 disclosures were available by the date that documents were extracted for review (May 4, 2020).

This methodology resulted in a final review population of 1,701 companies.[91]

2. DOCUMENTS REVIEWED

The Task Force focused primarily on companies' fiscal year 2017, 2018, and 2019 financial filings, annual reports, integrated reports, and sustainability reports. These documents were identified using the Bloomberg Terminal, and other relevant documents provided in the Terminal were reviewed as available. The Task Force only selected documents available in English and documents were categorized by the year of reporting.

- **Financial Filings** (including 10-Ks, 20-Fs, annual report and accounts, and registration documents): Reports that describe companies' audited financial results under the corporate, compliance, or securities laws of the jurisdictions in which they operate. While reporting requirements differ internationally, financial filings generally contain financial statements and other information such as governance statements and management commentary.

[91] The AI review population used in the 2019 status report included 1,126 companies compared to 1,701 companies this year. The Task Force broadened the coverage of the largest companies in each industry using the asset and revenue thresholds described above. While this approach led to a higher median market capitalization, the addition of 575 companies led to a drop in average market capitalization; it also led to a higher concentration of companies in North America and Europe (71% this year versus 47% in the 2019 AI review population).

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

- **Annual or Integrated Reports:** Reports that describe companies' activities for the preceding year (annual reports) or the broader range of measures that contribute to companies' long-term value and the role they play in society (integrated reports).
- **Sustainability Reports** (including Corporate Social Responsibility and Environmental, Social, and Governance reports): Reports that describe companies' impact on society, often addressing environmental, social, and governance issues.
- **Other Relevant Documents:** Documents available in the Bloomberg Terminal that are associated with companies' annual reporting or sustainability.

3. REVIEW METHODOLOGY

The AI technology used to review company reports was initially developed for the Task Force's 2018 status report. The AI methodology was refreshed for use in 2020 as described below.[92]

Trained the AI Technology

The AI technology was based on a set of statistical language models that were trained to identify responses to questions tied to the recommended disclosures, for companies in the review population. The statistical language models underlying the AI technology were trained using passages of text or excerpts identified as aligning with the Task Force's 11 recommended disclosures — referred to as labeled data. To collect this labeled data for its 2018 status report, the Task Force formed a small group to manually review publicly available reports from a sample of 150 "high-disclosing" companies. The small group agreed

Figure A2-1

Industry and Sub-Industry of Companies Selected for Review

Industries	Sub-Industries	
Banking 608 Companies	• Regional Banks • Large, Diversified Banks	• Investment and Asset Management Firms
Insurance 246 Companies	• Multiline Insurance • Property and Casualty Insurance	• Life and Health Insurance • Reinsurance
Energy 483 Companies	• Oil and Gas • Coal	• Utilities
Transportation 456 Companies	• Air Freight • Passenger Air Transportation • Maritime Transportation	• Rail Transportation • Trucking Services • Automobiles
Materials and Buildings 1,580 Companies	• Chemicals • Construction Materials • Capital Goods	• Metals and Mining • Real Estate Management and Development
Agriculture, Food, and Forest 325 Companies	• Beverages • Agriculture	• Packaged Foods and Meats • Paper and Forest Products
Technology and Media 292 Companies	• Technology Hardware and Equipment	• Interactive Media and Services
Consumer Goods 456 Companies	• Consumer Retailing	• Textiles and Apparel

Total: 4,446 Companies

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[92] Please refer to the Task Force's 2018 status report for additional information on the development of the AI technology in 2018.

to use a common standard for reviewing the reports, which included narrowing down each recommended disclosure to a single yes-no question (Figure A2-2).

For example, recommended disclosure a) under the Governance recommendation (*Governance a*) asks companies to describe the board's oversight of climate-related risks and opportunities. The yes-no question for *Governance a)*, Question 1, asked reviewers whether the company describes the board's or a board committee's oversight of climate-related risks or opportunities. As part of the process the group performed multiple levels of review to ensure consistency in approach. In 2019 and 2020, additional labeled data was collected following a similar approach in which a small group applied a common standard for review, and there was a peer review to ensure consistency in approach.

The labeled data was then used to train the AI technology to generalize these human judgments to a much larger set of company reports beyond the initial manually reviewed set. For the reports reviewed by the AI technology, passages of text were assigned a "yes" or "no" for each review question using judgments that are consistent with the training provided by the human reviewers. Importantly, this approach was *not* designed to assess the quality of companies' climate-related financial disclosures, but rather to provide an indication of the alignment of existing disclosures with the Task Force's 11 recommended disclosures.

Figure A2-2

AI Review Questions

#	Question	Recommended Disclosure
1	Does the company describe the board's or a board committee's oversight of climate-related risks or opportunities?	*Governance a)*
2	Does the company describe management's or a management committee's role in assessing and managing climate-related risks or opportunities?	*Governance b)*
3	Does the company describe the climate-related risks or opportunities it has identified?	*Strategy a)*
4	Does the company describe the impact of climate-related risks and opportunities on its businesses, strategy, or financial planning?	*Strategy b)*
5	Does the company describe the resilience of its strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario?	*Strategy c)*
6	Does the company describe its processes for identifying and/or assessing climate-related risks?	*Risk Management a)*
7	Does the company describe its processes for managing climate-related risks?	*Risk Management b)*
8	Does the company describe how processes for identifying, assessing, and managing climate-related risks are integrated into overall risk management?	*Risk Management c)*
9	Does the company disclose the metrics it uses to assess climate-related risks or opportunities?	*Metrics and Targets a)*
10	Does the company disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas emissions?	*Metrics and Targets b)*
11	Does the company describe the targets it uses to manage climate-related risks or opportunities?	*Metrics and Targets c)*

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

For the 2020 status report, the AI model went through a second iteration of training to further improve performance and keep this generalization of human judgments up to date. For each recommended disclosure, passages of text were extracted from the AI review process at various score threshold levels (i.e., passages predicted as "yes" with model scores ranging from high to low, and "no" with model scores ranging from high to low). Reviewers from the AI team then validated these passages by providing "yes" or "no" judgments consistent with the previous manual review process, resulting in the identification of a specific threshold for each disclosure. This generated thousands of additional labels that were used to retrain the initial models and increase confidence in the validity of the results.

Processed Relevant Reports

The Task Force used an automated process to extract passages of text from companies' reports for the AI technology to review. In cases where none of a company's reports were available in English or where a company's reports could not be sufficiently converted into text format, those companies were removed from the review population. Ultimately, nearly 30 million passages of text were converted for review.

Validated the AI Results

The AI technology allocated each passage of text with a probability score for each recommended disclosure that indicates the likelihood it would be assigned a "yes" by a human reviewer. The passages were then categorized as either positive or negative results for each recommended disclosure depending on whether that score was over or under the disclosure-specific threshold level. Each report was marked as having a TCFD-aligned disclosure if at least one passage was categorized as a positive result. Likewise, a company was then marked as having a TCFD-aligned disclosure if at least one report was categorized as a positive result.

To allow read-across between the 2020 and 2019 results, a process of calibration was required to ensure that the revised 2020 AI model was applying threshold levels in a way that would yield outcomes that were broadly consistent with the 2019 AI model. This was achieved by running the 2020 AI model on the reports of a group of 462 companies that were included in both the 2019 and 2020 AI review populations and adjusting the model thresholds so the 2019 disclosure rates approximated those previously published. Once this process of "re-thresholding" was complete, the 2020 AI model was then applied to all 1,701 companies in the 2020 AI review population, allowing for an "apples to apples" comparison for the 462 companies across years.

Figure A2-3
Paragraph-Level Model Accuracy (AUC Scores)

Recommended Disclosure	AUC
Governance a)	0.99
Governance b)	0.94
Strategy a)	0.93
Strategy b)	0.90
Strategy c)	0.81
Risk Management a)	0.88
Risk Management b)	0.85
Risk Management c)	0.91
Metrics and Targets a)	0.91
Metrics and Targets b)	0.99
Metrics and Targets c)	0.96

Performance and predictive accuracy for each of the models can be assessed by comparing what the AI generates as predictions to the judgments from human reviewers. Two main sources of human reviews were available, the initial full manual review of 150 companies and the manual reviews of individual passages identified using the AI review results across a wider set of companies. The model accuracy for each recommended disclosure class is presented in Figure A2-3, and is measured at a paragraph level using the Area Under the Curve (AUC) values produced from the model training.[93]

Applied AI Models to Review Population

Finally, the revised AI models were applied to excerpts from the reports of the 1,701 companies, and the results were aggregated for analysis by the 11 recommended disclosures, the eight industries, the size of the companies, and the regions in which the companies were located.

[93] Area Under the Curve is the metric used for optimizing model performance during training. AUC is calculated by measuring the area under a Receiver Operating Characteristic curve, which is an aggregate measure of performance across all possible classification thresholds; calculated using the true positive and false positive rates. AUC is the accepted standard accuracy measure for AI classification models.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Appendix 3: AI Review Results by Industry

As summarized in Section A.1. TCFD-Aligned Reporting by Public Companies, the Task Force developed an approach using artificial intelligence (AI) technology to review the alignment of information included in fiscal year 2017, 2018, and 2019 public reports with the TCFD recommendations. This appendix provides the results of the AI review for each of the eight industries included in the review — Banking; Insurance; Energy; Materials and Buildings; Transportation; Agriculture, Food, and Forest Products; Technology and Media; and Consumer Goods.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

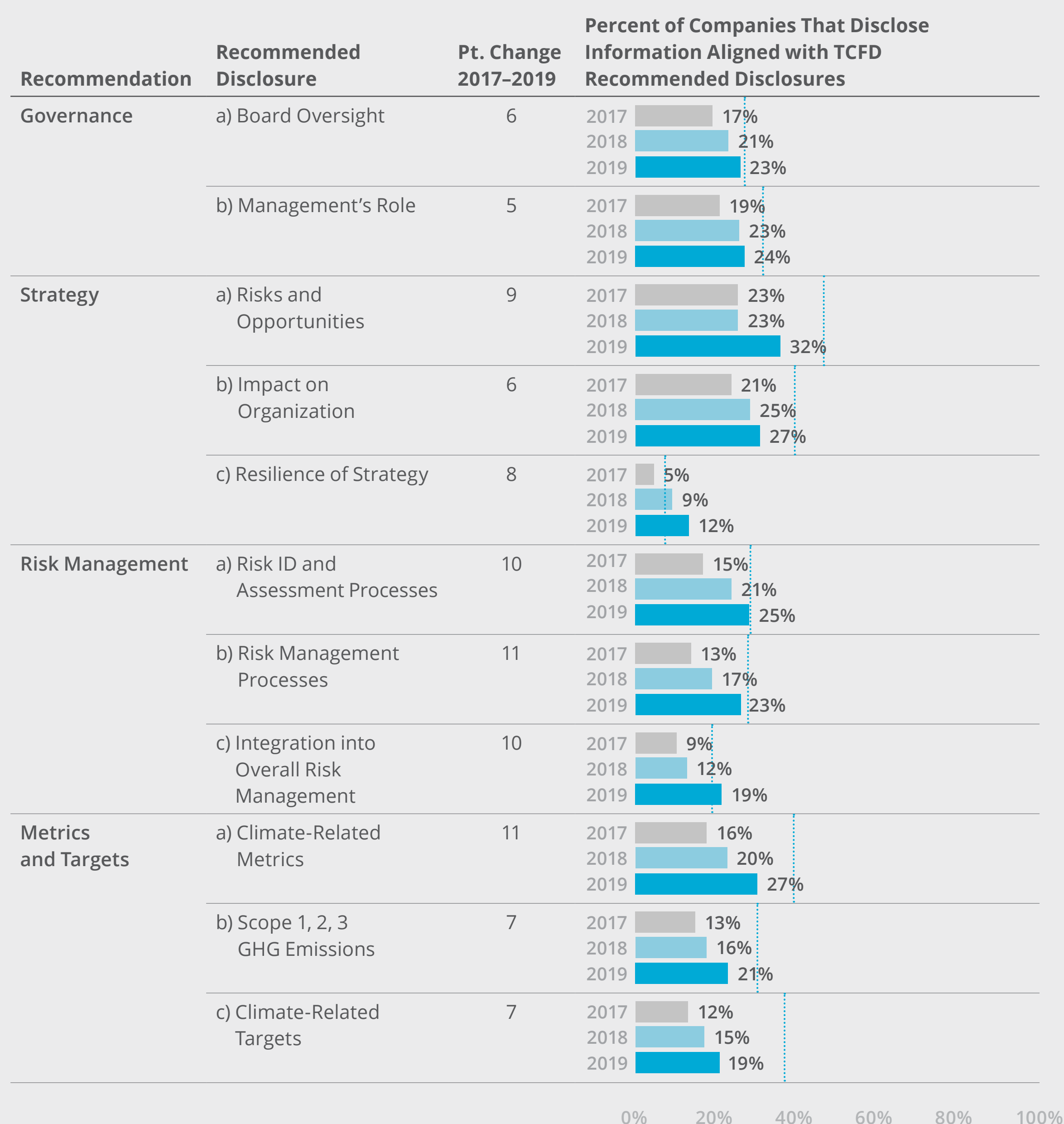
Banking

The AI technology reviewed reports from 289 banks in three sub-industries: investment and asset management banks, large and diversified banks, and regional banks. The 289 banks ranged in size from about $10 billion to $4.4 trillion in assets, with a median asset size of nearly $54 billion in assets. The AI review results for banks are shown in Figure A3-1.

For eight of the 11 recommended disclosures, the percentage of banks disclosing relevant information was lower than the average across all companies reviewed. Banks' disclosure of information in alignment with the TCFD recommendations increased from 2017 to 2019 for all the recommended disclosures, and banks had the largest increase in disclosure of climate-related risks and opportunities between 2017 and 2019 for any industry at nine percentage points. The most significant increases in disclosure — 11 percentage points — were for *Risk Management b)* and *Metrics and Targets a)*, showing that banks are increasingly disclosing their processes for managing climate-related risks as well as the climate-related metrics they use. However, banks had the lowest percentage of disclosure for climate-related targets (*Metrics and Targets c*) of all industries in all three years.

Figure A3-1

Banking Review Results



Recommendation	Recommended Disclosure	Pt. Change 2017–2019	2017	2018	2019
Governance	a) Board Oversight	6	17%	21%	23%
	b) Management's Role	5	19%	23%	24%
Strategy	a) Risks and Opportunities	9	23%	23%	32%
	b) Impact on Organization	6	21%	25%	27%
	c) Resilience of Strategy	8	5%	9%	12%
Risk Management	a) Risk ID and Assessment Processes	10	15%	21%	25%
	b) Risk Management Processes	11	13%	17%	23%
	c) Integration into Overall Risk Management	10	9%	12%	19%
Metrics and Targets	a) Climate-Related Metrics	11	16%	20%	27%
	b) Scope 1, 2, 3 GHG Emissions	7	13%	16%	21%
	c) Climate-Related Targets	7	12%	15%	19%

Percent of Companies That Disclose Information Aligned with TCFD Recommended Disclosures

Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

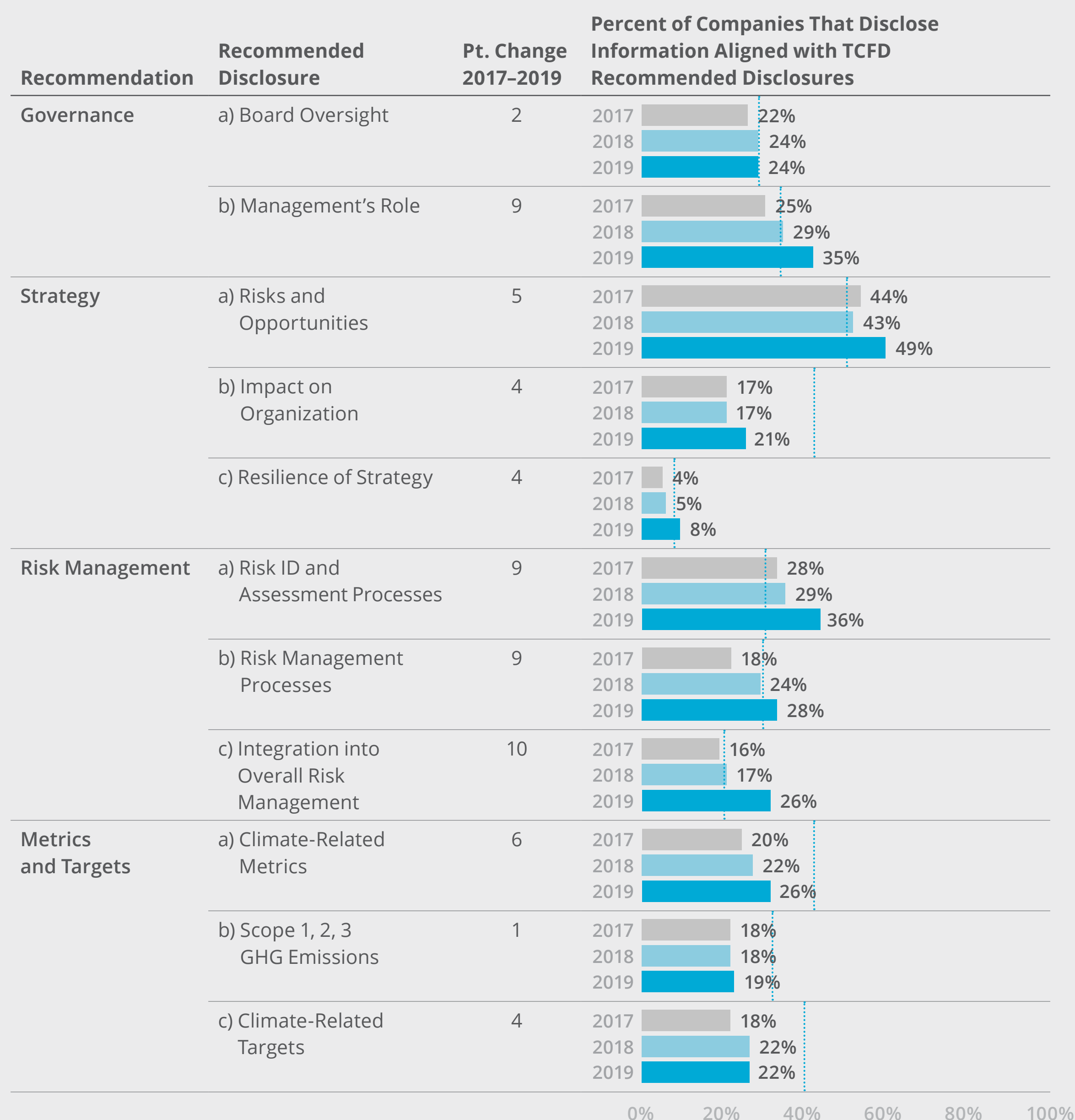
Insurance

The AI technology reviewed reports from 141 insurance companies in four categories: multi-line insurance, property and casualty insurance, reinsurance, and life and health insurance. The insurance companies reviewed ranged in size from about $1 billion to $1.1 trillion in assets, with a median asset size of around $26 billion in assets. The AI review results for these companies are shown in Figure A3-2.

Based on 2019 reporting, the 141 insurance companies most often disclosed information aligned with the TCFD recommended disclosure *Strategy a)*, climate-related risks and opportunities. The percentage of disclosure in 2019 was greater than or equal to the 2019 average across all companies for six of the 11 recommended disclosures — and insurance companies exceeded the 2019 average by ten or more percentage points for *Risk Management a)* and *Risk Management c)*. The insurance companies reviewed showed moderate increases in the percentage of disclosure between 2017 and 2019 for every recommended disclosure, with increases of nine or ten percentage points between 2017 and 2019 for four of the 11 recommended disclosures.

Figure A3-2

Insurance Review Results



Recommendation	Recommended Disclosure	Pt. Change 2017–2019	2017	2018	2019
Governance	a) Board Oversight	2	22%	24%	24%
	b) Management's Role	9	25%	29%	35%
Strategy	a) Risks and Opportunities	5	44%	43%	49%
	b) Impact on Organization	4	17%	17%	21%
	c) Resilience of Strategy	4	4%	5%	8%
Risk Management	a) Risk ID and Assessment Processes	9	28%	29%	36%
	b) Risk Management Processes	9	18%	24%	28%
	c) Integration into Overall Risk Management	10	16%	17%	26%
Metrics and Targets	a) Climate-Related Metrics	6	20%	22%	26%
	b) Scope 1, 2, 3 GHG Emissions	1	18%	18%	19%
	c) Climate-Related Targets	4	18%	22%	22%

Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

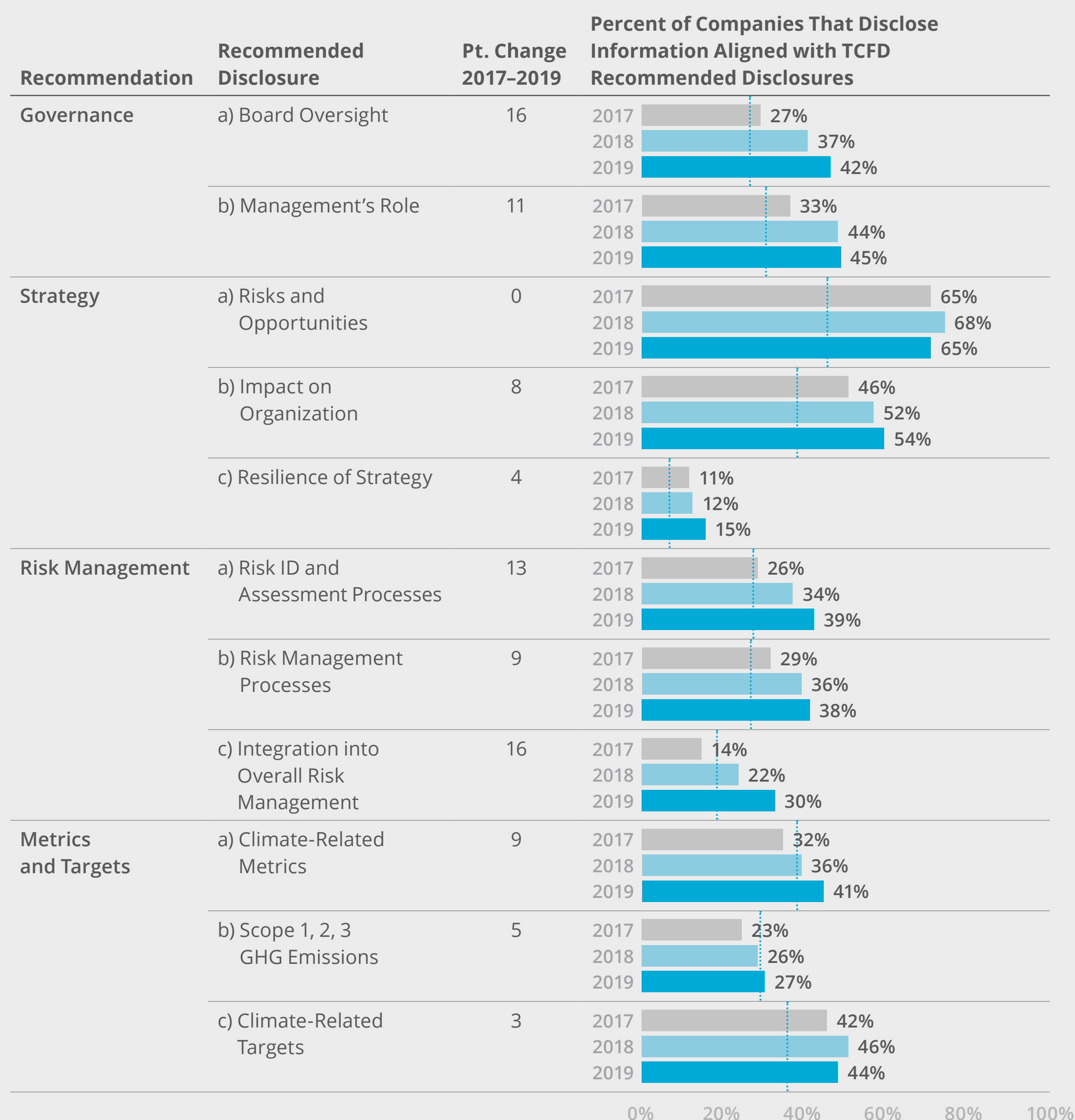
Energy

The AI technology reviewed reports from 277 energy companies in three categories: oil and gas, coal, and utilities. The energy companies ranged in size from about $1 billion to $377 billion in annual revenue, with a median annual revenue of nearly $5 billion. The AI review results for these companies are shown in Figure A3-3.

For all three years, the energy companies reviewed had the highest percentage of disclosure across the eight industries for information aligned with *Strategy a)*, climate-related risks and opportunities, and *Strategy b),* the impact of climate-related risks and opportunities on the company. In 2019, the energy companies reviewed disclosed TCFD-aligned information at a higher rate than the average across all industries for all 11 recommended disclosures. While the percentage of energy companies disclosing information on *Strategy a)* was the same in 2019 as it was in 2017 — 65% — the percentage of these companies reporting information aligned with *Risk Management c)*, the integration of climate-related risks and opportunities into overall risk management, more than doubled between 2017 and 2019.

Figure A3-3

Energy Review Results



Recommendation	Recommended Disclosure	Pt. Change 2017–2019	Percent of Companies That Disclose Information Aligned with TCFD Recommended Disclosures 2017	2018	2019
Governance	a) Board Oversight	16	27%	37%	42%
	b) Management's Role	11	33%	44%	45%
Strategy	a) Risks and Opportunities	0	65%	68%	65%
	b) Impact on Organization	8	46%	52%	54%
	c) Resilience of Strategy	4	11%	12%	15%
Risk Management	a) Risk ID and Assessment Processes	13	26%	34%	39%
	b) Risk Management Processes	9	29%	36%	38%
	c) Integration into Overall Risk Management	16	14%	22%	30%
Metrics and Targets	a) Climate-Related Metrics	9	32%	36%	41%
	b) Scope 1, 2, 3 GHG Emissions	5	23%	26%	27%
	c) Climate-Related Targets	3	42%	46%	44%

Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

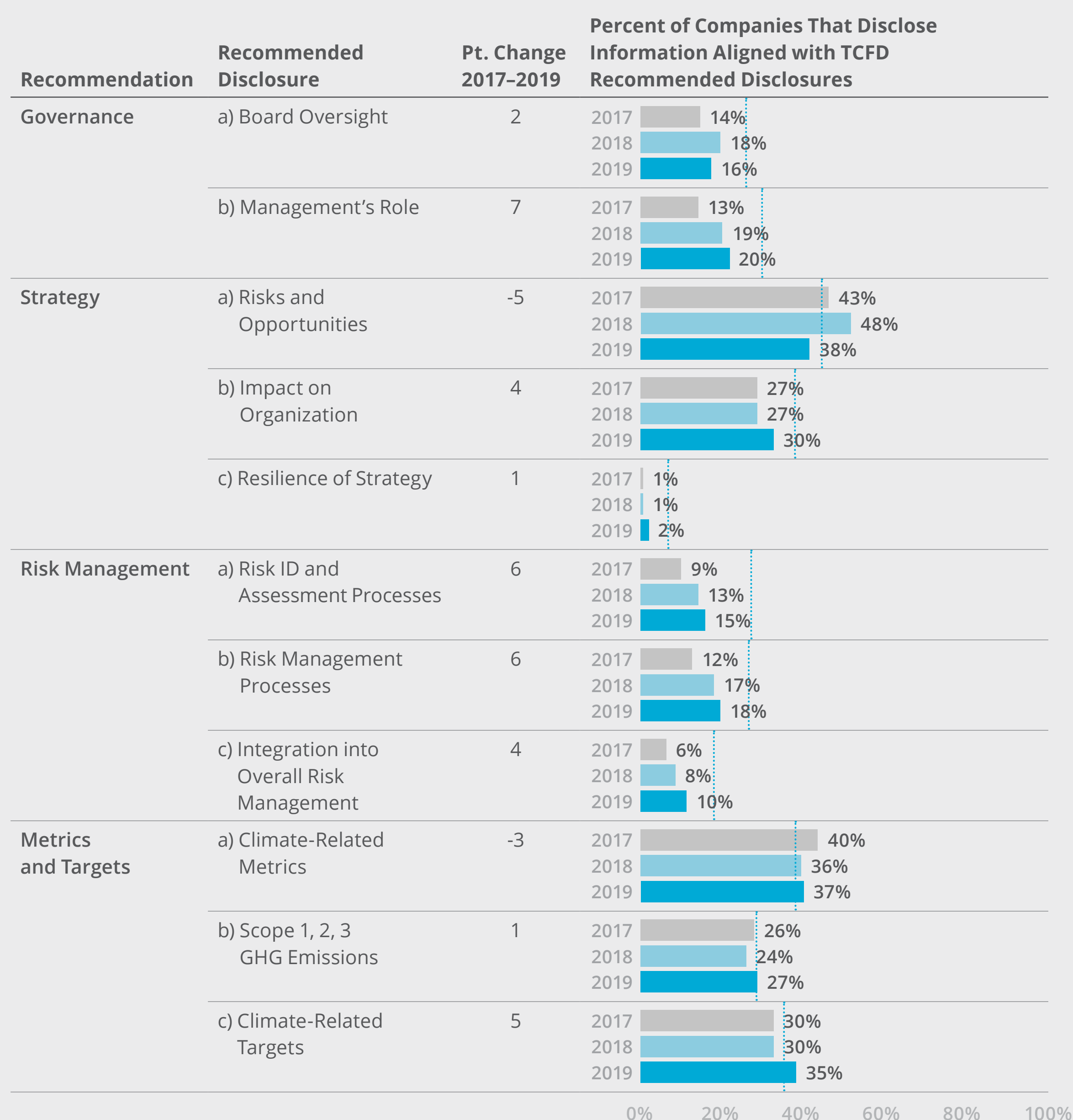
Transportation

The AI technology reviewed reports from 167 transportation companies in six categories: air freight, automobiles, maritime transportation, passenger air transportation, rail transportation, and trucking services. The transportation companies ranged in size from about $1 billion to $276 billion in annual revenue, with a median annual revenue of $4.3 billion. The AI review results are shown in Figure A3-4.

For 2019, the 167 transportation companies most often disclosed information aligned with *Strategy a)* and *Metrics and Targets a)* at 38% and 37%, respectively; and the lowest percentage of disclosure related to *Strategy c)* at 2%. Between 2017 and 2019, the largest increase in disclosure (seven percentage points) was for *Governance b)*, management's role in assessing and managing climate-related issues. However, disclosure of *Strategy a)* decreased by five percentage points over the same period following a slight increase in 2018. Overall, a smaller percentage of transportation companies disclosed TCFD-aligned information than the average across all industries for seven of the 11 recommended disclosures.

Figure A3-4

Transportation Review Results



Recommendation	Recommended Disclosure	Pt. Change 2017–2019	Percent of Companies That Disclose Information Aligned with TCFD Recommended Disclosures 2017	2018	2019
Governance	a) Board Oversight	2	14%	18%	16%
	b) Management's Role	7	13%	19%	20%
Strategy	a) Risks and Opportunities	-5	43%	48%	38%
	b) Impact on Organization	4	27%	27%	30%
	c) Resilience of Strategy	1	1%	1%	2%
Risk Management	a) Risk ID and Assessment Processes	6	9%	13%	15%
	b) Risk Management Processes	6	12%	17%	18%
	c) Integration into Overall Risk Management	4	6%	8%	10%
Metrics and Targets	a) Climate-Related Metrics	-3	40%	36%	37%
	b) Scope 1, 2, 3 GHG Emissions	1	26%	24%	27%
	c) Climate-Related Targets	5	30%	30%	35%

Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

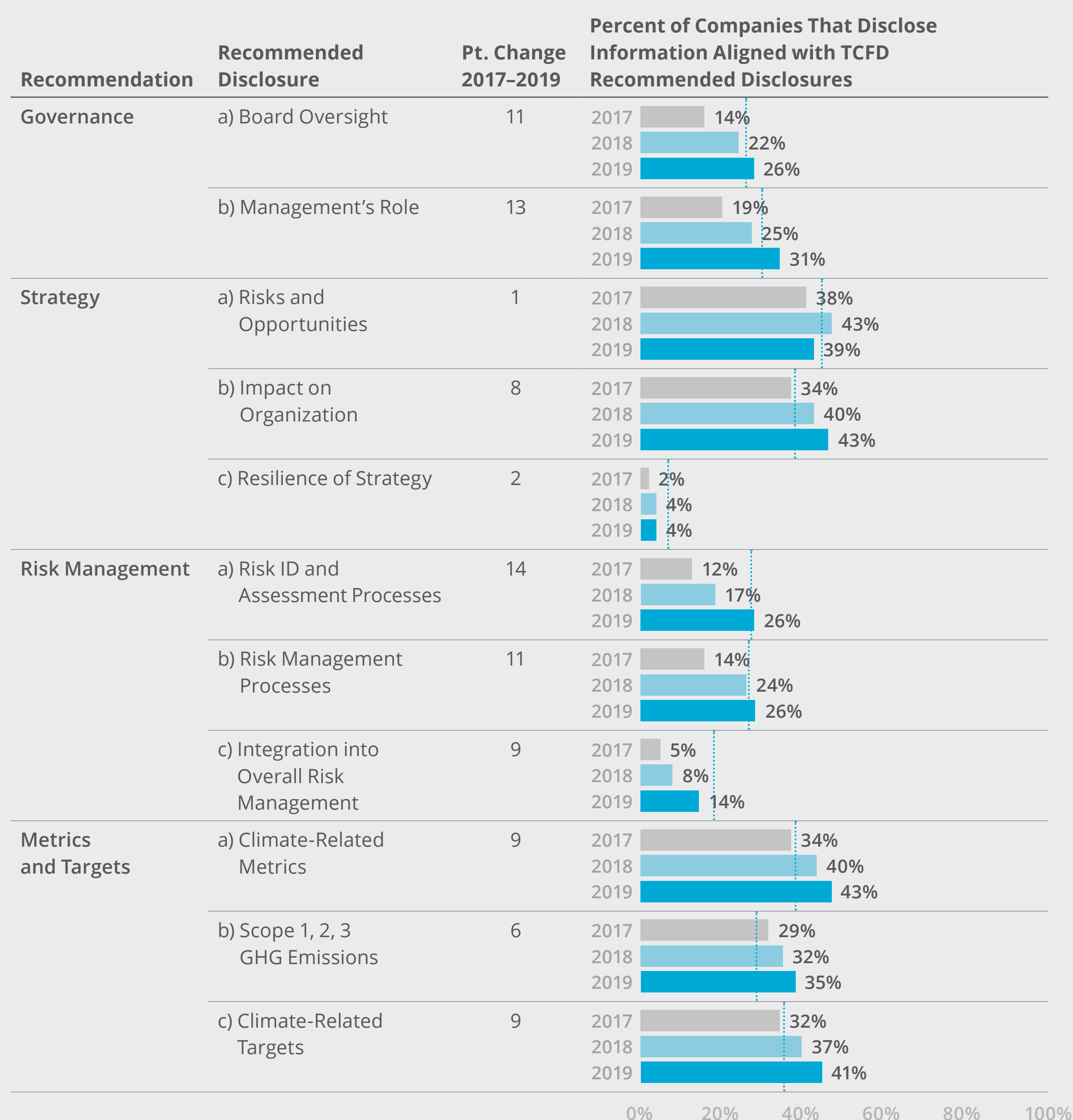
Materials and Buildings

The AI technology reviewed reports from 418 materials and buildings companies in five categories: capital goods, chemicals, construction materials, metals and mining, and real estate management and development. The materials and buildings companies ranged in size from $1 billion to $219 billion in annual revenue, with a median annual revenue of over $5.6 billion. The AI review results for these companies are shown in Figure A3-5.

In 2019 reporting, the 418 materials and buildings companies most often disclosed information aligned with the TCFD recommended disclosures *Strategy b)* and *Metrics and Targets a)*. In addition, the percentage of materials and buildings companies disclosing information in alignment with *Metrics and Targets a)* and *Metrics and Targets b)* was greater than that for companies in any other industry. However, disclosure of *Strategy a)*, climate-related risks and opportunities, decreased slightly in 2019 after increasing between 2017 and 2018. Between 2017 and 2019, the companies reviewed disclosed TCFD-aligned information more frequently than the 2019 average across industries for seven of the 11 recommended disclosures.

Figure A3-5

Materials and Buildings Review Results



Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

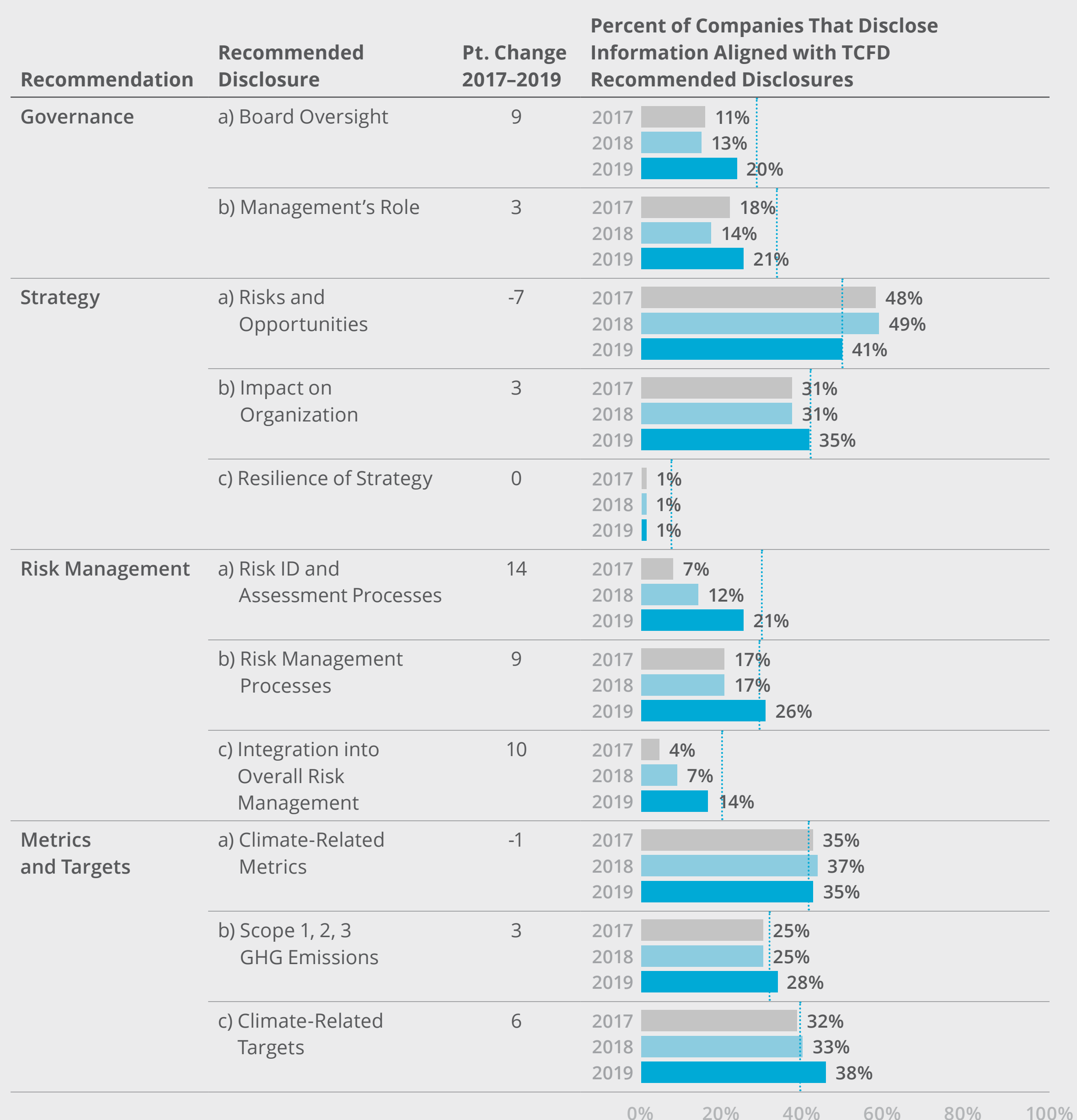
Agriculture, Food, and Forest Products

The AI technology reviewed reports from 149 agriculture, food, and forest products companies in four categories: beverages, packaged foods and meats, agriculture, and paper and forest products. The agriculture, food, and forest products companies ranged in size from about $1 billion to $94 billion in annual revenue, with a median annual revenue of over $3.8 billion. The AI review results for these companies are shown in Figure A3-6.

In 2019, agriculture, food, and forest products companies most frequently disclosed information on *Strategy a)*, climate-related risks and opportunities, although the percentage of disclosure fell seven percentage points between 2017 and 2019. The percentage of companies disclosing *Strategy c)* was particularly low for the agriculture, food, and forest products industry and did not increase in any of the years reviewed. However, there were notable increases for each recommended disclosure associated with Risk Management, with the percentage of disclosure for both *Risk Management a)* and *Risk Management c)* increasing by ten or more percentage points across the three years.

Figure A3-6

Agriculture, Food, and Forest Products Review Results



Recommendation	Recommended Disclosure	Pt. Change 2017–2019	2017	2018	2019
Governance	a) Board Oversight	9	11%	13%	20%
	b) Management's Role	3	18%	14%	21%
Strategy	a) Risks and Opportunities	-7	48%	49%	41%
	b) Impact on Organization	3	31%	31%	35%
	c) Resilience of Strategy	0	1%	1%	1%
Risk Management	a) Risk ID and Assessment Processes	14	7%	12%	21%
	b) Risk Management Processes	9	17%	17%	26%
	c) Integration into Overall Risk Management	10	4%	7%	14%
Metrics and Targets	a) Climate-Related Metrics	-1	35%	37%	35%
	b) Scope 1, 2, 3 GHG Emissions	3	25%	25%	28%
	c) Climate-Related Targets	6	32%	33%	38%

Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

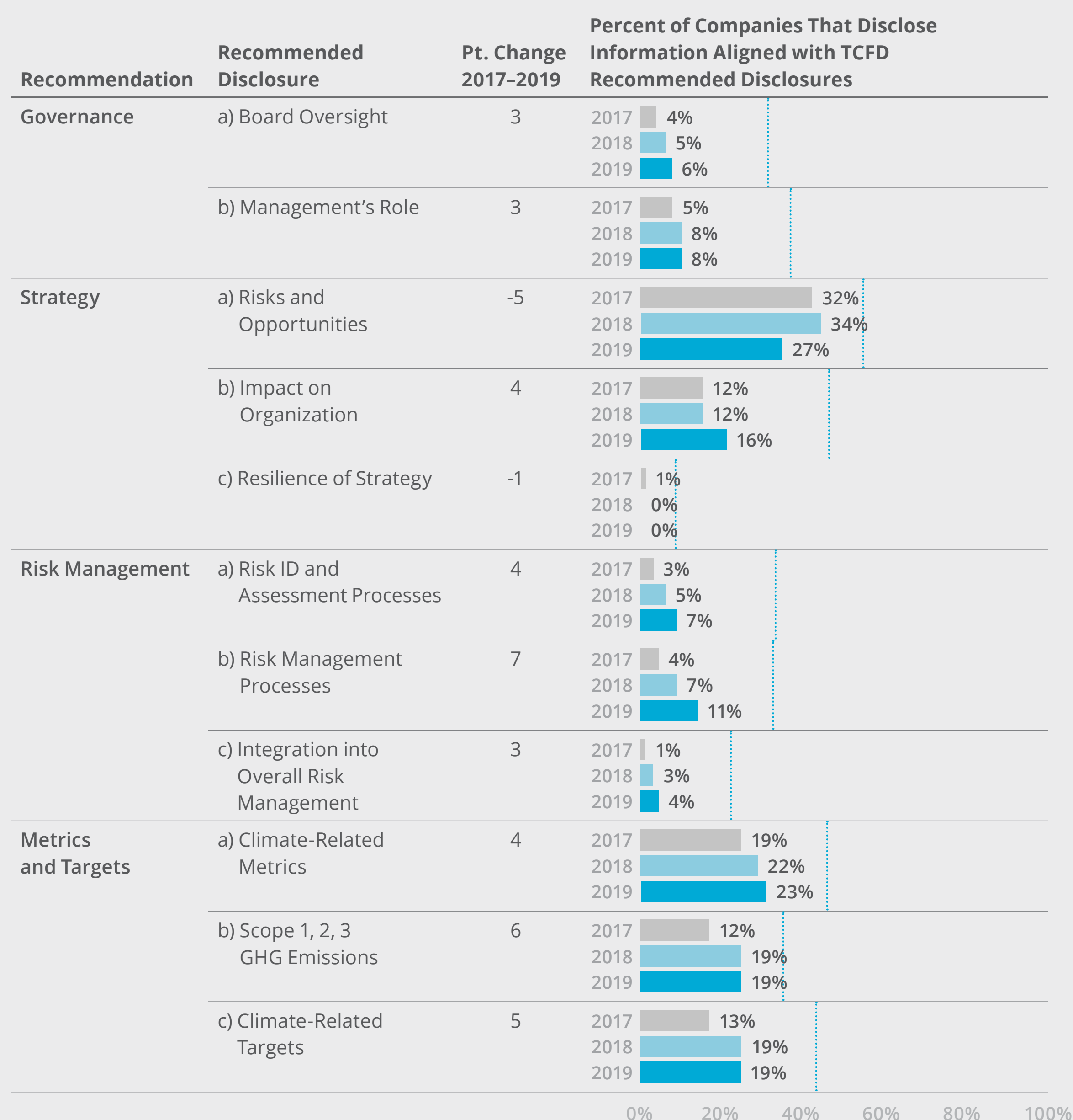
Technology and Media

The AI technology reviewed reports from 115 technology and media companies in two categories: interactive media and services and technology hardware and equipment. The technology and media companies ranged in size from about $1 billion to $259 billion in annual revenue, with a median annual revenue of $2.7 billion. The AI review results for these companies are shown in Figure A3-7.

Technology and media companies had the lowest levels of disclosure of the industries reviewed for all 11 recommended disclosures (see Figure A5, p. 16). For 2019, the percentage of disclosure for these companies was between seven and 20 percentage points lower than the percentage of disclosure across all the companies in the industries reviewed (represented by the vertical blue line). While the percentage of technology and media companies disclosing information aligned with *Strategy a)* and *Strategy c)* decreased between 2017 and 2019, the percentage disclosing information aligned with *Risk Management b)*, processes for managing climate-related risks, increased by seven percentage points. In addition, over a quarter of technology and media companies disclosed their climate-related risks and opportunities (*Strategy a*), and nearly a quarter disclosed climate-related metrics (*Metrics and Targets a*).

Figure A3-7

Technology and Media Review Results



Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

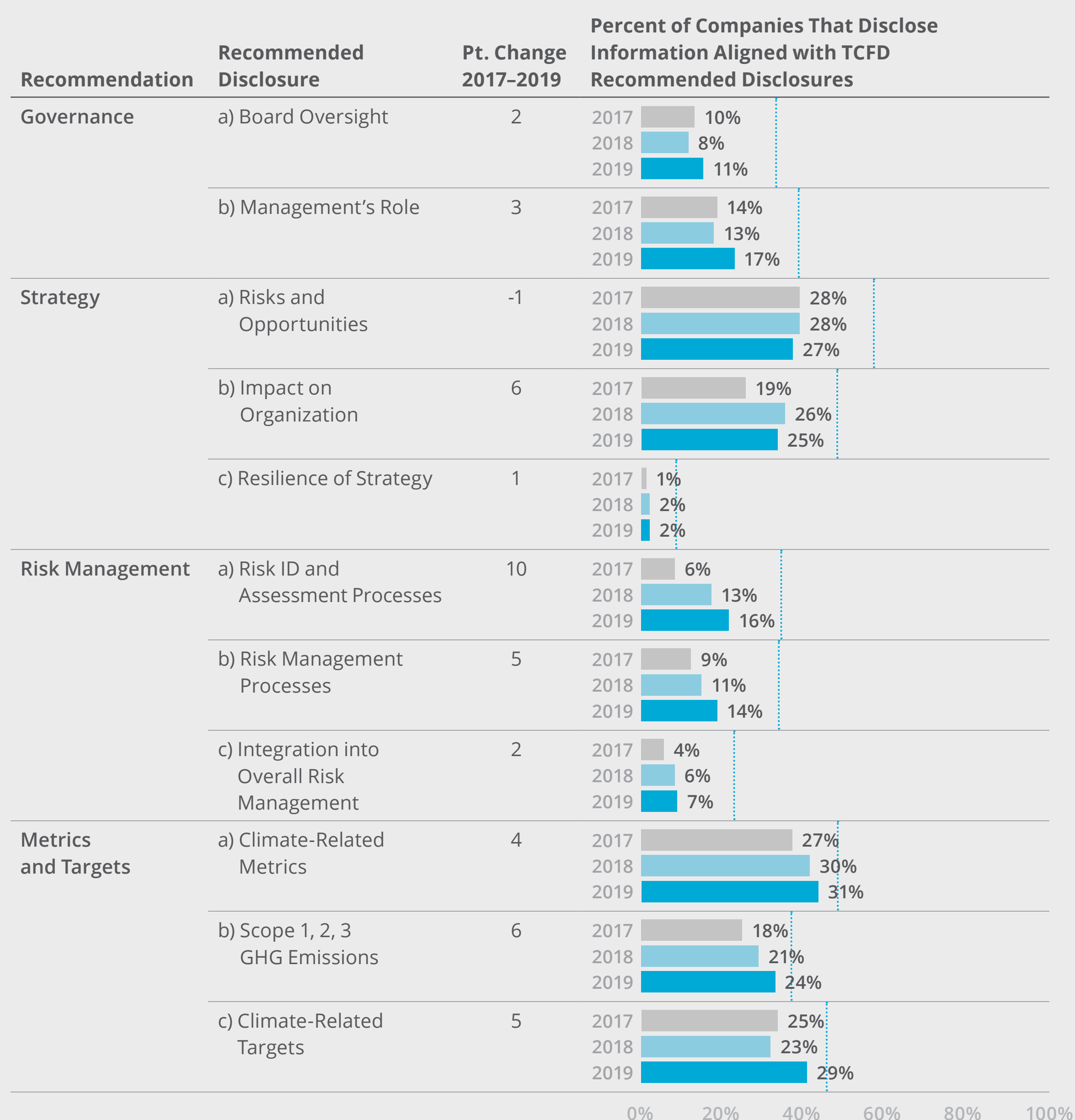
Consumer Goods

The AI technology reviewed reports from 170 consumer goods companies in two categories: consumer retailing and textiles and apparel. The consumer goods companies ranged in size from $1 billion to $518 billion in annual revenue, with a median annual revenue of more than $6 billion. The AI review results for these companies are shown in Figure A3-8.

Overall, the percentage of disclosure for all 11 recommended disclosures for the consumer goods companies reviewed was lower than the percentage of disclosure across all the companies reviewed (represented by the vertical blue line). The highest percentage of disclosure for these companies was on climate-related metrics (*Metrics and Targets a*), which was 31% in 2019. For ten of the 11 recommended disclosures, the percentage of the 170 consumer goods companies disclosing TCFD-aligned information increased between 2017 and 2019. Notably, the percentage of disclosure for *Risk Management a)*, processes for identifying and assessing climate-related risks, increased from 6% in 2017 to 16% in 2019.

Figure A3-8

Consumer Goods Review Results



Recommendation	Recommended Disclosure	Pt. Change 2017–2019	Percent of Companies That Disclose Information Aligned with TCFD Recommended Disclosures: 2017	2018	2019
Governance	a) Board Oversight	2	10%	8%	11%
	b) Management's Role	3	14%	13%	17%
Strategy	a) Risks and Opportunities	-1	28%	28%	27%
	b) Impact on Organization	6	19%	26%	25%
	c) Resilience of Strategy	1	1%	2%	2%
Risk Management	a) Risk ID and Assessment Processes	10	6%	13%	16%
	b) Risk Management Processes	5	9%	11%	14%
	c) Integration into Overall Risk Management	2	4%	6%	7%
Metrics and Targets	a) Climate-Related Metrics	4	27%	30%	31%
	b) Scope 1, 2, 3 GHG Emissions	6	18%	21%	24%
	c) Climate-Related Targets	5	25%	23%	29%

Legend: Percentage of companies that disclosed information aligned with TCFD recommended disclosures in 2019

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Appendix 4: Additional Information on PRI Reporting

As described in Section A.2. TCFD-Aligned Reporting by Asset Managers and Asset Owners, the Task Force used the Principles for Responsible Investment's (PRI) climate-related indicators to gain insight on asset managers' and asset owners' TCFD-aligned reporting. This appendix provides additional information on the Task Force's approach.

1. PRI INDICATORS MAPPED TO RECOMMENDATIONS

The Task Force mapped a single PRI indicator to each of its 11 recommended disclosures for each year — as shown in Figure A4-1 — with the exception of the following:

• For all three years, the Task Force mapped a single PRI indicator to the first two recommended disclosures under the Risk

Figure A4-1

PRI Indicators Mapped to TCFD Recommended Disclosures by Year

TCFD Recommendation	TCFD Recommended Disclosure	2018 PRI Indicator	2019 PRI Indicator	2020 PRI Indicator*
Governance	a) Describe the board's oversight of climate-related risks and opportunities.	SG 07.1a CC	SG 07.6 CC	***SG 07.6 CC***
	b) Describe management's role in assessing and managing climate-related risks and opportunities.	SG 07.1b CC	SG 07.7 CC	***SG 07.7 CC***
Strategy	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	SG 14.2a CC	SG 01.6 CC	***SG 01.6 CC***
	b) Describe the impact of climate-related risks and opportunities on the organization's business, strategy, and financial planning.	SG 01.3b CC	N/A	N/A
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	SG 13.1a CC	SG 13.4 CC	***SG 13.4 CC***
Risk Management	a) Describe the organization's processes for identifying and assessing climate-related risks. b) Describe the organization's processes for managing climate-related risks.	SG 14.7 CC	SG 14.8 CC	SG 14.8 CC
	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	SG 14.7 CC	SG 14.8 CC	SG 14.8 CC
Metrics and Targets	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management processes.	SG 14.4a CC	SG 14.6 CC	SG 14.6 CC
	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	SG 14.4a CC	SG 14.6 CC	SG 14.6 CC
	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	SG 14.4a CC	SG 14.6 CC	SG 14.6 CC

* 2020 PRI indicators shown in semi-bold, italicized text were mandatory for signatories to report.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Management recommendation — *Risk Management a)* and *Risk Management b)*.

- The Task Force did not map a PRI indicator to *Strategy b)* for 2019 or 2020 because the descriptions of the 2019 and 2020 PRI indicators that most closely align with the 2018 PRI indicator were modified and not comparable.[94]

2. BASE SIZES USED FOR GOVERNANCE INDICATORS

For climate-related indicators mapped to *Governance a)* and *Governance b)*, the PRI adjusts the total number of asset manager and asset owner signatories reporting in a given year (the denominator) based on whether the signatories have roles for board oversight and senior management, respectively. Figure A4-2 provides the base sizes, or denominators, used to calculate the percentages of reporting for indicators mapped to the Governance recommendation.

Figure A4-2

Base Sizes (Denominators) for PRI Governance Indicators by Year

TCFD Recommended Disclosure	Year	Asset Managers	Asset Owners
Governance a) Describe the board's oversight of climate-related risks and opportunities.	2018	744	304
	2019	944	351
	2020	1,146	417
Governance b) Describe management's role in assessing and managing climate-related risks and opportunities.	2018	1,046	300
	2019	1,137	315
	2020	1,574	409

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[94] The Task Force's supplemental guidance on *Strategy b)* for asset managers and asset owners asks these organizations to describe *how* climate-related risks and opportunities are factored into relevant funds, products, and investment strategies. The 2018 PRI indicator mapped to *Strategy b)* asks signatories to describe *how* climate-related risks and opportunities are factored into investment strategies and products, which matches the Task Force's supplemental guidance. The 2019 PRI indicator most closely aligned with the 2018 PRI indicator mapped to *Strategy b)* asks signatories to indicate the climate-related risks and opportunities that have been identified and factored into the investment strategies and products, within the organization's investment time horizon. Since the 2019 PRI indicator does not ask signatories to describe *how* climate-related risks and opportunities are factored into investment strategies and products, it was not mapped to *Strategy b)*. The 2020 indicator most closely aligned with the 2018 indicator mapped to *Strategy b)* asks signatories to describe their identified climate-related issues — which relates to *Strategy a)* — and how those issues have been factored into relevant funds, products, and investment strategies — which relates to *Strategy b)*. Since responses relevant to *Strategy b)* cannot be separated from those for *Strategy a)*, the Task Force decided to map the 2020 indicator to *Strategy a)* only.

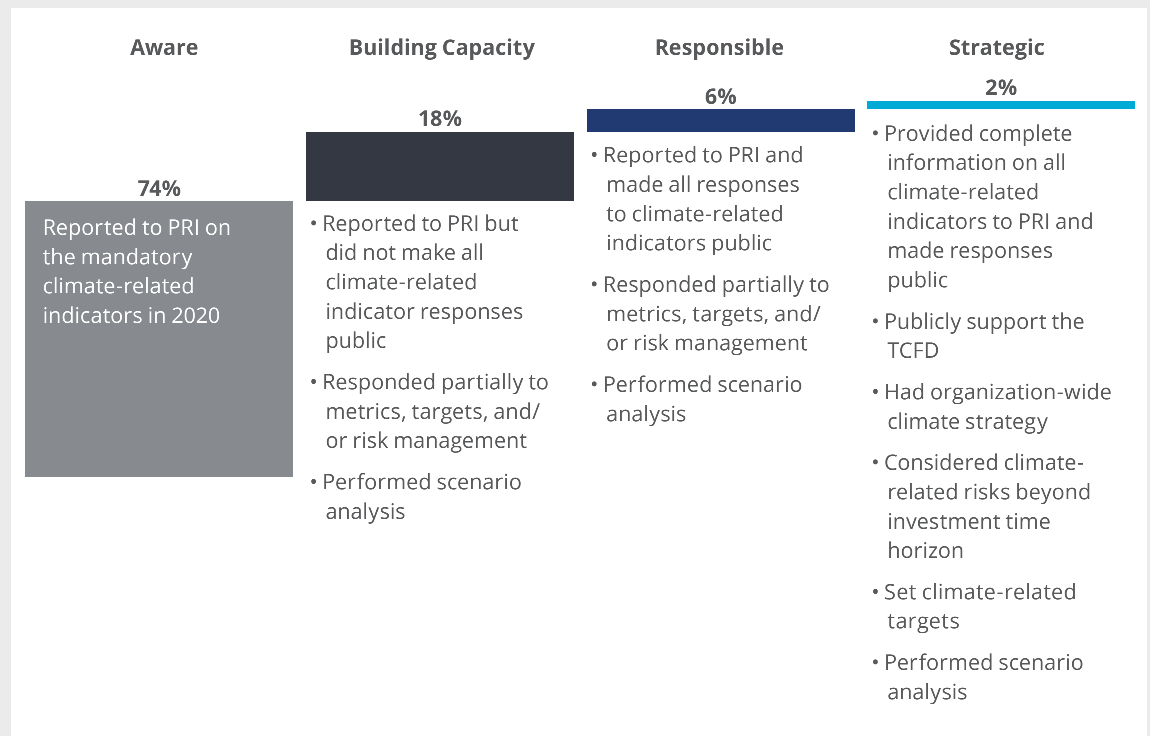
3. INTERPRETATION OF PRI SIGNATORY RESPONSES ON CLIMATE-RELATED INDICATORS

The PRI does not assess signatories' responses to climate-related indicators, but it does group signatories — based on their responses — into four categories that *may* provide an indication of the level of maturity of TCFD-aligned reporting.

Figure A4-3 shows the PRI's four categories, attributes of signatory reporting within each category, and the percentage of signatories in each category for the 2020 reporting period. For example, 2% of PRI signatories' responses are categorized as "strategic," which requires signatories to provide complete information on all climate-related indicators to the PRI and make such information public.

Figure A4-3

PRI Interpretation of Signatory Responses by Category



A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Appendix 5: User Feedback on Disclosure Elements

As described in Section B. Effective Climate-Related Financial Disclosures, for this status report, the Task Force sought to highlight specific types of climate-related information that investors, lenders, and others (collectively referred to as users) find the most useful for decision-making, with the goal of helping preparers develop more effective climate-related financial disclosures.

To identify specific climate-related information that users find the most useful when making financial decisions, the Task Force developed a questionnaire and asked a group of expert users to rate the usefulness of specific types of information. The Task Force organized the questionnaire by its 11 recommended disclosures and then identified specific types of climate-related information — referred to as disclosure elements — for each recommended disclosure. The disclosure elements were drawn from the guidance for all sectors included in the Task Force's 2017 report.[95] The disclosure elements cover baseline information the Task Force believes is decision-useful and generally applicable to different types of companies across industries and regions. Importantly, disclosure elements range from very specific information, such as how a company defines short-, medium-, and long-term timeframes, to broad concepts like management's role in assessing and managing climate-related issues.

In terms of the questionnaire itself, users were asked to rate the usefulness of specific disclosure elements associated with the 11 recommended disclosures using a five-point scale, with a rating of 1 representing the most useful information and a rating of 5 representing the least useful, as shown in Figure A5-1. In addition, recognizing the disclosure elements included in the questionnaire may not be complete, the Task Force asked users to identify any missing disclosure elements they find extremely useful for financial decision-making.

For purposes of analyzing and summarizing users' feedback on the usefulness of specific types of information for financial decision-making, the Task Force considered the average rating across users for each disclosure element (referred to as a score). When evaluating a disclosure element's score in terms of how useful it is for decision-making, the Task Force used the scale in Figure A5-2. The Task Force also looked at the amount of dispersion or variance in users' ratings to understand how aligned users were in their views on the usefulness of the disclosure elements.[96]

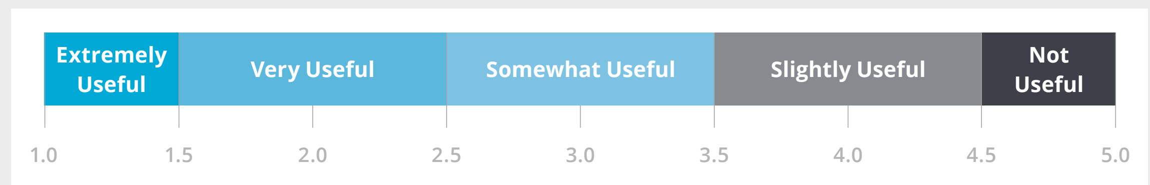
Figure A5-1

Scale for Rating Usefulness of Information for Decision-Making

Extremely Useful	Very Useful	Somewhat Useful	Slightly Useful	Not Useful
1	2	3	4	5

Figure A5-2

Scale Applied to Average Ratings or Scores



[95] See Section C.3 Guidance for All Sectors in the Task Force's 2017 report.

[96] Variance represents the measure of variability of users' ratings for a given disclosure element. Mathematically, variance is defined as the average of the squared differences from the mean.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

The lower the variance for a given disclosure element, the more aligned users are in their view of the usefulness of the disclosure element.

In the remainder of this appendix, the Task Force provides the score and variance for each of the nearly 60 disclosure elements users rated as well as additional information provided by users. The disclosure elements are organized by recommendation and recommended disclosure and are listed from most useful to least useful.

1. GOVERNANCE

A company's disclosure of how it oversees and makes decisions about climate-related risks and opportunities provides users with insight on whether these issues receive appropriate board and management attention.

Governance a)

Table A5-1 shows that users, on average, rated information on how the board or its committees consider climate-related issues when overseeing major capital expenditures, acquisitions, and divestitures as extremely useful. All but one of the other disclosure elements for *Governance a)* are considered very useful by users; and the last disclosure element listed — on the profile and capabilities of the board on climate-related issues — is considered somewhat useful.

Table A5-1
Usefulness of Information on Board Oversight

#	Disclosure Elements	Score	Var.
1	How the board or board committees consider climate-related issues when overseeing major capital expenditures, acquisitions, and divestitures	1.5	0.6
2	How the board or its committees consider climate-related issues when reviewing and guiding strategy	1.7	0.5
3	How the board or its committees consider climate-related issues when setting the organization's performance objectives and monitoring implementation and performance	1.9	0.4
4	How the board monitors and oversees progress against goals and targets for addressing climate-related issues	1.9	0.4
5	How the board or its committees consider climate-related issues when reviewing and guiding business plans	1.9	0.5
6	Processes and frequency by which the board or board committees are informed about climate-related issues	2.0	0.6
7	How the board or its committees consider climate-related issues when reviewing and guiding annual budgets	2.1	0.5
8	The profile and capabilities of the board on climate-related issues	3.0	0.9

In addition to the disclosure elements shown above, users suggested the following information would be extremely useful:

- the board's confirmation that the company has performed a detailed and quantified assessment of all likely financial impacts of climate change on its activities and strategy;
- training received by the board to ensure it remains adequately informed about climate-related issues; and
- the measures the board has taken to access climate change expertise.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Governance b)

For *Governance b)*, users found the description of management's role in assessing or managing climate-related issues as the most useful of the five disclosure elements, as shown in Table A5-2. While more than half of the users rated this disclosure element as extremely useful, several others rated it as somewhat useful or slightly useful.

In addition to the *Governance b)* disclosure elements shown below, information on the Chief Executive Officer's commitment to and involvement in climate-related issues was highlighted as extremely useful.

Table A5-2

Usefulness of Information on the Role of Management

#	Disclosure Elements	Score	Var.
1	Description of management's role in assessing and managing climate-related issues	1.7	0.8
2	Processes by which management is informed about or monitors climate-related issues (through specific positions or management committees)	2.1	0.9
3	Description of management-level positions or committees with responsibility for assessing and managing climate-related issues, including whether they report to the board or a board committee	2.2	0.7
4	The organizational structure(s) for assessing and/or managing climate-related issues	2.3	0.4
5	Information on whether the management-level positions or committees that have climate-related responsibilities report to the board or a committee of the board	2.3	0.5

2. STRATEGY

A company's disclosure of its material climate-related risks and opportunities and how these have affected or may affect the company's businesses, strategy, and financial planning are useful to investors and other users in understanding the company's potential future performance.

Strategy a)

This recommended disclosure focuses on the material climate-related risks and opportunities identified by a company. The majority of users indicated that disclosures on a company's material climate-related risks and opportunities for *each sector and geography* are extremely useful as are disclosures on a company's material climate-related risks and opportunities — without the additional information on sector and geography, as shown in Table A5-3 (p. 96).

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Table A5-3

Usefulness of Information on Material Climate-Related Risks and Opportunities

#	Disclosure Elements	Score	Var.
1	The material climate-related risks and opportunities the organization has identified for each sector and geography, as appropriate	1.3	0.3
2	The material climate-related risks and/or opportunities the organization has identified	1.4	0.2
3	The material climate-related risks and opportunities the organization has identified and the associated timeframes (short, medium, or long term)	1.6	0.5
4	The process(es) used to determine which climate-related risks and opportunities could have a material financial impact on the organization	1.8	0.6
5	How the organization defines short-, medium-, and long-term timeframes	2.0	1.3

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

A few disclosure elements under the Strategy recommendation included sub-elements in which users were asked to provide a rank order of the relative usefulness of the sub-elements. In these cases, the Task Force was interested in understanding whether users were generally aligned in their views on the relative usefulness of specific types of information. For example, under *Strategy a)*, the Task Force asked users to rank-order the usefulness of companies' disclosing the timeframes associated with the material climate-related risks and opportunities they have identified. Users ranked three timeframes — short term, medium term, and long term — from 1 to 3, with 1 representing the most useful information and 3 the least useful. As shown in Figure A5-3, the average ranking across users for the long term was the lowest (1.7) of the three timeframes, but it was followed closely by the medium term (1.8). The short term has the highest average ranking (2.4), and some users provided comments indicating the short term may be equally important depending on the specific investment time horizon for transactions and for assessing total portfolio exposures.

Figure A5-3

Average Ranking of Disclosure Sub-Elements for *Strategy a)*

The material climate-related risks and opportunities identified over specific timeframes	Avg. Rank	Var.
Long term	1.7	0.6
Medium term	1.8	0.4
Short term	2.4	0.7

Strategy b)
This recommended disclosure focuses on the actual impact of climate-related risks and opportunities on the company's businesses, strategy, and financial planning. As shown in Table A5-4, users rated information on how climate-related issues have affected a company's business and strategy as the most useful disclosure element for this recommended disclosure and the most useful disclosure element overall — across all the recommended disclosures.

Table A5-4
Usefulness of Information on Impact on Business, Strategy, and Financial Plans

#	Disclosure Elements	Score	Var.
1	How material climate-related issues have affected the organization's business and strategy	1.1	0.1
2	How material climate-related issues have affected the organization's financial planning	1.6	0.4
3	The climate-related scenarios used to inform the organization's strategy or financial planning if such scenarios are used	1.7	0.5
4	How the organization prioritizes its climate-related risks and opportunities	2.1	0.7
5	The time period(s) used/covered in the organization's financial planning process	2.3	0.9

Users noted that common climate-related scenarios across industries are needed to allow for more comparable disclosures and that if climate-related scenarios are not standardized across industries, companies should provide detailed descriptions of the scenarios, including regulatory and energy-pricing assumptions used and the associated timelines.

In addition, for *Strategy b)*, users were asked to rank-order sub-elements for two disclosure elements: how material climate-related issues have affected five specific aspects of business and strategy and how material climate-related issues have affected four specific aspects of financial planning, as shown in Figure A5-4 (p. 98). For the five sub-elements related to how climate-related issues have affected the company's business and strategy, the most useful sub-element is products and services, with an average ranking of 1.8. All the other sub-elements have an average ranking of 2.8 or higher and variances of 1.3 or higher, indicating users have very different views on which sub-elements are most useful for decision-making. For the four sub-elements related to how climate-related issues have affected the company's financial planning, the most useful sub-element is capital expenditures and capital allocation, with an average ranking of 1.3 and a variance of 0.4. Users are closely aligned in their views on this sub-element, with the majority of users ranking this as the most useful sub-element.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Figure A5-4

Average Ranking of Disclosure Sub-Elements for *Strategy b)*

How material climate-related issues have affected specific aspects of business and strategy	Avg. Rank	Var.
Products and services	1.8	1.1
Operations including types of operations and location of facilities	2.8	1.6
Supply chain or value chain	3.1	1.3
Investment in research and development	3.6	1.9
Adaptation and mitigation activities	3.6	2.0
How material climate-related issues have affected specific aspects of financial planning	**Avg. Rank**	**Var.**
Capital expenditures and capital allocation	1.3	0.4
Operating costs and revenues	2.3	0.9
Acquisitions or divestments	2.9	0.7
Cost of or access to debt or equity financing	3.4	0.6

Strategy c)
This recommended disclosure focuses on the resilience of a company's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. As shown in Table A5-5 (p. 99), users rated information on the resiliency of the company's strategy under different climate-related scenarios, including a 2°C or lower scenario, as the most useful disclosure element among the eight listed. This was closely followed by the company's sensitivity to carbon pricing.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Table A5-5

Usefulness of Information on Strategy Resilience

#	Disclosure Elements	Score	Var.
1	Description of the resiliency of the organization's strategy to climate-related issues, including an indication of the direction or ranges of potential financial implications, under different climate-related scenarios, including a 2°C or lower scenario	1.6	0.7
2	The organization's sensitivity to carbon pricing, if applicable	1.7	0.5
3	How the organization's strategy might be affected by or changed to address potential climate-related issues	1.8	0.3
4	The climate-related scenarios and associated time horizon(s) considered	1.8	0.8
5	How resilient the organization's strategy is to climate-related issues, taking into consideration scenarios consistent with increased physical climate-related risks (if applicable)	1.8	0.9
6	Description of the resiliency of the organization's strategy to climate-related issues, including an indication of the direction or ranges of potential financial implications, under different climate-related scenarios, including a 2°C scenario	1.9	0.6
7	Narrative, qualitative description of how resilient the organization's strategy is to climate-related issues under different climate-related scenarios, including a 2°C or lower scenario	2.0	1.1
8	Description of the resiliency of the organization's strategy to climate-related issues, including an indication of the direction or ranges of potential financial implications, under different climate-related scenarios, including a 1.5°C scenario	2.5	0.8

For this recommended disclosure, the Task Force included three disclosure elements on the resilience of a company's strategy under different climate-related scenarios. The disclosure elements varied in only one respect, which was in the description of the climate-related scenarios that should be considered, as follows:

- 2°C or lower scenario;
- 2°C scenario; and
- 1.5°C scenario.

The first type represents the language in the Task Force's recommended disclosure, while the other two represent specific temperature targets. The Task Force was interested in understanding whether users find scenario analysis based on a specific temperature target — 2°C or 1.5°C — more useful than analysis on a 2°C or lower scenario. Based on the scores for each disclosure element, users identified the disclosure element focused on a 2°C or lower scenario more useful than the two focused on specific temperature targets. For the disclosure elements focused on a specific temperature target, users identified analysis based on a 2°C scenario as more useful than analysis based on a 1.5°C scenario.

In addition, users highlighted the following as extremely useful information:

- scenarios based on 2°C or *higher* temperatures;
- disclosures describing whether a company has committed to the Science Based Targets; and
- the Value-at-Risk calculation and the methodology underpinning a company's assessment of its resilience.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

3. RISK MANAGEMENT

A company's disclosure of its processes for identifying, assessing, and managing climate-related risks helps users evaluate the company's overall risk profile and risk management activities. In terms of the usefulness of the disclosure elements included under this recommendation, none of the disclosure elements had a score of 1.5 or lower. In other words, none of the disclosure elements is considered extremely useful based on the average of users' ratings.

Risk Management a)

This recommended disclosure focuses on a company's risk management processes for identifying and assessing climate-related risks. On average, users rated information describing whether a company considers existing and emerging regulatory requirements related to climate change as part of its risk assessment processes as the most useful disclosure element (see Table A5-6). Commentary provided by users emphasized the importance of information on how a company's risk management processes link to its business decisions.

Table A5-6

Usefulness of Information on Risk Identification and Assessment

#	Disclosure Elements	Score	Var.
1	Description of whether the organization considers existing and emerging regulatory requirements related to climate change (e.g., limits on emissions) as part of its risk assessment processes	1.6	0.4
2	The organization's processes for identifying and assessing climate-related risks	1.7	0.6
3	The organization's processes for prioritizing climate-related risks, including how materiality determinations are made	2.0	0.8
4	Processes for assessing the potential size and scope of identified climate-related risks	2.0	0.8
5	Definitions of risk terminology used or references to existing risk classification frameworks used	2.6	0.7

Risk Management b) and Risk Management c)

These recommended disclosures focus on a company's processes for managing climate-related risks and how a company's processes for identifying, assessing, and managing climate-related risks are integrated into overall risk management. Since each of these recommended disclosures had only one disclosure element each, they are combined in Table A5-7 (p. 101). The scores for the disclosure elements associated with *Risk Management b)* and *Risk Management c)* are 1.7 and 1.8, respectively. In addition, users highlighted disclosure of the concrete measures taken by a company to mitigate the impact of extreme weather events is extremely useful for decision-making.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Table A5-7

Usefulness of Information on Risk Management and Integration

#	Disclosure Elements	Score	Var.
—	The organization's processes for managing climate-related risks, including how it makes decisions to mitigate, transfer, accept, or control those risks	1.7	0.5
—	How the organization's processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management	1.8	0.6

4. METRICS AND TARGETS

A company's disclosure of the metrics and targets it uses to measure and monitor its climate-related risks and opportunities supports users' assessments of a company'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. They also provide a basis upon which investors and other users can compare companies within a sector or industry. Notably, the scores for the 20 disclosure elements associated with this recommendation range from 1.3 to 1.9, indicating users view them as extremely useful or very useful in making financial decisions.

Metrics and Targets a)

This recommended disclosure focuses on the metrics used by a company to assess its climate-related risks and opportunities in line with its strategy and risk management process. As shown in Table A5-8, on average, users rated the key metrics a company uses to measure and manage climate-related risks and opportunities as the most useful disclosure element.

Table A5-8

Usefulness of Information on Key Metrics

#	Disclosure Elements	Score	Var.
1	The key metrics used to measure and manage climate-related risks and opportunities for the most recent period and historical periods	1.3	0.2
2	Whether and how related performance metrics are incorporated into remuneration policies, in cases where climate-related issues are material	1.6	0.4
3	Internal carbon prices used	1.7	0.7
4	Metrics on climate-related risks associated with water, energy, land use, and waste management where relevant and applicable	1.8	0.7
5	A description of the methodologies used to calculate or estimate climate-related metrics, where not apparent	1.8	0.7
6	Climate-related opportunity metrics such as revenue from products and services designed for a lower-carbon economy	1.8	0.9

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

In addition, users mentioned the importance of using consistent definitions of metrics so that the metrics are comparable across companies. Users also identified the following as extremely useful:

- information on physical climate-related risks such as the number and percent of facilities exposed to certain hazards, the locations of facilities and the types of activities performed, and the number and percent of facilities in each location or region; and
- information related to capital expenditures (amount spent and percent of total) on low-carbon technologies.

Metrics and Targets b)

This recommended disclosure focuses specifically on metrics related to Scope 1, Scope 2, and Scope 3 GHG emissions. As shown in Table A5-9, the most useful disclosure element for this recommended disclosure is Scope 1 GHG emissions, which is followed closely by Scope 2 GHG emissions. With equal scores and variance, the next most useful disclosure elements are related to Scope 3 GHG emissions and a description of the methodologies used to calculate or estimate the metrics, if different from the GHG protocol.

Users mentioned a breakdown of Scope 3 GHG emissions by sector, rather than in aggregate, would be extremely useful.

Table A5-9

Usefulness of Information on GHG Emissions

#	Disclosure Elements	Score	Var.
1	Scope 1 GHG emissions for the most recent period and historical periods (e.g., three years)	1.3	0.4
2	Scope 2 GHG emissions for the most recent period and historical periods (e.g., three years)	1.4	0.4
3	Scope 3 GHG emissions for the most recent period and historical periods (e.g., three years)	1.6	0.8
4	A description of the methodologies used to calculate or estimate the metrics if different from the GHG protocol	1.6	0.8
5	Accepted industry-specific efficiency ratios if used by the organization	1.9	1.2

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Metrics and Targets c)

This recommended disclosure focuses on the targets used by a company to manage climate-related risks and opportunities and how the company performs against those targets. On average, users rated information on a company's climate-related targets related to GHG emissions as the most useful. However, as shown in Table A5-10, information on the timeframes over which the company's climate-related targets apply and key performance indicators used to assess progress against climate-related targets were also rated as extremely useful.

In addition, users indicated information on how climate-related targets are linked to management's compensation is extremely useful for decision-making.

Table A5-10

Usefulness of Information on Climate-Related Targets

#	Disclosure Elements	Score	Var.
1	Climate-related targets related to GHG emissions	1.3	0.4
2	The timeframes over which the organization's climate-related targets apply	1.4	0.4
3	Key performance indicators used to assess progress against climate-related targets	1.5	0.4
4	Identification of the climate-related targets as absolute or intensity based	1.6	0.5
5	A description of the methodologies used to calculate or estimate the climate-related targets	1.6	0.5
6	A description of the efficiency or financial goals, financial loss tolerances, avoided GHG emissions through the entire product lifecycle, net revenue goals for products and services designed for a lower-carbon economy, or other goals with which the organization has aligned its targets	1.7	0.5
7	Climate-related targets related to water usage, energy usage, etc.	1.7	0.6
8	The base year from which progress is measured	1.8	1.1
9	A description of the anticipated regulatory requirements or market constraints with which the organization has aligned its climate-related targets	1.9	0.6

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Appendix 6: Glossary and Abbreviations

GLOSSARY

ANNUAL OR INTEGRATED REPORTS refer to reports that describe companies' activities for the preceding year (annual reports) or the broader range of measures that contribute to companies' long-term value and the role they play in society (integrated reports).

BOARD OF DIRECTORS (OR BOARD) refers to a body of elected or appointed members who jointly oversee the activities of a company or organization. Some countries use a two-tiered system where "board" refers to the "supervisory board" while "key executives" refers to the "management board."[97]

CLIMATE-RELATED OPPORTUNITY refers to the potential positive impacts related to climate change on a company or organization. Efforts to mitigate and adapt to climate change can produce opportunities for companies, such as through resource efficiency and cost savings, the adoption and utilization of low-emission energy sources, the development of new products and services, and building resilience along the supply chain. Climate-related opportunities will vary depending on the region, market, and industry in which an organization operates.

CLIMATE-RELATED RISK refers to the potential negative impacts of climate change on a company or organization. Physical risks emanating from climate change can be event-driven (acute) such as increased severity of extreme weather events (e.g., cyclones, droughts, floods, and fires). They can also relate to longer-term shifts (chronic) in precipitation and temperature and increased variability in weather patterns (e.g., sea level rise). Climate-related risks can also be associated with the transition to a lower-carbon global economy, the most common of which relate to policy and legal actions, technology changes, market responses, and reputational considerations.

FINANCIAL FILINGS refer to the annual reporting packages in which companies are required to deliver their audited financial results under the corporate, compliance, or securities laws of the jurisdictions in which they operate. While reporting requirements differ internationally, financial filings generally contain financial statements and other information such as governance statements and management commentary.[98]

FINANCIAL PLANNING refers to a company's consideration of how it will achieve and fund its objectives and strategic goals. The process of financial planning allows companies to assess future financial positions and determine how resources can be utilized in pursuit of short- and long-term objectives. As part of financial planning, companies often create "financial plans" that outline the specific actions, assets, and resources (including capital) necessary to achieve these objectives over a one-to-five-year period. However, financial planning is broader than the development of a financial plan as it includes long-term capital allocation and other considerations that may extend beyond the typical three-to-five-year financial plan (e.g., investment, research and development, manufacturing, and markets).

GOVERNANCE refers to "the system by which an organization is directed and controlled in the interests of shareholders and other stakeholders."[99] "Governance involves a set of relationships between an organization's management, its board, its shareholders, and other stakeholders. Governance provides the structure and processes through which the objectives of the organization are set, progress against performance is monitored, and results are evaluated."[100]

GREENHOUSE GAS (GHG) EMISSIONS SCOPE LEVELS[101]

- Scope 1 refers to all direct GHG emissions.
- Scope 2 refers to indirect GHG emissions from consumption of purchased electricity, heat, or steam.
- Scope 3 refers to other indirect emissions not covered in Scope 2 that occur in the value chain of the reporting company, including both upstream and downstream emissions. Scope 3 emissions could include: the extraction and production of purchased materials and fuels, transport-related activities in vehicles not

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[97] Organisation for Economic Co-operation and Development (OECD), *G20/OECD Principles of Corporate Governance*, OECD Publishing, Paris, 2015.

[98] Based on Climate Disclosure Standards Board, *CDSB Framework for Reporting Environmental Information, Natural Capital and Associated Business Impacts*, April 2018.

[99] A. Cadbury, *Report of the Committee on the Financial Aspects of Corporate Governance*, London, 1992.

[100] OECD, *G20/OECD Principles of Corporate Governance*, OECD Publishing, Paris, 2015.

[101] World Resources Institute and World Business Council for Sustainable Development, *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)*, March 2004.

owned or controlled by the reporting entity, electricity-related activities (e.g., transmission and distribution losses), outsourced activities, and waste disposal.[102]

MANAGEMENT refers to those positions a company or organization views as executive or senior management positions and that are generally separate from the board.

RISK MANAGEMENT refers to a set of processes that are carried out by a company or organization's board and management to support the achievement of its objectives by addressing its risks and managing the combined potential impact of those risks.

SCENARIO ANALYSIS is a process for identifying and assessing a potential range of outcomes of future events under conditions of uncertainty. In the case of climate change, for example, scenarios allow an organization to explore and develop an understanding of how the physical and transition risks of climate change may impact its businesses, strategies, and financial performance over time.

SECTOR refers to a segment of companies performing similar business activities in an economy. A sector generally refers to a large segment of the economy or grouping of business types, while "industry" is used to describe more specific groupings of companies within a sector.

STRATEGY refers to an organization's desired future state. An organization's strategy establishes a foundation against which it can monitor and measure its progress in reaching that desired state. Strategy formulation generally involves establishing the purpose and scope of the organization's activities and the nature of its businesses, taking into account the risks and opportunities it faces and the environment in which it operates.

SUSTAINABILITY REPORT is a report that describes a company or organization's impact on society, often addressing environmental, social, and governance issues.

ABBREVIATIONS

2°C — 2° Celsius

AI — Artificial Intelligence

ASX — Australian Securities Exchange

AUM — Assets under management

CDSB — Climate Disclosure Standards Board

CFRF — Climate Financial Risk Forum

CRD — Corporate Reporting Dialogue

ESG — Environmental, Social, and Governance

FCA — Financial Conduct Authority

FSB — Financial Stability Board

G20 — Group of 20

GHG — Greenhouse Gas

GICS — Global Industry Classification Standard

IPCC — Intergovernmental Panel on Climate Change

NGFS — Network for Greening the Financial System

PRA — Prudential Regulation Authority (Bank of England)

PRI — Principles for Responsible Investment

RCP — Representative Concentration Pathway

SASB — Sustainability Accounting Standards Board

TCFD — Task Force on Climate-related Financial Disclosures

UN — United Nations

UNEP FI — United Nations Environment Programme Finance Initiative

WBCSD — World Business Council for Sustainable Development

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

[102] World Resources Institute and World Business Council for Sustainable Development, *The Corporate Value Chain (Scope 3) Accounting and Reporting Standard*, April 16, 2014.

Appendix 7: References

Acclimatise. "Training Workshop: Integrating Climate Risk Considerations into Decision-Making Processes." November 26, 2019. http://www.acclimatise.uk.com/2019/11/26/training-workshop-integrating-climate-risk-considerations-into-decision-making-processes/.

Accounting for Sustainability (A4S). "Supporting the TCFD Recommendations." https://www.accountingforsustainability.org/en/activities/tcfd.html.

A4S. "TCFD Practical Examples." https://www.accountingforsustainability.org/en/activities/tcfd/tcfd-practical-examples.html.

Allianz Group. *Sustainability Report 2019.* April 29, 2020. https://www.allianz.com/content/dam/onemarketing/azcom/Allianz_com/sustainability/documents/Allianz_Group_Sustainability_Report_2019-web.pdf.

ASX Corporate Governance Council. *Corporate Governance Principles and Recommendations, 4th Edition.* February 2019. https://www.asx.com.au/documents/asx-compliance/cgc-principles-and-recommendations-fourth-edn.pdf.

Australia Securities & Investments Commission (ASIC). "19-208MR ASIC Updates Guidance on Climate Change Related Disclosure." August 12, 2019. https://asic.gov.au/about-asic/news-centre/find-a-media-release/2019-releases/19-208mr-asic-updates-guidance-on-climate-change-related-disclosure/.

ASIC. *Prospectuses: Effective Disclosure for Retail Investors.* August 12, 2019. https://download.asic.gov.au/media/5230057/rg228-published-12-august-2019.pdf.

Banco de México. *Climate and Environmental Risks and Opportunities in Mexico's Financial System: From Diagnosis to Action.* February 2020. https://unepinquiry.org/wp-content/uploads/2020/05/Climate_and_environmental_risks_and_opportunities_in_Mexicos_Financial_System.pdf.

Bank Negara Malaysia. *Climate Change and Principle-Based Taxonomy: Discussion Paper.* December 27, 2019. https://www.bnm.gov.my/index.php?ch=57&pg=137&ac=892&bb=file.

Bank of England. *The Bank of England's Climate-Related Financial Disclosure 2020.* June 2020. https://www.bankofengland.co.uk/-/media/boe/files/annual-report/2020/climate-related-financial-disclosure-report-2019-20.pdf?la=en&hash=5DA959C54540287A2E90C823807E089055E6721B.

BHP. *Annual Report 2019.* September 17, 2019. https://www.bhp.com/-/media/documents/investors/annual-reports/2019/bhpannualreport2019.pdf?la=en.

BlackRock. *BlackRock Investment Stewardship: Engagement Priorities for 2020.* March 2020. https://www.blackrock.com/corporate/literature/publication/blk-stewardship-priorities-final.pdf.

Boston Consulting Group. *Global Asset Management 2020: Protect, Adapt, and Innovate.* May 2020. https://image-src.bcg.com/Images/BCG-Global-Asset-Management-2020-May-2020-r_tcm9-247209.pdf.

Brazilian Federation of Banks and SITAWI Finance for Good. *Supplement to the TCFD/FSB Implementation Roadmap for the Brazilian Banking Sector, Update on Progress in 2019.* January 2020. https://cmsportal.febraban.org.br/Arquivos/documentos/PDF/Acompanhamento%20Roadmap.pdf.

Cadbury, A. *Report of the Committee on the Financial Aspects of Corporate Governance.* London, 1992. www.ecgi.org/codes/documents/cadbury.pdf.

Cambridge Institute for Sustainability Leadership (CISL). *The ClimateWise Principles.* https://www.cisl.cam.ac.uk/business-action/sustainable-finance/climatewise/principles.

CISL. *The ClimateWise Principles Independent Review 2019.* December 17, 2019. https://www-falcon.csx.cam.ac.uk/site/CISL/resources/publication-pdfs/climate-wiseprinciples-review-2019.pdf.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Carney, Mark. "The Road to Glasgow." February 27, 2020. https://www.bankofengland.co.uk/-/media/boe/files/speech/2020/the-road-to-glasgow-speech-by-mark-carney.pdf?la=en&hash=DCA8689207770DCBBB179CBADBE3296F7982FDF5.

CDP. "CDP." https://www.cdp.net/en.

Climate Action 100+. "About Us." http://www.climateaction100.org/.

Climate Disclosure Standards Board (CSDB). *CDSB Framework for Reporting Environmental Information, Natural Capital and Associated Business Impacts.* April 2018. https://www.cdsb.net/sites/default/files/cdsb_framework_2.1.pdf.

CDSB and Sustainable Accounting Standards Board (SASB). *TCFD Good Practice Handbook.* September 2019. https://www.cdsb.net/sites/default/files/tcfd_good_practice_handbook_web_a4.pdf.

CDSB and SASB. *TCFD Implementation Guide.* May 2019. https://www.cdsb.net/sites/default/files/sasb_cdsb-tcfd-implementation-guide-a4-size-cdsb.pdf.

Climate Financial Risk Forum (CFRF). *Climate Financial Risk Forum Guide 2020: Disclosures Chapter.* June 29, 2020. https://www.fca.org.uk/publication/corporate/climate-financial-risk-forum-guide-2020-disclosures-chapter.pdf.

CFRF. *Climate Financial Risk Forum Guide 2020: Innovation Chapter.* June 29, 2020. https://www.fca.org.uk/publication/corporate/climate-financial-risk-forum-guide-2020-innovation-chapter.pdf.

CFRF. *Climate Financial Risk Forum Guide 2020: Risk Management Chapter.* June 29, 2020. https://www.fca.org.uk/publication/corporate/climate-financial-risk-forum-guide-2020-risk-management-chapter.pdf.

CFRF. *Climate Financial Risk Forum Guide 2020: Scenario Analysis Chapter.* June 29, 2020. https://www.fca.org.uk/publication/corporate/climate-financial-risk-forum-guide-2020-scenario-analysis-chapter.pdf.

CFRF. *Climate Financial Risk Forum Guide 2020: Summary.* June 29, 2020. https://www.fca.org.uk/publication/corporate/climate-financial-risk-forum-guide-2020-summary.pdf.

Colombian Climate Asset Disclosure Initiative (CCADI). "Colombian Climate Asset Disclosure Initiative." https://ccadi.co/.

CCADI. "TCFD Assessment of Colombian Asset Owners Underway with UK Government Funding." August 8, 2019. https://ccadi.co/wp-content/uploads/2019/08/TCFD-assessment-of-Colombian-asset-owne...ernment-funding-Responsible-Investor.pdf.

Committee of Sponsoring Organizations of the Treadway Commission. *Enterprise Risk Management—Integrating with Strategy and Performance.* June 2017. https://www.coso.org/Documents/2017-COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.pdf.

COP25 Chile UN Climate Change Conference. *Climate Ambition Alliance: Nations Renew their Push to Upscale Action by 2020 and Achieve Net Zero CO2 Emissions by 2050.* December 11, 2019. https://cop25.mma.gob.cl/wp-content/uploads/2020/04/Alianza-11122019-INGL%C3%89S.pdf.

Corporate Reporting Dialogue (CRD). "Better Alignment Project." https://corporatereportingdialogue.com/better-alignment-project/.

CRD. "Better Alignment Project." November 2018. https://corporatereportingdialogue.com/wp-content/uploads/2018/11/Corporate-Reporting-Dialogue-Better-Alignment-Project.pdf.

CRD. "Corporate Reporting Dialogue." https://corporatereportingdialogue.com/.

CRD. *Driving Alignment in Climate-Related Reporting, Year One of the Better Alignment Project.* September 2019. https://corporatereportingdialogue.com/climatereport2019/pdf/CRD_BAP_Report_2019.pdf.

CPP Investments. *Policy on Sustainable Investing.* June 19, 2020. https://cdn4.cppinvestments.com/wp-content/uploads/2020/09/cpp-investments-policy-on-sustainable-investing-june-19-2020-en.pdf.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Deutsche Gesellschaft für Internationale Zusammenarbeit. "Addressing climate change in South Africa." https://www.giz.de/en/worldwide/17807.html.

EnBW. *Integrated Annual Report 2019.* March 26, 2020. https://www.enbw.com/media/bericht/bericht_2019/downloads/integrated-annual-report-2019.pdf.

European Bank for Reconstruction and Development. *Advancing TCFD Guidance on Physical Climate Risks and Opportunities.* May 2018. http://427mt.com/wp-content/uploads/2018/05/EBRD-GCECA_final_report.pdf.

European Central Bank, Banking Supervision. *Guide on Climate-Related and Environmental Risks, Supervisory Expectations Relating to Risk Management and Disclosure.* May 2020. https://www.bankingsupervision.europa.eu/legalframework/publiccons/pdf/climate-related_risks/ssm.202005_draft_guide_on_climate-related_and_environmental_risks.en.pdf.

European Commission. *Guidelines on Reporting Climate-Related Information.* June 2019. https://ec.europa.eu/finance/docs/policy/190618-climate-related-information-reporting-guidelines_en.pdf.

European Financial Reporting Advisory Group (EFRAG). "European Lab [Project Task Force] PTF on Climate-related Reporting." https://www.efrag.org/About/Governance/41/European-Lab-PTF-on-Climate-related-Reporting.

EFRAG. *How to Improve Climate-Related Reporting, Supplement 1: Climate-Related Reporting Practices.* February 6, 2020. http://www.efrag.org/Lab1?AspxAutoDetectCookieSupport=1.

European IPR Helpdesk. *Fact Sheet: How to Manage Confidential Business Information.* June 2015. https://www.iprhelpdesk.eu/sites/default/files/newsdocuments/Fact-Sheet-How-to-Manage-Confidential-Business-Information.pdf.

Expert Panel on Sustainable Finance. *Final Report of the Expert Panel on Sustainable Finance: Mobilizing Finance for Sustainable Growth.* June 14, 2019. http://publications.gc.ca/collections/collection_2019/eccc/En4-350-2-2019-eng.pdf.

Financial Conduct Authority. *Proposals to Enhance Climate-Related Disclosures by Listed Issuers and Clarification of Existing Disclosure Obligations, Consultation Paper.* March 2020. https://www.fca.org.uk/publication/consultation/cp20-3.pdf.

Financial Stability Board (FSB). "Press Release: FSB to establish Task Force on Climate-related Financial Disclosures." December 4, 2015. https://www.fsb-tcfd.org/wp-content/uploads/2016/01/12-4-2015-Climate-change-task-force-press-release.pdf.

FSB. *Stocktake of Financial Authorities' Experience in Including Physical and Transition Climate Risks as Part of Their Financial Stability Monitoring.* July 22, 2020. https://www.fsb.org/wp-content/uploads/P220720.pdf.

FSB. *Task Force on Climate-related Financial Disclosures: 2019 Status Report.* June 5, 2019. https://www.fsb.org/2019/06/task-force-on-climate-related-financial-disclosures-2019-status-report/.

Forbes. "The World's Largest Public Companies." May 13, 2020. https://www.forbes.com/global2000/list/ - tab:overall.

Four Twenty Seven. *Demystifying Climate Scenario Analysis for Financial Stakeholders.* December 2019. http://427mt.com/wp-content/uploads/2019/12/Demystifying-Scenario-Analysis_427_2019.pdf.

Four Twenty Seven. "Four Twenty Seven." http://427mt.com/.

Fujifilm Group. *Sustainability Report 2019.* June 2019. https://asset.fujifilm.com/holdings/files/2020-01/b01431293b033e0186cee061b0ad1b0f/sustainability_activity_report_2019_management_en.pdf.

Global Investors for Sustainable Development Alliance. *Renewed, Recharged and Reinforced: Urgent Actions to Harmonize and Scale Sustainable Finance.* July 2020. https://www.un.org/development/desa/financing/sites/www.un.org.development.desa.financing/files/2020-08/Renewed,%20Recharged%20and%20Reinforced%20(GISD%202020)_vF.pdf.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

Gold Fields. *Our 2019 Climate Change Report.* October 7, 2019. https://www.goldfields.com/reports/annual-report-2019/pdf/other-reports/tcfd-report-2019.pdf.

Governance Institute of Australia. *Climate Change Risk Disclosure: A Practical Guide to Reporting Against ASX Corporate Governance Council's Corporate Governance Principles and Recommendations.* February 2020. https://higherlogicdownload.s3.amazonaws.com/GOVERNANCEPROFESSIONALS/a8892c7c-6297-4149-b9fc-378577d0b150/UploadedImages/govinst_climate_change_guide.pdf.

Government of Canada. "News Release: Prime Minister Announces Additional Support for Businesses to Help Save Canadian Jobs." May 11, 2020. https://pm.gc.ca/en/news/news-releases/2020/05/11/prime-minister-announces-additional-support-businesses-help-save.

HM Government. *Green Finance Strategy, Transforming Finance for a Greener Future.* July 2, 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820284/190716_BEIS_Green_Finance_Strategy_Accessible_Final.pdf.

HM Government and the Pensions Climate Risk Industry Group. *Aligning your Pension Scheme with the TCFD Recommendations: A Guide for Trustees on Integrating Climate-Related Risk Assessment and Management into Decision Making and Reporting, Public Consultation Version.* March 2020. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/871772/aligning-your-pension-scheme-with-the-TCFD-recommendations-consultation-guidance.pdf.

Hong Kong Monetary Authority. *White Paper on Green and Sustainable Banking.* June 2020. https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2020/20200630e1a1.pdf.

IE Foundation. *Sovereign Wealth Funds 2018.* 2019. https://docs.ie.edu/cgc/SWF-CGC-2018.pdf.

IFRS Foundation. *Consultation Paper on Sustainability Reporting.* September 30, 2020. https://cdn.ifrs.org/-/media/project/sustainability-reporting/consultation-paper-on-sustainability-reporting.pdf?la=en.

Institute of International Finance. *Climate-Related Financial Disclosures: Examples of Leading Practices in TCFD Reporting by Financial Firms*. August 2019. https://www.iif.com/Portals/0/Files/content/2_SFWG%20TCFD%20Practices%20Report_vf.pdf.

Institutional Investors Group on Climate Change (IIGCC). *Addressing Climate Risks and Opportunities in the Investment Process.* June 11, 2018. https://www.iigcc.org/download/addressing-climate-risks-and-opportunities-in-the-investment-process/?wpdmdl=623&refresh=5f108b6de7eed1594919789.

IIGCC. *Addressing Physical Climate Risks: Key Steps for Asset Owners and Asset Managers.* May 27, 2020. https://www.iigcc.org/download/addressing-physical-climate-risks-and-opportunities/?wpdmdl=3384&refresh=5f0f488b58e3b1594837131.

Intergovernmental Panel on Climate Change. *RCP 8.5 — A Scenario of Comparatively High Greenhouse Gas Emissions.* August 13, 2011. https://link.springer.com/article/10.1007/s10584-011-0149-y.

International Association of Insurance Supervisors and the Sustainable Insurance Forum. *Issues Paper on the Implementation of the Recommendations of the Task Force on Climate-related Financial Disclosures.* February 27, 2020. https://www.iaisweb.org/page/supervisory-material/issues-papers/file/88991/issues-paper-on-the-implementation-of-the-tcfd-recommendations.

International Energy Agency. *World Energy Model, Scenario Analysis of Future Energy Trends.* November 2019. https://www.iea.org/reports/world-energy-model/sustainable-development-scenario.

Investor Leadership Network (ILN). "About Investor Leadership Network." https://www.investorleadershipnetwork.org/en/about/.

ILN. *Climate Change Mitigation and Your Portfolio: Practical Tools for Investors.* September 17, 2020. https://www.investorleadershipnetwork.org/wp-content/uploads/2020/09/ILN_Climate-Change-Mitigation-and-Your-Portfolio.pdf.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

ILN. *TCFD Implementation, Practical Insights and Perspectives from Behind the Scenes for Institutional Investors.* September 26, 2019. https://www.investorleadershipnetwork.org/wp-content/uploads/2019/09/ILN_TCFD-Implementation_final.pdf.

London Stock Exchange. *Main Market: A Guide to Listing on London Stock Exchange.* November 2010. https://docs.londonstockexchange.com/sites/default/files/documents/gudetolisting.pdf.

Ministry for the Environment. "Mandatory Climate-Related Financial Disclosures." September 15, 2020. https://www.mfe.govt.nz/climate-change/climate-change-and-government/mandatory-climate-related-financial-disclosures.

Ministry for the Environment and Ministry of Business, Innovation & Employment. *Climate-Related Financial Disclosures — Understanding Your Business Risks and Opportunities Related to Climate Change: Discussion Document.* October 2019. https://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/Climate-related-financial-disclosures-discussion-document.pdf.

Ministry of Economy, Trade, and Industry, Government of Japan. "The Inaugural TCFD Summit Held in Japan." October 10, 2019. https://www.meti.go.jp/english/press/2019/1010_004.html.

Monetary Authority of Singapore. *Proposed Guidelines on Environmental Risk Management (Banks).* June 25, 2020. https://www.mas.gov.sg/-/media/MAS/News-and-Publications/Consultation-Papers/2020/Consultation-Paper-on-Proposed-Guidelines-on-Environmental-Risk-Management-for-Banks.pdf.

Moody's. *Better Decisions, Brighter Futures: 2019 Corporate Social Responsibility Report.* April 2020. https://assets.website-files.com/5a54fd01e519160001e4bbb9/5ea6f7c132df3e302da58875_Moodys_2019_CSR_Report.pdf.

Moody's. "Moody's." https://www.moodys.com/.

Moody's. *TCFD Report.* April 2020. https://assets.website-files.com/5a54fd01e519160001e4bbb9/5ea6f9111d7311abf10b9c64_Moodys_2020_TCFD_Report.pdf.

National Treasury of South Africa. *Financing a Sustainable Economy: Draft Technical Paper.* May 15, 2020. http://www.treasury.gov.za/publications/other/Sustainability%20technical%20paper%202020.pdf.

Network for Greening the Financial System (NGFS). *A Call for Action: Climate Change as a Source of Financial Risk.* April 17, 2019. https://www.banque-france.fr/sites/default/files/media/2019/04/17/ngfs_first_comprehensive_report_-_17042019_0.pdf.

NGFS. *Macroeconomics and Financial Stability: Implications of Climate Change.* July 23, 2019. https://www.ngfs.net/sites/default/files/medias/documents/ngfs-report-technical-supplement_final_v2.pdf.

NGFS. *NGFS Climate Scenarios for Central Banks and Supervisors.* June 24, 2020. https://www.ngfs.net/sites/default/files/medias/documents/ngfs_climate_scenarios_final.pdf.

Nutrien. *2020 Environmental, Social and Governance (ESG) Report.* April 9, 2020. https://www.nutrien.com/sites/default/files/uploads/2020-04/Nutrien%202020%20ESG%20Report.pdf.

Organization for Economic Co-operation and Development (OECD). *G20/OECD Principles of Corporate Governance.* OECD Publishing, Paris, 2015. dx.doi.org/10.1787/9789264236882-en.

OECD. "Global Pension Statistics." http://www.oecd.org/finance/private-pensions/globalpensionstatistics.htm.

OECD. *OECD Insurance Statistics 2019.* https://read.oecd-ilibrary.org/finance-and-investment/oecd-insurance-statistics-2019_g2g9fade-en#page15.

Principles for Responsible Investment (PRI). *Implementing the Task Force on Climate-related Financial Disclosures (TCFD) Recommendations: A Guide for Asset Owners.* May 11, 2018. https://www.unpri.org/download?ac=4652.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

PRI. "PRI Climate Snapshot 2020." July 17, 2020. https://www.unpri.org/climate-change/pri-climate-snapshot-2020/6080.article.

PRI. *PRI Reporting Framework 2018, Strategy and Governance (Climate-Related Indicators Only).* November 2017. https://www.unpri.org/Uploads/e/e/e/2.-SG-CC-2018---final.pdf.

PRI. *PRI Reporting Framework 2019, Strategy and Governance (Climate-Related Indicators Only).* November 2018. https://www.unpri.org/Uploads/n/p/v/14.sgcc2019clean_956715.pdf.

PRI. *PRI Reporting Framework 2020, Strategy and Governance (Climate-Related Indicators Only).* November 2019. https://d8g8t13e9vf2o.cloudfront.net/Uploads/o/k/u/03.cc2020_125127.pdf.

PRI. "Reporting for Signatories." https://www.unpri.org/signatories/reporting-for-signatories.

PRI. "TCFD-Based Reporting to Become Mandatory for PRI Signatories in 2020." February 18, 2019. https://www.unpri.org/news-and-press/tcfd-based-reporting-to-become-mandatory-for-pri-signatories-in-2020/4116.article.

Rolls-Royce Holdings plc. *Annual Report 2019.* February 28, 2020. https://www.rolls-royce.com/~/media/Files/R/Rolls-Royce/documents/annual-report/2019/2019-full-annual-report.pdf.

Royal Bank of Canada. *Task Force on Climate-related Financial Disclosures Report 2019.* March 4, 2020. https://www.rbc.com/community-social-impact/_assets-custom/pdf/RBC-TCFD-Report-2019.PDF.

Science Based Targets. "Science Based Targets." https://sciencebasedtargets.org/.

Société Générale. *Societe Generale's Task Force on Climate-related Financial Disclosures Report.* June 2019. https://www.societegenerale.com/sites/default/files/documents/Document%20RSE/climate-disclosure-societe-generale-tcfd-report-june.pdf.

Solvay. *2019 Annual Integrated Report.* March 31, 2020. https://www.solvay.com/sites/g/files/srpend221/files/2020-03/en_final_web_optimized.pdf.

Sustainable Finance-Committee of the German Federal Government. *Interim Report: The Significance of Sustainable Finance to the Great Transformation.* March 6, 2020. https://sustainable-finance-beirat.de/wp-content/uploads/2020/03/200306_SFB-Zwischenbericht_EN.pdf.

Task Force on Climate-related Financial Disclosures (TCFD). *2018 Status Report.* September 26, 2018. https://www.fsb-tcfd.org/wp-content/uploads/2018/08/FINAL-2018-TCFD-Status-Report-092518.pdf.

TCFD. *2019 Status Report.* June 5, 2019. https://www.fsb-tcfd.org/wp-content/uploads/2019/06/2019-TCFD-Status-Report-FINAL-053119.pdf.

TCFD. "Case Studies." https://www.tcfdhub.org/case-study/.

TCFD. *Consultation on Forward-Looking Financial Sector Metrics.* October 29, 2020. https://assets.bbhub.io/company/sites/60/2020/09/2020-TCFD_Consultation-Forward-Looking-Financial-Sector-Metrics.pdf.

TCFD. *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures.* June 29, 2017. https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf.

TCFD. *Guidance on Risk Management Integration and Disclosure.* October 29, 2020. https://assets.bbhub.io/company/sites/60/2020/09/2020-TCFD_Guidance-Risk-Management-Integration-and-Disclosure.pdf.

TCFD. *Guidance on Scenario Analysis for Non-Financial Companies.* October 29, 2020. https://assets.bbhub.io/company/sites/60/2020/09/2020-TCFD_Guidance-Scenario-Analysis-Guidance.pdf.

TCFD. *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures.* June 29, 2017. https://www.fsb-tcfd.org/wp-content/uploads/2017/12/FINAL-TCFD-Annex-Amended-121517.pdf.

A.
State of Climate-Related Financial Disclosures

B.
Effective Climate-Related Financial Disclosures

C.
Addressing Implementation Issues

D.
Case Studies on Implementation

E.
Initiatives Supporting TCFD

Appendices

TCFD. "Publications." https://www.fsb-tcfd.org/publications/.

TCFD Consortium. "About Us." https://tcfd-consortium.jp/en.

TCFD Consortium. *Guidance on Climate-Related Financial Disclosures 2.0.* July 31, 2020. https://tcfd-consortium.jp/pdf/en/news/20081201/TCFD_Guidance_2_0-e.pdf.

TCFD Summit. "TCFD Summit 2020." https://tcfd-summit.org/indexEn.html.

The Transition Pathway Initiative (TPI). "Supporters." https://www.transitionpathwayinitiative.org/tpi/supporters.

TPI. *TPI State of Transition Report 2020.* March 2020. https://www.transitionpathwayinitiative.org/tpi/publications/50.pdf?type=Publication.

Total. *Universal Registration Document 2019.* March 20, 2020. https://www.total.com/sites/default/files/atoms/files/2019_total_universal_registration_document.pdf.

United Nations Environment Programme Finance Initiative (UNEP FI). *Changing Course.* May 2019. https://www.unepfi.org/wordpress/wp-content/uploads/2019/05/TCFD-Changing-Course-Oct-19.pdf.

UNEP FI. *Changing Course, Real Estate.* November 2019. https://www.unepfi.org/wordpress/wp-content/uploads/2019/11/TCFD-Real-Estate-Web_final_28112019.pdf.

UNEP FI. "Press Release: UNEP FI Working with 16 Global Insurers to Better Understand Risk & Implement TCFD Recommendations." November 13, 2018. https://www.unepfi.org/news/industries/insurance/unep-fi-working-with-16-global-insurers-to-better-understand-risk-implement-tcfd-recommendations/.

United Nations Global Compact. "Business Ambition for 1.5°C." https://www.unglobalcompact.org/take-action/events/climate-action-summit-2019/business-ambition.

Walmart de México y Centroamérica. *Financial and Corporate Responsibility Report 2019.* April 2020. https://informes.walmex.mx/2019/descargas/eng/Walmart_2019_annual_report_complete.pdf.

World Business Council for Sustainable Development (WBCSD). *Climate-Related Financial Disclosure by Chemical Sector Companies: Implementing the TCFD Recommendations.* July 16, 2019. https://docs.wbcsd.org/2019/07/WBCSD_TCFD_Chemical_Sector_Preparer_Forum.pdf.

WBCSD. *Communicating Collective and Individual Climate-Related Challenges and Action.* July 1, 2020. https://www.wbcsd.org/Programs/Redefining-Value/External-Disclosure/TCFD/Resources/Construction-and-Building-Materials-share-TCFD-implementation-experience.

WBCSD. *Disclosure in a Time of System Transformation: Climate-Related Financial Disclosure for Food, Agriculture and Forest Products Companies.* April 9, 2020. https://docs.wbcsd.org/2020/04/WBCSD-TCFD-Food-Agriculture-and-Forest-Products%C2%AC-Preparer-Fourm-report.pdf.

WBCSD. *Disclosure in a Time of Transition: Climate-Related Financial Disclosure and the Opportunity for the Electric Utilities Sector.* July 16, 2019. https://docs.wbcsd.org/2019/07/WBCSD_TCFD_Electric_Utilities_Preparer_Forum.pdf.

WBCSD. *Staying Competitive in a Fast-Changing World, Practical Steps for Future-Proofing Your Business.* October 14, 2019. https://docs.wbcsd.org/2019/10/WBCSD_Redefining_Value_Checklist_2019.pdf.

WBCSD. "TCFD Preparer Forums, Resources." https://www.wbcsd.org/Programs/Redefining-Value/External-Disclosure/TCFD/Resources.

World Resources Institute (WRI) and WBCSD. *The Corporate Value Chain (Scope 3) Accounting and Reporting Standard.* April 16, 2013. https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf.

WRI and WBCSD. *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition),* March 2004. https://ghgprotocol.org/corporate-standard.

A.
State of Climate-Related
Financial Disclosures

B.
Effective Climate-Related
Financial Disclosures

C.
Addressing
Implementation Issues

D.
Case Studies on
Implementation

E.
Initiatives Supporting TCFD

Appendices

For more information, please visit fsb-tcfd.org

Nothing in this document constitutes an offer or a solicitation of an offer to buy or sell a security or financial instrument or investment advice or recommendation of a security or financial instrument. The Task Force on Climate-related Financial Disclosures believes the information herein was obtained from reliable sources but does not guarantee its accuracy.
Copyright 2020 The Task Force on Climate-related Financial Disclosures.