



Assessing Global TCFD Compliance: A Cross-Sector Analysis of Climate-Related Financial Disclosures Perspective

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Abstract: In moving the world towards a reduced carbon footprint, it is essential for policymakers, investors, and various stakeholders to have clearer, more specific, and uniform details concerning companies' exposure to climate risks and their capacity to manage them. Consequently, this study aims to assess the extent of corporate financial disclosures related to climate change and their adherence to the Recommendations established by the Taskforce on Climate-Related Financial Disclosures (TCFD) and Evolution of Taskforce on Climate-Related Financial Disclosures (TCFD) Recommendations. The proportion of public companies reporting TCFD-aligned information is on the rise, yet further advancements are required. In the fiscal year 2022 reporting period, 58% of companies provided disclosures that aligned with at least five of the 11 recommended disclosures, an increase from 18% in 2020; however, just 4% reported in accordance with all 11. The proportion of businesses disclosing climate-related risks or opportunities, oversight by the board, and targets related to climate changed drastically — rising by 26, 25, and 24 percentage points, respectively — from fiscal years 2020 to 2022. The study shows that the sample Industry's disclosure of climate risk-related information sharply increased during the study period. The present research adds to the current body of literature by examining the extent of disclosures related to climate change in accordance with the guidelines set forth by the TCFD, as demonstrated by select Industries. Index Terms – TCFD, Governance, Strategy, Risk Management, Metrics and Targets.

1. INTRODUCTION

The Task Force on Climate-related Financial Disclosures (TCFD) establishes a widely accepted framework for organizations to report on climate-related financial risks and opportunities, concentrating on four essential areas: Governance, Strategy, Risk Management, and Metrics & Targets. The recommendations encourage companies to effectively convey the potential and actual effects of climate change on their operations, strategy, and financial planning to investors, lenders, and insurance underwriters, promoting consistent and comparable information for improved capital allocation and a more sustainable economy.

2. Literature Review

Tumewang, Y. K., Ntim, C. G., & Haque, F. (2025) titled “Task Force on Climate-Related Financial Disclosures: A Systematic Literature Review and Future Research Agenda” examined First, the majority of the studies reviewed are descriptive in nature, with limited theoretical insights. Second that existing studies are predominantly narrative reports in nature that focus on the extent of TCFD implementation.



Domínguez-Quiñones, M., Aliende, I., & Escot, L. (2025) titled “Assessment of TCFD Voluntary Disclosure Compliance in the Spanish Energy Sector: A Text Mining Approach to Climate Change Financial Disclosures” examined the participation of this sector, given its impact on carbon emissions and future European regulations on climate disclosure.

Xhindole, C., Tarquinio, L., & Sierra-García, L. (2025) titled “Climate change and Task Force on Climate-related Financial Disclosures (TCFD) reports. A comparison between Italy and Spain” examined the reporting practices of a sample of companies listed in Italy and Spain that prepare a Task Force on Climate-related Financial Disclosures (TCFD) report.

Demers, E., Hendrikse, J., & Metzner, M. (2024) titled “*TCFD reporting: Early evidence related to the future of global climate-related disclosures*” examined that disclosing to the CDP is negatively associated with equity market bid-ask spreads, consistent with disclosure reducing information asymmetry, although the results do not hold for U.S. and Japanese firms.

Dias, A. I., Pinheiro, P., & Fernandes, S. (2024) titled “Gender diversity and climate disclosure: a tcfid perspective” examined the influence of gender diversity in climate-related financial disclosures, as recommended by the TCFD based on a sample of 27 companies operating within the sectors of electricity, oil, coal and gas, water, and alternative energy that have announced their adherence to the recommendations from 2017 to 2021.

Alexa, A. F. (2023) titled “Handbook for Introducing TCFD in Sustainability Reporting, Case Study: Normet Group Oy” examined SWOT analysis highlighted Normet’s practices aligning with TCFD recommendations and identified the areas needing further attention. Notably, the benchmarking demonstrated that if the TCFD framework is not standardized, each companies’ disclosures may vary in quality and details.

Ding, D., Liu, B., & Chang, M. (2023) titled “Carbon emissions and TCFD aligned climate-related information disclosures” examined that high carbon emitting firms appear to discharge their corporate accountability by increasing climate-related disclosure, consistent with legitimizing their potentially unethical actions and submitting to stakeholder and societal pressure.

Ngo, T., Le, T., Ullah, S., & Trinh, H. H. (2023) titled “Climate risk disclosures and global sustainability initiatives: A conceptual analysis and agenda for future research” examined the essential functions of financial markets and also provide the critical implications for different market players ranging from providers to supporters of the TCFD.

Auzepy, A., Tönjes, E., Lenz, D., & Funk, C. (2023) titled “Evaluating TCFD reporting—A new application of zero-shot analysis to climate-related financial disclosures” examined that corporate climate-related disclosures increased after the launch of the TCFD recommendations and following individual endorsements.

Demaria, S., & Rigot, S. (2021) titled “Corporate environmental reporting: Are French firms compliant with the Task Force on Climate Financial Disclosures' recommendations?” examined the compliance of CAC 40 firms with the recommendations of the Task Force on Climate-related Financial Disclosures (2017), an international initiative made up by Financial Stability Board to enhance financial transparency.

3. Objectives of the study: The present study aims

To Know the Evolution of Taskforce on Climate-Related Financial Disclosures (TCFD) Recommendations

To examine the level of climate change-related financial disclosures and their compliance with the Recommendations provided by the Taskforce on Climate-Related Financial Disclosures (TCFD).

4. Research Methodology: The AI technology utilized to analyze companies’ publicly available reports for this report differed from the AI technology employed in the Task Force’s earlier status reports. The purpose of the AI review was to automatically pinpoint information within financial filings and other corporate documents that corresponded with one or more of the 11 recommended disclosures (known as TCFD-aligned information). One of the difficulties in developing automated AI technology to assess company reports for TCFD-aligned information is that the terminology and semantics used to define a specific recommended disclosure can vary across countries, sectors, and even among firms within the same sector. To help mitigate these difficulties, the AI technology used language models capable of mathematically representing entire sentences and paragraphs while capturing meaning within context.

Sample Selection:

To evaluate the present condition and progression of financial disclosures related to climate change, the Task Force employed AI technology to analyze reports from over 1,350 publicly traded companies covering a three-year span — fiscal years 2020, 2021, and 2022 — as detailed in Section A.1. TCFD- Aligned Reporting by Public Companies.



Figure A1: AI Review Population Size

Industry	Number
1. Banking	235
2. Insurance	117
3. Energy	205
4. Materials and Buildings	345
5. Transportation	126
6. Agriculture, Food, Forest Products	115
7. Technology and Media	91
8. Consumer Goods	131
Total	1,365

Period of the study: The data has been examined for the three financial years i.e. 2020-21 to 2022-23.

5. Analysis and Findings

State of Climate-Related Financial Disclosures: In line with earlier status updates, the Task Force conducted an examination of numerous public companies' reports regarding climate-related financial information utilizing artificial intelligence (AI) technology. The AI technology was employed to assess whether the reports contain information that seems to correspond with the Task Force's recommendations. The Task Force has obtained feedback indicating that the fundamental information on climate-related financial disclosures derived from its AI assessments is beneficial for companies adopting the TCFD recommendations in grasping current practices. Moreover, stakeholders, report preparers, and others have shown interest in tracking changes in climate-related financial disclosures over time.

Table 1: Percent of Companies for the Select Eight Industries That Disclose Information Related to Governance Aligned with TCFD for the F.Y. 2020-2021 to 2022-23.

Industry	Recommendation	Recommended Disclosure	Pt. Change 2020–2022	Percent of Companies That Disclose Information Aligned with TCFD Recommended Disclosures
1. Banking	Governance	a) Board Oversight	22	2020 35% 2021 51% 2022 57%
		b) Management's Role	18	2020 22% 2021 34% 2022 40%
2. Insurance	Governance	a) Board Oversight	16	2020 49% 2021 60% 2022 65%
		b) Management's Role	13	2020 31% 2021 44% 2022 44%
3. Energy	Governance	a) Board Oversight	16	2020 60% 2021 74% 2022 76%
		b) Management's Role	18	2020 39% 2021 49% 2022 57%
4. Materials and Buildings	Governance	a) Board Oversight	29	2020 42% 2021 58% 2022 71%
		b) Management's Role	21	2020 35% 2021 39% 2022 46%



5. Transportation	Governance	a) Board Oversight	37	2020 33% 2021 52% 2022 70%
		b) Management's Role	23	2020 21% 2021 40% 2022 44%
6. Agriculture, Food, and Forest Products	Governance	a) Board Oversight	26	2020 31% 2021 49% 2022 57%
		b) Management's Role	23	2020 16% 2021 23% 2022 39%
7. Technology and Media	Governance	a) Board Oversight	32	2020 11% 2021 40% 2022 43%
		b) Management's Role	25	2020 7% 2021 26% 2022 32%
8. Consumer Goods	Governance	a) Board Oversight	34	2020 24% 2021 51% 2022 58%
		b) Management's Role	19	2020 13% 2021 28% 2022 32%

Source: Task Force on Climate-related Financial Disclosures 2023 Status Report

Table 2: Percent of Companies for the Select Eight Industries That Disclose Information Related to strategy Aligned with TCFD for the F.Y. 2020-2021 to 2022-23.

Industry	Recommendation	Recommended Disclosure	Pt. Change 2020–2022	Percent of Companies That Disclose Information Aligned with TCFD Recommended Disclosures
1. Banking	Strategy	a) Risks and Opportunities	35	2020 34% 2021 58% 2022 69%
		b) Impact on Organization	13	2020 22% 2021 27% 2022 35%
		c) Resilience of Strategy	7	2020 2% 2021 7% 2022 9%
2. Insurance	Strategy	a) Risks and Opportunities	17	2020 51% 2021 60% 2022 68%
		b) Impact on Organization	13	2020 32% 2021 38% 2022 45%
		c) Resilience of Strategy	8	2020 5% 2021 13% 2022 13%
3. Energy	Strategy	a) Risks and Opportunities	21	2020 49% 2021 71%



		b) Impact on Organization	17	2022 70% 2020 41% 2021 55 %
		c) Resilience of Strategy	7	2022 58% 2020 9% 2021 14%
4. Materials and Buildings	Strategy	a) Risks and Opportunities	27	2022 16% 2020 39% 2021 57%
		b) Impact on Organization	21	2022 66% 2020 25% 2021 40%
		c) Resilience of Strategy	9	2022 46% 2020 3% 2021 9%
5. Transportation	Strategy	a) Risks and Opportunities	26	2022 12% 2020 29% 2021 48%
		b) Impact on Organization	23	2022 55% 2020 17% 2021 35%
		c) Resilience of Strategy	3	2022 40% 2020 3% 2021 7%
6. Agriculture, Food, and Forest Products	Strategy	a) Risks and Opportunities	30	2022 6% 2020 27% 2021 50%
		b) Impact on Organization	22	2022 57% 2020 27% 2021 41%
		c) Resilience of Strategy	14	2022 49% 2020 3% 2021 10%
7. Technology and Media	Strategy	a) Risks and Opportunities	20	2022 17% 2020 18% 2021 29%
		b) Impact on Organization	12	2022 38% 2020 15% 2021 26%
		c) Resilience of Strategy	4	2022 27% 2020 1% 2021 2%
8. Consumer Goods	Strategy	a) Risks and Opportunities	23	2022 5% 2020 23% 2021 46%
		b) Impact on Organization	10	2022 46% 2020 18% 2021 27%
		c) Resilience of Strategy	5	2022 28% 2020 3% 2021 5%
				2022 8%

Source: Task Force on Climate-related Financial Disclosures 2023 Status Report



Table 3: Percent of Companies for the Select Eight Industries That Disclose Information Related to Risk Management Aligned with TCFD for the F.Y. 2020-2021 to 2022-23.

Industry	Recommendation	Recommended Disclosure	Pt. Change 2020–2022	Percent of Companies That Disclose Information Aligned with TCFD Recommended Disclosures
1. Banking	Risk Management	a) Risk IdAssessment Processes	24	2020 16% 2021 29% 2022 40%
		b) Risk Management Processes	26	2020 20% 2021 37% 2022 46%
		c) Integration into Overall Risk Management	21	2020 17% 2021 28% 2022 38%
2. Insurance	Risk Management	a) Risk IdAssessment Processes	26	2020 18% 2021 33% 2022 44%
		b) Risk Management Processes	17	2020 34% 2021 48% 2022 51 %
		c) Integration into Overall Risk Management	16	2020 20% 2021 36% 2022 36%
3. Energy	Risk Management	a) Risk IdAssessment Processes	21	2020 21% 2021 31% 2022 42%
		b) Risk Management Processes	15	2020 30% 2021 44% 2022 45%
		c) Integration into Overall Risk Management	14	2020 18% 2021 26% 2022 32%
4. Materials and Buildings	Risk Management	a) Risk IdAssessment Processes	26	2020 14% 2021 28% 2022 40%
		b) Risk Management Processes	20	2020 18% 2021 30% 2022 38%
		c) Integration into Overall Risk Management	14	2020 8% 2021 19% 2022 22%
5. Transportation	Risk Management	a) Risk IdAssessment Processes	20	2020 10% 2021 23% 2022 305
		b) Risk Management Processes	24	2020 13% 2021 25% 2022 37%
		c) Integration into Overall Risk Management	9	2020 12% 2021 185 2022 21%



6. Agriculture, Food, Forest Products	Risk Management	a) Risk IdAssessment Processes	26	2020 10% 2021 23% 2022 36%
		b) Risk Management Processes	20	2020 15% 2021 30% 2022 35%
		c) Integration into Overall Risk Management	11	2020 7% 2021 13% 2022 18%
7. Technology and Media	Risk Management	a) Risk IdAssessment Processes	12	2020 2% 2021 8% 2022 14%
		b) Risk Management Processes	13	2020 7% 2021 18% 2022 20%
		c) Integration into Overall Risk Management	5	2020 2% 2021 13% 2022 7%
8. Consumer Goods	Risk Management	a) Risk IdAssessment Processes	14	2020 8% 2021 18% 2022 22%
		b) Risk Management Processes	17	2020 12% 2021 24% 2022 29%
		c) Integration into Overall Risk Management	8	2020 3% 2021 9% 2022 11%

Source: Task Force on Climate-related Financial Disclosures 2023 Status Report

Table 4: Percent of Companies for the Select Eight Industries That Disclose Information Related to Metrics and Targets Aligned with TCFD for the F.Y. 2020-2021 to 2022-23.

Industry	Recommendation	Recommended Disclosure	Pt. Change 2020-2022	Percent of Companies That Disclose Information Aligned with TCFD Recommended Disclosures
1. Banking	Metrics and Targets	a) Climate-Related Metrics	16	2020 45% 2021 54% 2022 61%
		b) Scope 1,2,3 GHG Emissions	18	2020 40% 2021 49% 2022 50%
		c) Climate-Related Targets	19	2020 28% 2021 41% 2022 47%
2. Insurance	Metrics and Targets	a) Climate-Related Metrics	7	2020 49% 2021 53% 2022 56%
		b) Scope 1,2,3 GHG Emissions	9	2020 44% 2021 47% 2022 53%
		c) Climate-Related Targets	18	2020 32% 2021 46% 2022 50%



3. Energy	Metrics and Targets	a) Climate-Related Metrics b) Scope 1,2,3 GHG Emissions c) Climate-Related Targets	11 13 20	2020 70% 2021 78% 2022 81% 2020 64% 2021 71 % 2022 77% 2020 60% 2021 75% 2022 80%
4. Materials and Buildings	Metrics and Targets	a) Climate-Related Metrics b) Scope 1,2,3 GHG Emissions c) Climate-Related Targets	11 13 20	2020 70% 2021 76% 2022 81% 2020 62% 2021 69% 2022 75% 2020 47% 2021 69% 2022 81%
5. Transportation	Metrics and Targets	a) Climate-Related Metrics b) Scope 1,2,3 GHG Emissions c) Climate-Related Targets	16 17 31	2020 54% 2021 65% 2022 70% 2020 47% 2021 58% 2022 64% 2020 42% 2021 69% 2022 73%
6. Agriculture, Food, Forest Products	Metrics and Targets	a) Climate-Related Metrics b) Scope 1,2,3 GHG Emissions c) Climate-Related Targets	10 14 20	2020 61 % 2021 72% 2022 71 % 2020 50% 2021 62% 2022 64% 2020 49% 2021 63% 2022 69%
7. Technology and Media	Metrics and Targets	a) Climate-Related Metrics b) Scope 1,2,3 GHG Emissions c) Climate-Related Targets	26 30 32	2020 41% 2021 56% 2022 67% 2020 35% 2021 56% 2022 65% 2020 24% 2021 44% 2022 56%
8. Consumer Goods	Metrics and Targets	a) Climate-Related Metrics b) Scope 1,2,3 GHG Emissions c) Climate-Related Targets	15 14 24	2020 47% 2021 59% 2022 62% 2020 40% 2021 52% 2022 54% 2020 39% 2021 54% 2022 63%

Source: Task Force on Climate-related Financial Disclosures 2023 Status Report



6. Conclusions and Implications: The proportion of public companies reporting TCFD-aligned information is on the rise, yet further advancements are required. In the fiscal year 2022 reporting period, 58% of companies provided disclosures that aligned with at least five of the 11 recommended disclosures, an increase from 18% in 2020; however, just 4% reported in accordance with all 11.

The proportion of businesses disclosing climate-related risks or opportunities, oversight by the board, and targets related to climate changed drastically — rising by 26, 25, and 24 percentage points, respectively — from fiscal years 2020 to 2022.

The amount of climate-related financial information included in financial filings is restricted. For the fiscal year 2022, disclosures that aligned with the 11 recommended items were four times more frequently found in sustainability and annual reports compared to financial filings.

Most jurisdictions that have established or suggested climate-related disclosure obligations indicate that these disclosures should be included in financial statements or annual reports.

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