

ANALYSIS

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TCFD-Aligned Reporting by Major U.S. and European Corporations

The Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) provides a global framework for organizations to develop more effective climate-related financial disclosures through existing reporting processes. This white paper discusses Moody's Analytics' findings on the alignment with TCFD recommendations of reporting by major U.S. and European companies in 2020/21. The analysis is informed by an artificial intelligence (AI) based review of public filings by a diverse population of public firms. Our major findings on TCFD alignment are as follows:

- **Europe leads the U.S. in TCFD reporting** – Regional differences in alignment are quite pronounced, with climate-related disclosures considerably more TCFD-aligned in Europe than in the U.S.
- **Alignment varies across TCFD recommendations** – Both U.S. and European reporting show high levels of alignment with only one TCFD recommendation – i.e., disclosures related to the strategic risks and opportunities presented by climate changes, whereas a significant variation was observed between disclosures of U.S. and European companies on climate-related metrics and targets.
- **Alignment varies by sector** – The Energy and Materials & Buildings sectors showed the highest levels of alignment among U.S. companies, while most sectors in Europe showed high levels of alignment except the Technology and Media sector.
- **Alignment varies by firm size** – Larger companies are more likely than smaller companies to have TCFD-aligned disclosures in both the U.S. and in Europe.

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1. Introduction

In 2017, the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) released its recommendations providing a global framework for companies and other organizations to develop more effective climate-related financial disclosures through existing reporting processes.¹ There were 11 recommended disclosures grouped into four thematic areas – governance, strategy, risk management, and metrics and targets. Starting from 2018, the Task Force has released four annual status reports describing the alignment of companies' public reporting with the TCFD recommendations.

On behalf of the TCFD and in support of its 2021 status report, Moody's assessed the extent to which the public financial disclosures made by a large sample of global companies were aligned with one or more of the Task Force's 11 recommended disclosures. The status report details the extent of alignment for the global aggregate and the subsample disaggregated by broad industry and geography, but results are not presented at the country and region level.

This report fills that gap for the United States and Europe by presenting alignment results for the U.S. and European companies that were part of the Task Force's larger global sample. Results are presented for U.S. and European companies in aggregate and by industry.

The sample for analysis was provided by the TCFD and consists of 1,651 companies, 659 domiciled in the United States and 424 domiciled in Europe. For these companies, Moody's conducted an Artificial Intelligence (AI) based review of all public filings, including financial filings, annual reports, integrated reports, sustainability reports, and other publicly available reports that were associated with companies' annual reporting or sustainability. Non-public disclosures, such as CDP reports, were not included in the analysis.

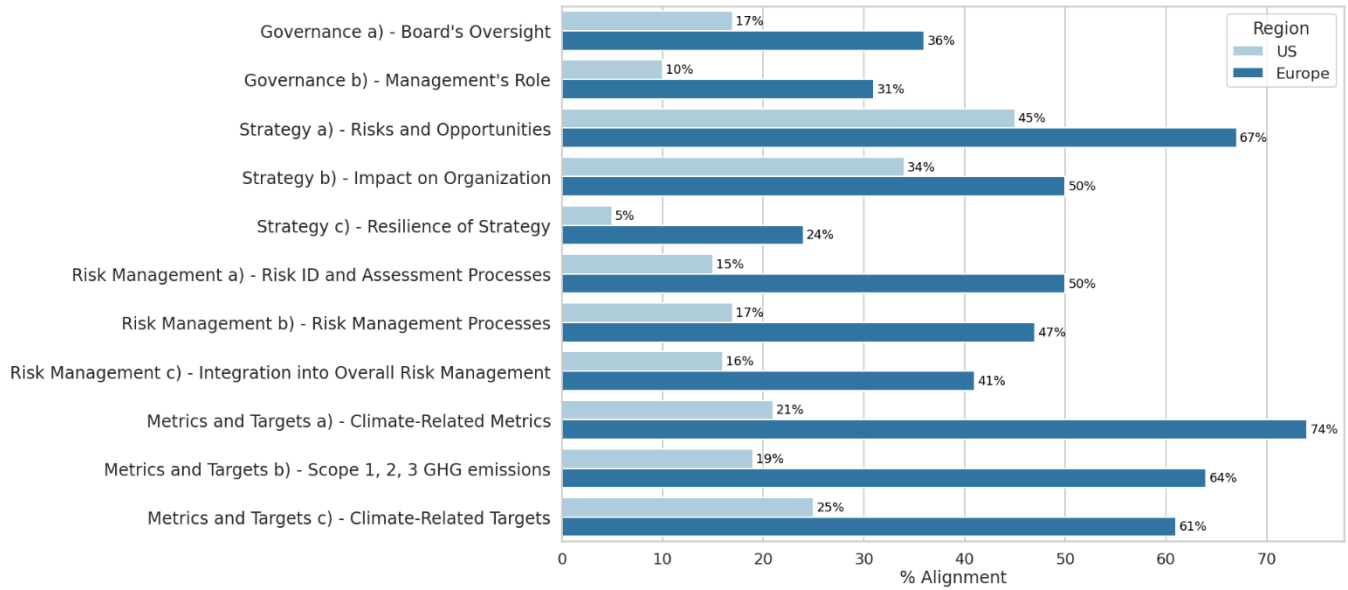
2. TCFD Alignment of U.S. and European Companies

Figure 1 shows the percentage of U.S. and European companies from the 2021 company population that were aligned with the TCFD recommendations for each disclosure category, based on information from publicly available documents for the U.S. and European firms (the types of publicly available documents analyzed are detailed above). Of the U.S. companies assessed in the report, the highest levels of alignment were in Strategy a) – Risks and Opportunities and Strategy b) – Impact disclosure categories, while the lowest levels alignment were in the Strategy c) – Resilience of Strategy and the Governance b) – Management's Role disclosure categories. For European companies, the highest alignment percentages were in the Strategy a) – Risks and Opportunities, and the three Metrics and Targets disclosure categories.

Strategy a) – Risks and Opportunities was one area where both U.S. and European companies showed high levels of alignment with TCFD recommendations.

¹TCFD. *2021 Status Report*. October 2021. https://assets.bbhub.io/company/sites/60/2021/07/2021-TCFD-Status_Report.pdf.

Figure 1 TCFD alignment of U.S. and European companies



3. TCFD Alignment by Industry

Figures 2 and 3 show distributions of U.S. and European companies by industry used in our AI analysis for TCFD alignment.

Figure 2 Distribution of U.S. companies by industry for the TCFD review population

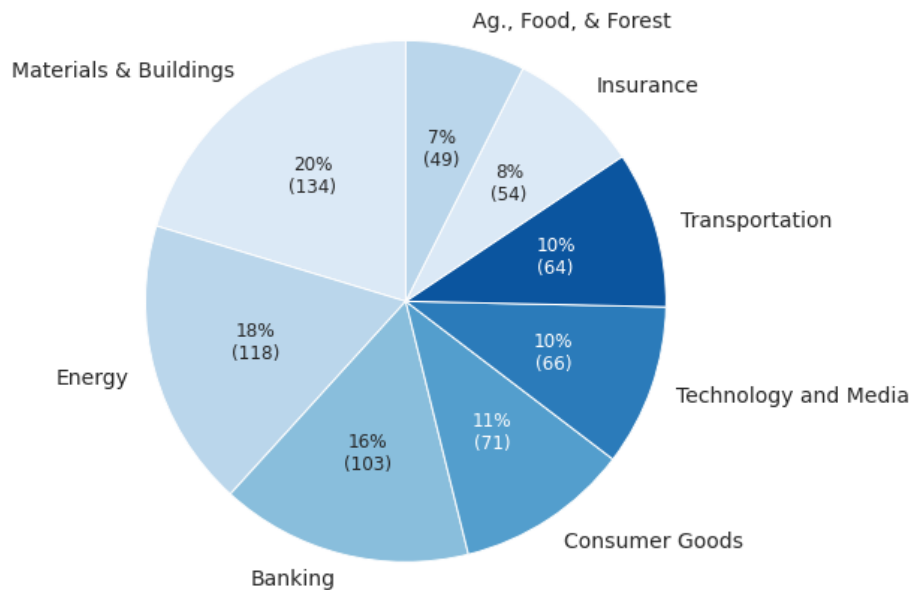
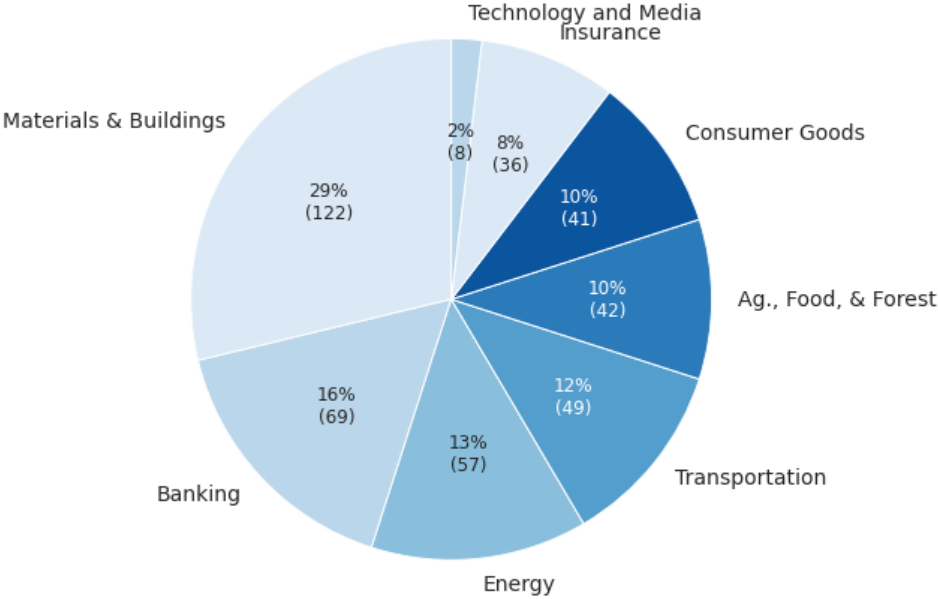


Figure 3 Distribution of European companies by industry for the TCFD review population



Tables 1a and 1b break down the alignment of U.S. companies with TCFD recommendations by their industries, while Tables 2a and 2b break down the alignment of European companies by their industries.

Among U.S. companies, the two sectors that showed the highest levels of alignment, when aggregating the percentage alignment figures across all disclosures for each industry, were Energy and Materials & Buildings. Among European companies, the Insurance and Energy sectors showed the highest levels of alignment, when aggregating the percentage alignment figures across all disclosures for each industry. The Technology and Media sector showed the lowest level of alignment for both U.S. and European companies.

Table 1a Percentage of U.S. companies aligned with TCFD recommendations by industry

Recommendation	Recommended Disclosure	Insurance	Materials & Buildings	Transportation	Energy
Governance	a. Board's Oversight	18.5	21.6	18.8	28.8
Governance	b. Management's Role	14.8	11.2	14.1	8.5
Strategy	a. Risks and Opportunities	31.5	57.5	54.7	69.5
Strategy	b. Impact on Organization	22.2	52.2	37.5	44.1
Strategy	c. Resilience of Strategy	7.4	4.5	1.6	11.9
Risk Management	a. Risk ID and Assessment Processes	14.8	21.6	10.9	18.6
Risk Management	b. Risk Management Processes	31.5	18.7	10.9	22.0
Risk Management	c. Integration into Overall Risk Management	22.2	16.4	7.8	22.0
Metrics and Targets	a. Climate-Related Metrics	5.6	34.3	21.9	24.6
Metrics and Targets	b. Scope 1, 2, 3 GHG emissions	7.4	32.1	17.2	21.2
Metrics and Targets	c. Climate-Related Targets	9.3	30.6	25.0	39.0

Table 1b Percentage of U.S. companies aligned with TCFD recommendations by industry

Recommendation	Recommended Disclosure	Ag., Food, & Forest	Technology and Media	Banking	Consumer Goods
Governance	a. Board's Oversight	10.2	3.0	9.7	16.9
Governance	b. Management's Role	10.2	4.5	5.8	9.9
Strategy	a. Risks and Opportunities	40.8	15.2	33	32.4
Strategy	b. Impact on Organization	18.4	27.3	27.2	16.9
Strategy	c. Resilience of Strategy	2.0	4.5	4.9	1.4
Risk Management	a. Risk ID and Assessment Processes	10.2	4.5	16.5	14.1
Risk Management	b. Risk Management Processes	14.3	4.5	18.4	14.1
Risk Management	c. Integration into Overall Risk Management	12.2	6.1	20.4	11.3
Metrics and Targets	a. Climate-Related Metrics	16.3	24.2	6.8	23.9
Metrics and Targets	b. Scope 1, 2, 3 GHG emissions	16.3	19.7	5.8	25.4
Metrics and Targets	c. Climate-Related Targets	22.4	24.2	8.7	26.8

Table 2a Percentage of European companies aligned with TCFD recommendations by industry

Recommendation	Recommended Disclosure	Insurance	Materials & Buildings	Transportation	Energy
Governance	a. Board's Oversight	61.1	32.8	28.6	47.4
Governance	b. Management's Role	50.0	35.2	12.2	38.6
Strategy	a. Risks and Opportunities	75.0	68.9	55.1	75.4
Strategy	b. Impact on Organization	61.1	44.3	49.0	57.9
Strategy	c. Resilience of Strategy	38.9	16.4	8.2	35.1
Risk Management	a. Risk ID and Assessment Processes	69.4	41.8	46.9	50.9
Risk Management	b. Risk Management Processes	77.8	39.3	40.8	49.1
Risk Management	c. Integration into Overall Risk Management	63.9	36.1	32.7	49.1
Metrics and Targets	a. Climate-Related Metrics	69.4	79.5	69.4	75.4
Metrics and Targets	b. Scope 1, 2, 3 GHG emissions	61.1	73.0	53.1	64.9
Metrics and Targets	c. Climate-Related Targets	61.1	68.9	46.9	63.2

Table 2b Percentage of European companies aligned with TCFD recommendations by industry

Recommendation	Recommended Disclosure	Ag., Food, & Forest	Technology and Media	Banking	Consumer Goods
Governance	a. Board's Oversight	31	0.0	37.7	22
Governance	b. Management's Role	19	12.5	36.2	19.5
Strategy	a. Risks and Opportunities	64.3	50.0	71.0	58.5
Strategy	b. Impact on Organization	52.4	37.5	52.2	43.9
Strategy	c. Resilience of Strategy	23.8	25.0	33.3	17.1
Risk Management	a. Risk ID and Assessment Processes	40.5	50.0	65.2	41.5
Risk Management	b. Risk Management Processes	38.1	37.5	62.3	31.7
Risk Management	c. Integration into Overall Risk Management	38.1	25.0	50.7	24.4
Metrics and Targets	a. Climate-Related Metrics	85.7	37.5	65.2	80.5
Metrics and Targets	b. Scope 1, 2, 3 GHG emissions	73.8	50.0	50.7	70.7
Metrics and Targets	c. Climate-Related Targets	71.4	62.5	49.3	63.4

4. TCFD Alignment by Firm Size

We analyze the TCFD alignment numbers by splitting the trailing 12-month revenues for European and U.S. companies into two buckets. Figure 4 shows the alignment percentages for U.S. companies, while Figure 5 shows the same information for European companies. There seems to be a clear trend showing an increased level of alignment for larger companies.

Figure 4 Percentage alignment by revenues — below \$5B and above \$5B — U.S. companies

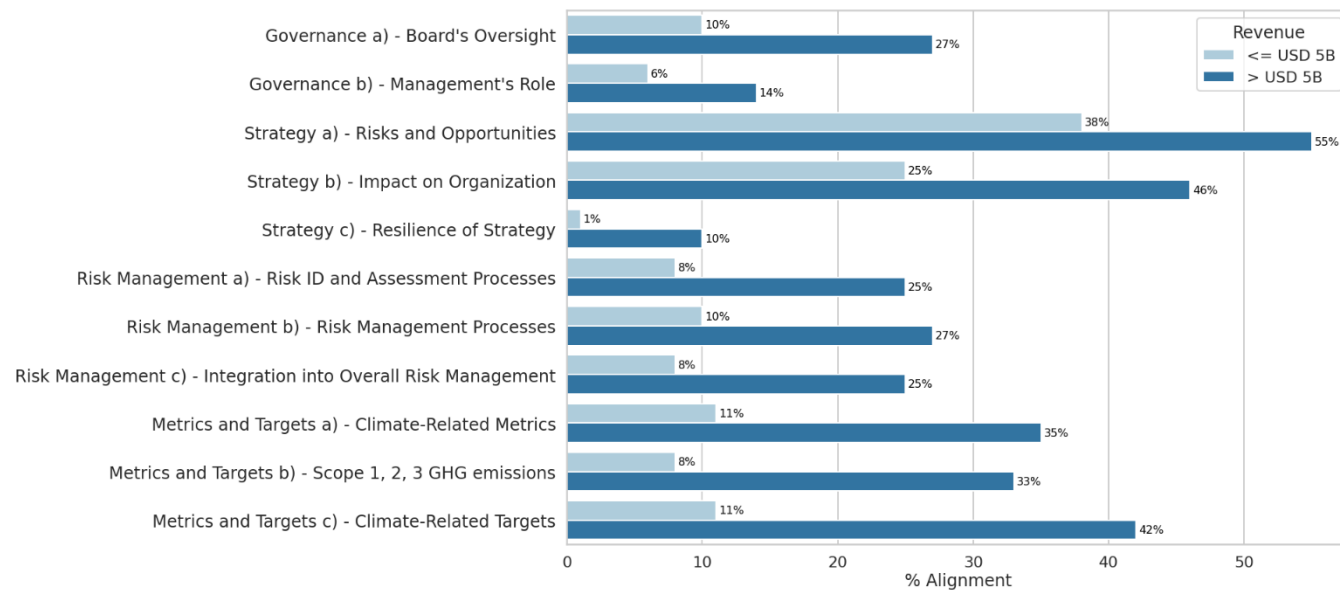
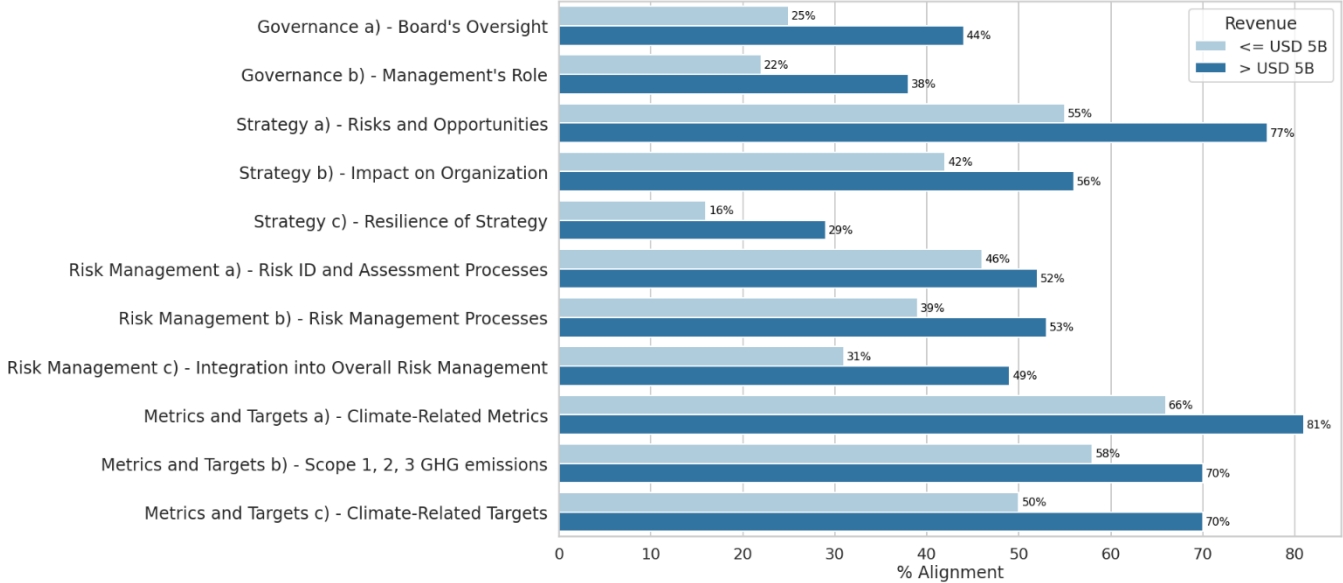


Figure 5 Percentage alignment by revenues — below \$5B and above \$5B — European companies



Appendix: AI Review Methodology

The AI-based review methodology for automatically reviewing and interpreting the content of the publicly available documents for a company includes financial filings, annual reports, integrated reports, sustainability reports, and other publicly available reports associated with companies' annual reporting or sustainability.² The AI review process involves evaluating thousands of pages of text as well as some unique challenges related to identifying TCFD-related content and the language and semantics used to describe the recommended disclosures. A significant challenge for TCFD analysis is the lack of a standardized way of reporting climate and TCFD-aligned disclosures, and the fact that different TCFD metrics (and other climate-related risk metrics) can be disclosed in different documents, across different sections and pages in company reports, and exist in different formats (PDF, HTML, scanned images, etc.). We, therefore, developed a customized AI solution that robustly processes and interprets the complexity, variety, and volume in TCFD reporting.

Our AI evaluation methodology utilizes custom automated techniques to extract and segment text paragraphs from company disclosures. These paragraphs are then filtered to include only those relevant to climate-related disclosures. A custom transformer-based³ language model trained and tuned for ESG reporting is then used to retrieve, score, and rank the passages in order of relevance to a particular disclosure. These passages are then ordered by relevance score, and the highest-scoring ones are then selected as relevant to a particular disclosure. Finally, another deep learning-based AI model determines the alignment of the selected paragraphs with a specific disclosure.

The AI review framework, as well as the AI models, are designed and trained at Moody's Analytics and fine-tuned using examples labeled by subject matter experts from V.E., a part of Moody's ESG Solutions. Active Learning (AL) techniques are employed to increase the efficiency of the data annotation process. The TCFD AI review pipeline is implemented and run on MLFabric™, a custom-designed modular, reusable, cloud-based platform developed at Moody's Analytics that operationalizes deep learning and machine learning models, allowing users to deploy and reuse AI models and AI workflows at scale. The AI Review solution leveraged Moody's MLFabric AI-as-a-service platform to scale the processing of thousands of documents for the selected population of companies to produce the final TCFD alignment results for the U.S. companies discussed here.

² TCFD. *2021 Status Report*. October 2021. https://assets.bbhub.io/company/sites/60/2021/07/2021-TCFD-Status_Report.pdf.

³ Devlin, et al., "Bert: Pre-training of Deep Bidirectional Transformers for Language Understanding," ArXiv, 2018.

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