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LANDSCAPE ANALYSIS: MEASUREMENT, REPORTING AND VERIFICATION (MRV) OF SCIENCE- BASED TARGETS

RESEARCH REPORT

NOVEMBER 2023

This report was commissioned by the Science Based Targets initiative (SBTi) and was co-authored with Ernst and Young (EY).

About the Science Based Targets initiative

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The Science Based Targets initiative (SBTi) drives ambitious corporate climate action by enabling businesses and financial institutions globally to set science-based greenhouse gas emissions reduction targets.

It was formed as a collaboration between CDP, the United Nations Global Compact, World Resources Institute (WRI), the World Wide Fund for Nature (WWF) and the We Mean Business Coalition. The SBTi's goal is to enable companies worldwide to do what climate science requires of the global economy: to halve emissions by 2030 and achieve net-zero before 2050.

We develop criteria and provide tools and guidance to enable businesses and financial institutions to set GHG emissions reduction targets in line with what science tells us is needed to keep global heating below 1.5°C.

www.sciencebasedtargets.org

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About Ernst and Young

Ernst and Young (EY) is a global organization of member firms with the purpose of *Building a better working world* by providing insights and quality services to help build trust in capital markets and economies. EY believes that a better working world is one where economic growth is sustainable and inclusive, working continuously to utilize knowledge, skills and experience to fulfil the organization's purpose and create positive change.

EY serves clients through four integrated service lines — Assurance, Consulting, Strategy and Transactions, and Tax. The global Climate Change and Sustainability Services (CCaSS) team supports clients in understanding and responding to the risks and opportunities from climate change and sustainability issues. A multidisciplinary team, CCaSS collaborates with organizations to evaluate the broader value impacts and outcomes of climate change, identifies opportunities and supports the reporting of nonfinancial performance risks to stakeholders.



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EXECUTIVE SUMMARY

BACKGROUND AND SCOPE

The SBTi develops standards, guidance and tools to enable companies and financial institutions to set climate targets. After setting targets, the SBTi requires entities to publicly disclose greenhouse gas (GHG) inventories and target progress on an annual basis following the GHG Protocol Corporate Standard's reporting requirements. However, guidance on how to account for and report progress against climate targets in a coherent, consistent and transparent way remains limited across relevant voluntary standards and regulatory frameworks. Reliance on self-reporting of progress and the absence of standardized guidance has led to widespread inconsistencies, prompting skepticism from stakeholders, including concerns relating to data quality and transparency as well as accusations of corporate

greenwashing. Acknowledging the shortcomings in the current landscape of standards and frameworks, the SBTi is undertaking research on reporting and assessment of target progress to enhance the accountability of science-based targets.

To support these plans, this paper seeks to map the existing landscape and identify leading practices for key areas of measurement, reporting and verification (MRV) of the underlying information to enable progress assessment against corporate science-based targets. This research paper informs the review of current practices in key topic areas and analyzes associated challenges under the SBTi target types.

KEY FINDINGS

The SBTi and EY consulted stakeholders, reviewed available literature, conducted desk research and analyzed data of corporate practices on MRV for science-based targets. For each topic, five assessment lenses were used to identify leading practices - consistency with targets,

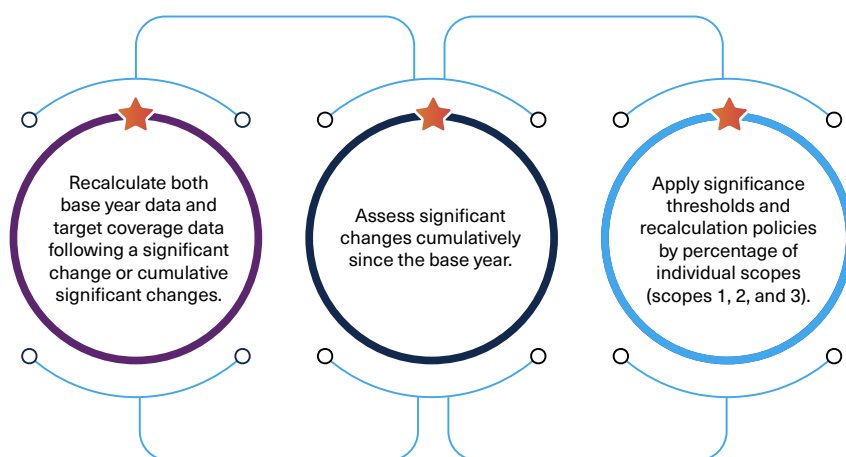
achievement, transparency, feasibility, and alignment with guidance (see *Approach for identifying leading practices* section for more details).



KEY FINDING 1

Significant changes over the course of the target period can impact the emissions disclosed by companies (e.g., a merger, acquisition, major divestment or the introduction of a different GHG accounting methodology). In 2022, roughly one-third of companies responding to the CDP Climate Change Questionnaire indicated some type of significant change and almost one-fifth indicated a methodological change. However, without clear guidance on how to address such changes in emissions data, companies and stakeholders face challenges of accuracy and comparability for progress determinations. As of July 2023, at least seven global regulations include approaches for updating data in the face of significant changes, but do not define what “significant” means. In 2023, the

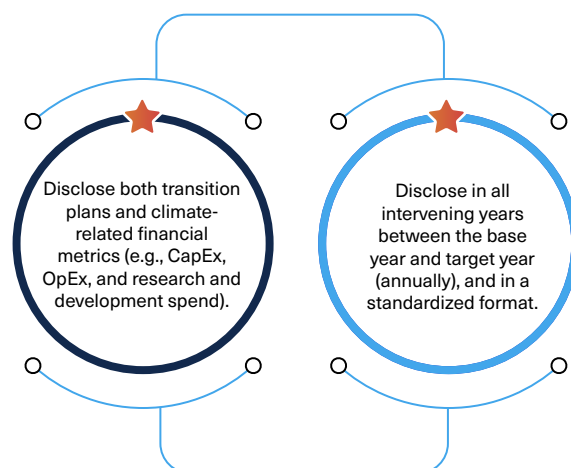
SBTi introduced a 5% threshold to define when a change is “significant” and would require updating data in a company’s emissions inventory. This standardized threshold can facilitate comparability and consistency across corporate disclosures. Identified leading practices are to:



KEY FINDING 2

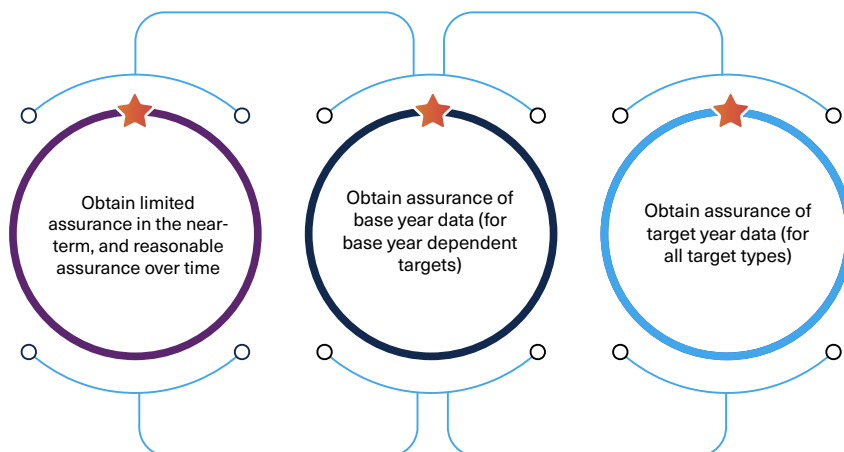
Determining company progress against targets is often difficult, given issues of emission calculation accuracy and completeness as well as delays between action and impact. **Additional metrics** of target progress (e.g., capital expenditure (CapEx), operating expenditure (OpEx), research and development spend, and transition plans) can function as early progress indicators and provide greater context around the overall approach to decarbonizing the business. Though the GHG Protocol and the SBTi have not historically addressed these alternative indicators, their prevalence in the current climate landscape is growing — at least nine global regulations and ten leading climate

frameworks encourage or require disclosure on financial metrics and/or transition plans. Identified leading practices are to:



KEY FINDING 3

Though the GHG Protocol and the SBTi do not currently require mandatory third-party assurance of metrics relating to and underlying company progress toward targets, the practice is increasingly common. In 2022, organizations responding to CDP reported obtaining assurance over 60%, 59%, and 55% of scope 1, 2, and 3 GHG emissions respectively. Now, at least seven regulations and eleven leading climate frameworks include recommendations or requirements on third-party assurance. Identified leading practices are to:



The findings and analysis on leading practices reviewed in this paper will inform and support the SBTi's upcoming work into the MRV of science-based targets.



INTRODUCTION

ADDITIONAL GUIDANCE NEEDED FOR TARGET PROGRESS

In 2018, the Intergovernmental Panel on Climate Change (IPCC), the United Nations' expert global body for assessing the science related to climate change, issued a [Special Report](#)¹ warning of the dangerous impacts of climate change if the world were to exceed a 1.5°C temperature rise. To remain below this limit would require international cooperation, including action from national and sub-national authorities, civil society and the private sector.² Given the important role of businesses in limiting global warming, the SBTi enables companies and financial institutions to set emission reduction targets in line with the latest climate science.

Since 2015, the SBTi has helped to fill the private sector decarbonization knowledge gap, enabling companies and financial institutions to set meaningful targets in line with climate science. As of September 2023, more than 3,500 companies and financial institutions have set science-based targets in line with SBTi methods and another 2,500 have committed to do so in the next two years.³ Once such targets are validated by the SBTi, it is important for companies to measure and report on progress to facilitate increased transparency and accountability. Addressing this, the United Nations' High-Level Expert Group (UN HLEG) on the Net-zero Emissions Commitments of Non-State Entities stated in their report that *"publicly tracking progress helps to build trust, showcases successful strategies and encourages other players to make ambitious commitments,"* so that there may be *"sound functioning of the market and to reduce risks."*⁴

Currently, the SBTi requires companies to publicly disclose GHG inventories and target progress annually following the GHG Protocol Corporate Standard's reporting

requirements.⁵ While the GHG Protocol was developed to standardize corporate GHG accounting and has been adopted by *"virtually every corporate GHG reporting program in the world,"* it was not originally developed for the purpose of measuring, planning and tracking target progress.⁶ The GHG Protocol has since developed a section related to target-setting; however, guidance relating to measurement and reporting of target progress is limited to carrying out *"regular performance checks"* and reporting *"information in relation to the target."*⁷ Across the climate ecosystem, there are numerous other third-party organizations that provide guidance or recommendations addressing target progress disclosures (see Appendices C, D and E for more information on these frameworks and standards).

In recent years, financial markets and regulators have shown more interest in the disclosure of climate-related information. Two of the more prominent frameworks include the Task Force on Climate-Related Financial Disclosures (TCFD) and the International Sustainability Standards Board (ISSB) International Financial Reporting Standards (IFRS).^A Proposed and emerging global regulations are aligning with and building upon TCFD and ISSB standards (Table 1). According to the research and analysis conducted for this paper, the standards lack certain target progress measurement and reporting guidance (see Appendices D and E for more information on this guidance).

^A For the purposes of this analysis, this paper evaluated the Recommendations of the Task Force on Climate-related Financial Disclosures (2017), the Task Force on Climate-related Financial Disclosures Guidance on Metrics, Targets, and Transition Plans (2021), and the IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosures (2023).

Table 1 – National and regional climate legislation alignment with TCFD, ISSB and the GHG Protocol^B

Alignment with Reporting Frameworks			
Country/Region	TCFD	ISSB	GHG Protocol
Australia ^{8,9}			
Brazil ¹⁰			
Canada ¹¹ [proposed]			
European Union ^{12, 13, 14}			
Hong Kong ¹⁵ [proposed]			
Japan ^{16,17}			
New Zealand ¹⁸			
Singapore ^{19,20}			
Switzerland ²¹			
United Kingdom ²²			
United States ²³ [proposed]			

Furthermore, climate regulations in China and India do not specifically cite the GHG Protocol, TCFD or ISSB. ^{24, 25, 26}

^B The 13 evaluated climate regulations were selected based on criteria relating to geographic distribution, economic development, climate impact, and strength of policy.

^C The Australian Prudential Regulation Authority (ARPA)'s Prudential Practice Guidance: CPG 229 Climate Change Financial Risks references the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and Technical Guidance for Calculating Scope 3 Emissions.

^D While the UK Streamlined Energy and Carbon Reporting (SECR) regulations were out of scope of the broader analysis for this paper, the reference in SECR to GHG Protocol is indicated here: https://assets.publishing.service.gov.uk/media/5de6acc4e5274a65dc12a33a/Env-reporting-guidance_inc_SECR_31March.pdf.

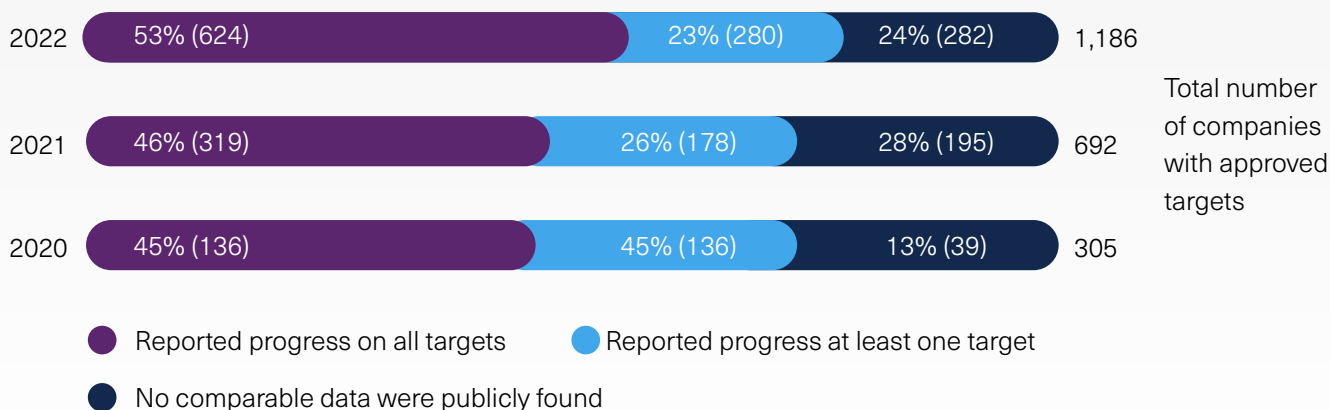
^E The US SEC's 2022 proposed rule on "The Enhancement and standardization of Climate-Related Disclosures for Investors" includes mention that "The ISSB is expected to engage in standard setting...including developing climate-specific disclosure standards based on the recommendations of the TCFD." The proposed rule goes on to ask stakeholders if an alternative reporting provision is adopted, "should that provision be structured to encompass reports made pursuant to criteria developed by a global sustainability standards body, such as the ISSB?" While the proposed rule does not directly align with the ISSB standards, it demonstrates consideration for the adoption of such standards in the future, pending comments. (See <https://www.sec.gov/rules/proposed/2022/33-11042.pdf>)

As the SBTi and other climate-related non-governmental organizations (NGOs) have provided only high-level guidance on corporate target progress measurement and disclosure, companies have reported this data in self-selected formats, platforms and metrics, resulting in

inconsistent, inaccurate and/or unverified results. A 2021 academic study of companies, reporting progress on their science-based targets, revealed that *“reporting practices across the companies assessed were highly variable and often of poor quality.”*^{27, F}

MORE THAN HALF OF COMPANIES WITH SCIENCE-BASED TARGETS FAILED TO REPORT PROGRESS ON ALL OF THEIR NEAR-TERM AND LONG-TERM TARGETS

Reporting status of companies with approved targets in 2022 (as of December 31 2022) vs 2021 (as of July 31 2021) vs 2020 (as of November 30 2020). Numbers may not add up to 100% due to rounding. See SBTi Monitoring Report 2022 for more details.



For three consecutive years, the SBTi has reviewed and disclosed company self-reported progress on science-based targets. Though reporting on progress each year is a requirement for companies that set such targets, in 2022, only 53% of companies fully reported progress on all their near- and long-term targets. The other 47% reported data that was incomplete or incomparable or did not make relevant data publicly available.²⁸ Reliance on self-reporting of progress and the absence of standardized guidance has led to widespread inconsistencies, prompting skepticism from stakeholders, including concerns relating

to data quality and transparency as well as accusations of corporate greenwashing.²⁹

Standards are needed to enhance transparency into corporate progress and achievement of science-based targets. In the words of UN Secretary General Antonio Guterres, *“We urgently need every business, investor, city, state and region to walk the talk on their net-zero promises. We cannot afford slow movers, fake movers or any form of greenwashing.”*³⁰

^F The referenced 2021 academic study evaluated 133 primary and secondary targets from 81 companies. Of 92 companies originally sampled, 2 were omitted due to mergers invalidating their targets and 9 were omitted due to a lack of sufficient target-related data.

HOW THE SBTi IS UNDERTAKING RESEARCH ON REPORTING AND ASSESSMENT OF TARGET PROGRESS

The SBTi and EY conducted stakeholder surveys and interviews to investigate current practices and pinpoint areas where additional guidance is needed. The results showed that stakeholders perceive an opportunity for the SBTi to provide standardized guidance on target progress assessments.^{G,H}

In April 2023 the SBTi updated its Corporate Manual to include recommendations aimed at enhancing the quality, usefulness and completeness of corporate reporting on targets.³¹ Furthermore, the SBTi is researching how companies achieve their targets to determine the parameters that need to be considered for robust reporting and assessment of target progress and delivery, as well as for substantiating claims of target achievement. This research will focus on two main areas:

- Measurement and reporting of target progress: aiming at establishing a framework to enable the robust, transparent and consistent accounting and disclosure of companies' progress against targets. This involves i) identifying the key factors that need to be standardized

so that there is consistency in the way companies measure and report progress against targets and ii) accounting for elements that can lead to changes in estimated and reported emissions, aside from genuine decarbonization actions, such as structural, methodological or data variations.

- Target performance: aiming at exploring the types of interventions that can enable entities to make credible decarbonization claims across different activities and emission sources.

By identifying challenges and leading practices on target progress data, this paper will support the ongoing research work that will feed into the development and revision of SBTi standards according to SBTi's procedures.

^G In September, 2022 the SBTi conducted a global survey of external stakeholders across sectors and stages of target-setting maturity relating to the current state and ambitions of corporate climate target-setting for various topics, including the Measurement, Reporting, and Verification (MRV) of science-based targets. To complement the findings, in May 2023 EY and the SBTi conducted a corporate survey across sectors and regions relating to practices and challenges on the topic. Interviews were conducted with both internal SBTi stakeholders and external stakeholders from climate-related NGOs. See Appendix A for additional information on stakeholder engagement.

^H When asked if there is a need for the SBTi to provide standardized criteria for how to assess progress towards, and achievement of targets, roughly 68% of survey respondents said yes (SBTi corporate survey, 2022). More than two-thirds of stakeholders (8 out of 13), when asked about the SBTi's role in the target verification and achievement landscape, stated that the SBTi should provide guidance to clarify and align company measurement and reporting (Interviews by EY, 2023).

OBJECTIVES

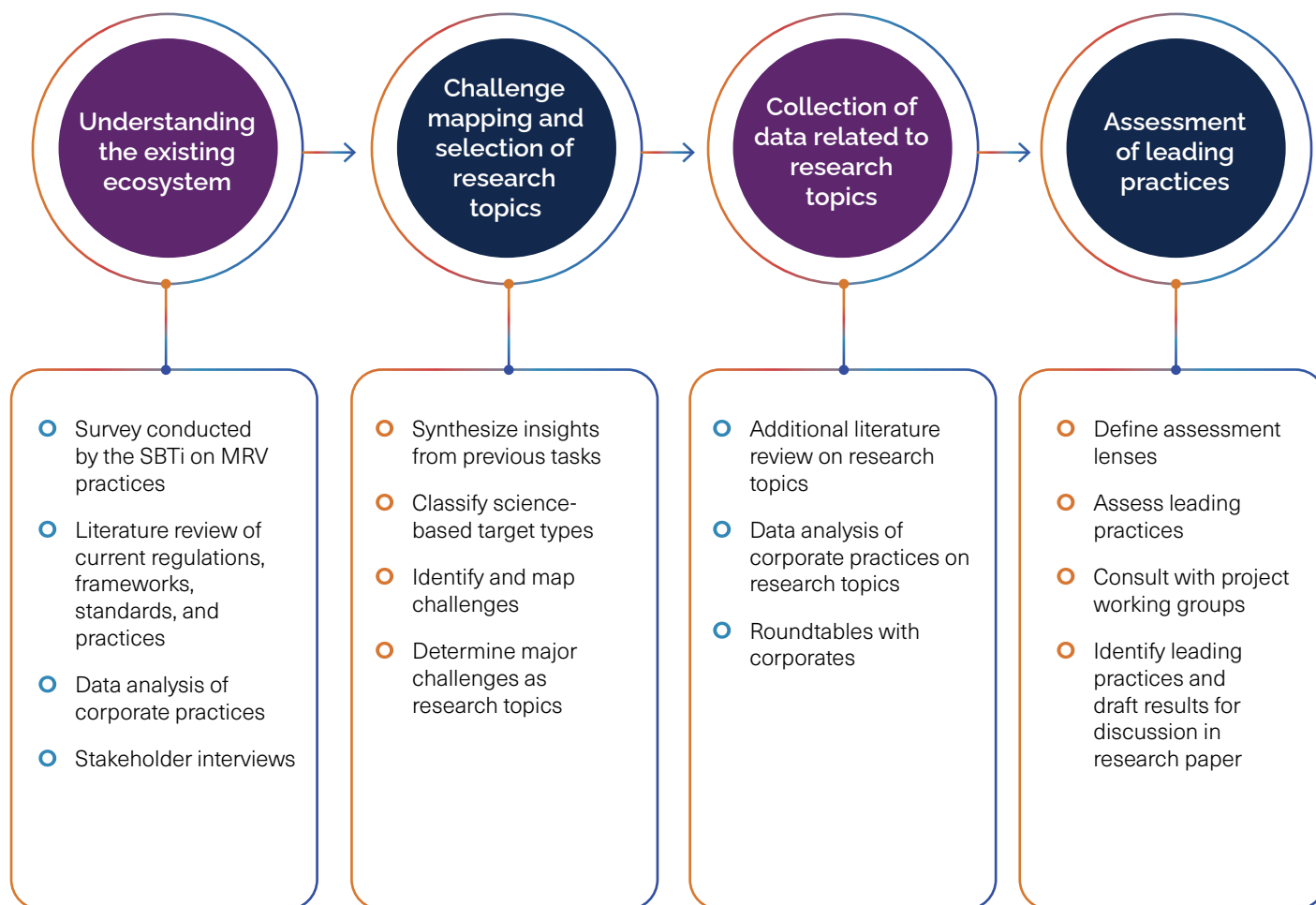
To support the SBTi's research on reporting and assessment of target progress, this paper seeks to map the existing landscape and identify leading practices for key areas of MRV of the underlying information to enable progress assessment against corporate science-based targets.

This was accomplished via:

- Identifying science-based target types and dependencies from a progress perspective
- Establishing key areas that lack clear guidance or common practice
- Exploring the current state, challenges and potential leading practices in the key areas



METHODOLOGY



Over approximately six months, the SBTi and EY conducted a broad landscape analysis through stakeholder engagement, literature review, desk research and data analysis. The inputs for this first phase, *Understanding the existing ecosystem*, included an external stakeholder survey conducted by the SBTi to investigate perspectives on MRV practices. Inputs also included interviews with internal and external stakeholders, a literature review of climate regulations, frameworks, standards and guidance (see Appendices C, D and E), as well as a data analysis of current corporate measurement and reporting practices.

The identified challenges were mapped across the SBTi's target taxonomy and categorized into sub-topics relating to MRV. To narrow these down for further exploration in

this paper, three primary topics were selected under the following criteria:

- Relevance for clarifying current lack of guidance in GHG accountability practices
- Relevance for increasing robustness and quality of progress data of science-based targets
- Relevance for enabling target progress assessment and informing forthcoming technical outputs of the SBTi related to the assessment of target achievement

Other topics deemed out of scope include the following (Table 2).

Table 2: Boundaries for the development of this research paper

Out-of-scope topics	Rationale for exclusion
Aligning corporate accounting and target-setting practices with real-world emissions reductions, or the actual reduction of GHGs in the atmosphere (e.g., in the context of the sale of high-emitting assets and utilization of market-based instruments).	To be further researched by the SBTi within a workstream on performance against targets.
Normative/strategic decisions for the SBTi, including: ○ Mechanisms for consequences of compliance or noncompliance (including expired or unmet targets). ○ The SBTi's validation cycle, including the five-year mandatory review period for validated targets (and, if necessary, recalculation and revalidation).¹² ○ Implications or changes to the SBTi's temperature classification process. ○ Preferred/required disclosure mechanism (e.g., CDP). ○ SBTi's operational process to verify target performance/achievement.	Strategic decisions relating to the operationalization of the accountability framework will be determined and implemented by alternative teams and workstreams at the SBTi, following standardized procedures.
Metrics used in cross-sector standards, including financial institutions; forestry, land and agriculture (FLAG); oil and gas; etc.	This may be covered in SBTi forthcoming and existing sector-specific guidance.
The SBTi's ongoing work defining and establishing guidance related to beyond value chain mitigation (BVCm) and neutralization as part of net-zero targets.	This may be covered in SBTi forthcoming technical outputs and sector-specific guidance relating to target progress measurement and reporting.

For each of the three identified in-scope topics, the team conducted an in-depth review of existing national and regional climate regulations as well as current climate standards and guidance,¹ data analysis and further stakeholder analysis, including corporate roundtables (see Appendix A for more details). Following an initial review, the literature and regulations deemed most relevant were included in the drafting of the current state in this paper. This additional research and engagement facilitated the deep dive on the current state and challenges explored in this paper.

This additional research enabled the identification of existing leading practices and a thorough investigation into the challenges further discussed in this paper. Using a five-lens evaluation method, identified practices were ranked and refined through stakeholder input to determine leading practices.

SCOPE

This paper focuses on three key topics, which the landscape analysis identified as currently lacking guidance and which are required for assessing target progress:

1. Addressing methodological and structural

changes: Significance thresholds for base year, target coverage, and interim progress recalculations to address maintaining data integrity and traceability over the target period due to structural or methodological changes.

2. Additional progress indicators:

Indicators of progress beyond target-requirements, such as financial metrics (e.g., CapEx, OpEx, research and development spend) and transition plans.

3. Third-party assurance:

Third-party assurance of corporate GHG emissions inventories and other target-related data, specifically whether and what type of assurance companies seek.

This paper covers the current state, challenges and leading practices in each of these three areas.

¹ This paper is limited in scope to these sources, including the 13 national and regional climate regulations and 13 climate standards and guidance.



CLASSIFYING SBTI TARGET TYPES FOR PROGRESS TRACKING

TYPES OF SBTI TARGETS

The SBTi provides guidance and validation for companies and financial institutions to set eight different target types aligned with 1.5°C or well-below 2°C scenarios and applicable to various scopes and sectors (Table 3). This is

relevant, as companies begin to consider applying leading practices related to data underlying target progress.

Table 3 – SBTi target scope and sector applicability^J

Target type	Scope	Sector
Absolute emissions reduction	All	All except Power Generation
Emissions intensity (economic or physical)	All (economic intensity targets only apply to scope 3)	All
Renewable electricity	Scope 2	All
Supplier/customer engagement	Scope 3	All
Portfolio coverage	Scope 3	Finance
Portfolio temperature rating	Scope 3	Finance
No deforestation	Scope 3	Forest, land and agriculture (FLAG)
Net-zero ^K	All	All except Finance

^J Based on the current SBTi Criteria Version 5.1, which was updated in April 2023. <https://sciencebasedtargets.org/resources/files/SBTi-criteria-v5.1.pdf>

^K Note that net-zero targets include both absolute or sector-aligned intensity targets as well as neutralization.

TARGET DEFINITIONS AND METRICS

For companies and financial institutions to disclose progress against these eight target types in a comparable and standardized way, clear definitions and assessment

metrics to track progress over time are needed (Table 4). Such definitions and metrics are provided below, as consolidated from the [SBTi Corporate Manual, Version 2.1](#).

Table 4 – SBTi targets definitions and relevant metrics in target year

Target type	Target definition	Relevant metrics in target year ¹
Absolute emissions reduction	Reduce absolute emissions X% of the base year emissions by the target year.	- Relevant scopes GHG emissions in the base year - GHG emissions for relevant scopes in the target year
Emissions intensity	Reduce emissions intensity X% of the base year emissions by the target year.	- Relevant scopes GHG emissions in the base year - GHG emissions for relevant scopes in the target year - Relevant activity value(s) in the base year - Relevant activity values in the target year
Renewable electricity	Increase active sourcing of renewables (as measured by kWh or equivalent unit of procured electricity coming from renewable sources) to X% in target year.	The kWh of procured electricity coming from renewable sources in the target year or years
Supplier/customer engagement	Increase sourcing from suppliers (or sales to customers) with science-based targets to X% in the target year. This target allows for either engagement (getting a company to set science-based targets) or switching (moving spend to a company with science-based targets).	The % of suppliers or customers by emissions or spend with science-based targets in the target year

¹ Note that for base year dependent targets, assessment in the target year will consider base year data.



Target type	Target definition	Relevant metrics in target year ^M
Portfolio coverage	Increase portion of borrowers/investees with science-based targets to X% in target year. This target allows for either engagement (getting a borrower/investee to set Science-based targets) or switching (moving spend to a company with Science-based targets).	○ The % of borrowers/investees in a metric representative of the magnitude of Financial institutions main business activities with Science-based targets in target year
Portfolio temperature rating	Decrease portfolio scope 1 and 2 temperature rating to X degrees and portfolio scope 1, 2 and 3 temperature rating to Y degrees in target year. This target allows for either engagement (getting a borrower/investee to set lower-temperature aligned targets) or switching (moving investments to a borrower/investee with lower-temperature aligned targets).	○ Portfolio temperature rating in the target year
No deforestation	Eliminate deforestation across primary deforestation-linked commodities in operations and supply chains by the target year.	○ The % of deforestation occurring related to deforestation-linked commodities in target year
Net-zero	Reduce absolute emissions X% by 2050 and neutralize remaining unabated emissions.	○ Relevant scopes GHG emissions in the base year ○ GHG emissions for relevant scopes in the target year ○ Relevant scopes GHG emissions neutralized in the target year

^M Note that for base year dependent targets, assessment in the target year will consider base year data.

TARGET ACHIEVEMENT DEPENDENCIES

The target types in Table 3 can be classified into two groups — those for which achievement is base year-dependent and those for which achievement is base year-independent (Table 5).

Base year-dependent targets define target achievement based on both the base year and the target year. For example, an absolute emissions reduction target in which Company A must reduce scope 1 and 2 GHG emissions by 60% in target year 2030 *from a base year of 2020*. If Company A's GHG inventory included base year data of

100 MT carbon dioxide equivalent (CO₂e) in 2020, then the absolute emissions reduction target would be a 60 MT CO₂e reduction by 2030.

Base year-independent targets define target achievement based on the target year alone. For example, in the case of a renewable electricity target, both Company B and Company C have the same end state of 100% renewable energy by 2030, regardless that Company B has 12% renewable energy and Company C has 31% renewable energy in their respective base years.

Table 5 – SBTi target dependencies

Target type	Base year dependent	Base year independent
Absolute emissions reduction	○	
Emissions intensity	○	
Renewable electricity		○
Supplier/customer engagement ^N		○
Portfolio coverage		○
Portfolio temperature rating ^O		○
No deforestation		○
Net-zero	○	

^N Note that suppliers/customers for this target type are determined according to base-year data, although ambition and target achievement are base-year independent.

^O Note that for portfolio temperature rating, the ambition itself may be base-year dependent, but target achievement is determined based on a temperature rating in the target year, which is base year independent.

APPROACH FOR IDENTIFYING LEADING PRACTICES

ASSESSMENT LENSES

For each key topic explored in this paper, the SBTi and EY conducted research on current practices, disclosure frameworks, proposed regulations and academic literature. Five assessment lenses were used to identify leading practices among this group (Table 6).

Table 6 – Assessment lenses

Lens	Description	Explanation
Consistency with target	Remain consistent with target criteria as defined when it was set.	Practices that met the requirements of the target when it was set. For example, requiring companies to provide lifecycle analysis of products in annual disclosures would not be <i>consistent</i> , given that SBTi has not historically required this data.
Achievement	Foster an environment in which companies are held more accountable for achieving targets, while maintaining ambition level, given issues of data quality, accuracy and timeliness.	Practices that increase the accountability of target setters in achieving their targets, while maintaining ambition level. For example, not measuring or reporting on progress throughout the target period would not foster <i>achievement</i> .
Transparency	Allow for external scrutiny by increasing clarity, simplicity and ease of public understanding of progress.	Practices that increase the capacity for public evaluation of target progress. For example, disclosing partial or incomplete data would not be considered <i>transparent</i> .
Feasibility	Allow for implementation by companies at a reasonable level of effort and cost and considering data availability. ^P	Practices that are not prohibitively resource and cost intensive. For example, requiring companies to review and recalculate their targets every month would not be <i>feasible</i> .
Alignment with guidance	Facilitate the comparison of disclosures across leading climate-related NGOs and regulatory guidance and requirements.	Practices that differ from leading climate-related NGO and regulatory guidance and requirements would not be <i>comparable</i> .
The current practices identified were ranked according to high alignment, moderate alignment, moderate misalignment and high misalignment for each of the lenses described above (see Appendix B, Table 8). ^Q The rankings were initially scored by the EY and SBTi		team and then validated with additional internal and external stakeholders. Once aligned, the team provided a quantitative value for each ranking and determined the leading practices based on those with the highest scores.

^P Note that feasibility is considered for companies in a generalized sense. Individual companies or financial institutions may find certain practices more or less feasible than the average presented herein.

^Q For the ranking exercise, all practices were weighted equally for the selection of leading practices.



ADDRESSING METHODOLOGICAL AND STRUCTURAL CHANGES

KEY FINDINGS:

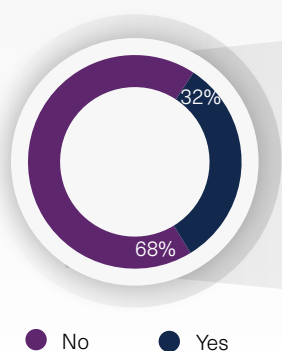
- While the GHG Protocol acknowledges that regular changes over the target period may require recalculating historical data (e.g., due to structural or methodological changes), guidance suggests that companies self-determine a threshold for doing so.
- In April 2023, the SBTi introduced a 5% recalculation threshold. However, ambiguities remain relating to interpretation of the threshold, including whether changes should be considered cumulatively over time and across scopes.
- Research found that 6 of 13 regulations explored addressing significant changes but are not prescriptive about thresholds for recalculation. Of the 13 climate-related standards evaluated for this paper, 7 address significant changes and baseline or target coverage recalculations.
- Review of CDP data revealed that in 2022, roughly 32% of respondents reported experiencing structural changes and 17% reported methodological changes. However, 46% of this group failed to recalculate base year emissions data, of which roughly half cited a lack of significance threshold as the reason.
- Through an analysis of current practices based on the five assessment lenses, leading practices were identified as follows:
 - Standardized significance threshold, particularly implementing the SBTi's 5% threshold across inventory boundary.
 - Recalculating both base year and target coverage when the threshold is met or exceeded.
 - Considering cumulative changes since the base year.
 - Considering cumulative changes by percentage of individual scopes.

CURRENT STATE

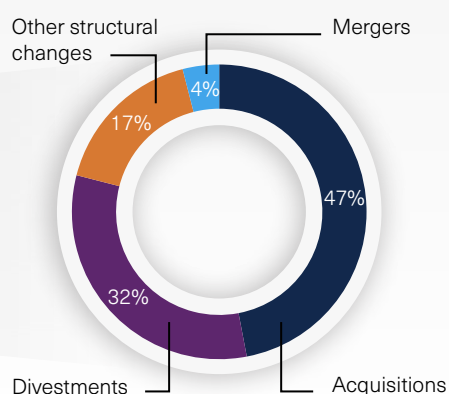
Often, companies and financial institutions experience structural or methodological changes throughout a target period that affect the measurement and accounting of target-related data.

ALMOST ONE-THIRD OF COMPANIES RESPONDING TO CDP IN 2022 EXPERIENCED STRUCTURAL CHANGES

Percentage of organizations responding to CDP that have undergone structural changes in 2022



Percentage of organizations responding to CDP that have undergone structural changes in 2022 by sub-category



Structural changes include mergers, acquisitions, divestments and other organizational changes. In 2022 alone, almost 32% of organizations responding to CDP^R indicated a structural change.³² Of the companies

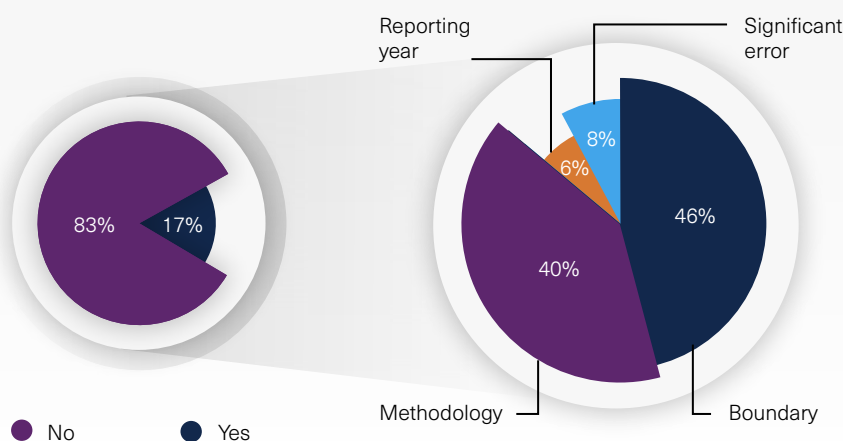
reporting structural changes, 47% reported acquisitions, 32% reported divestments, 17% reported 'other structural changes' and 4% reported mergers.³³

^R Organizations responding to CDP for the purposes of this paper are defined as those companies disclosing a ticker in their CDP Climate Change Questionnaire response and disclosing the response publicly. The analysis also only considered investor-requested companies.

ROUGHLY ONE IN SIX COMPANIES RESPONDING TO CDP IN 2022 EXPERIENCED METHODOLOGICAL CHANGES

Percentage of organizations responding to CDP that have experienced a change in methodology, boundary, or definition in 2022

Percentage of organizations responding to CDP that have experienced methodological changes in 2022 by sub-category



Methodological changes include variations in GHG accounting approaches (e.g., switching from location-based to market-based scope 2 accounting), calculation approaches (e.g., updating emission factors^s or switching from spend-based calculations to calculations with primary data), adjustments to boundary or consolidation approaches (e.g., changing from operational to financial consolidation approach), change in the definition of the reporting year (e.g., from calendar year to fiscal year), and discovery of significant error in past measurement and reporting. In 2022, roughly 17% of organizations responding to CDP indicated a change in boundary, methodology, or reporting year definition.³⁴ Of the companies reporting methodological changes, 46% reported a change in boundary, 40% reported a change in methodology, 6% reported a change in the reporting year definition and 8% reported a significant error.³⁵

In the case of such changes, historical data, such as base year emissions and target coverage, may need to be recalculated. For example, Company D sets a 60% absolute emissions reduction target for 2030 with a base year of 2018. If the base year data was originally 100 MT CO₂e, the target would require a reduction of 60 MT CO₂e in 2030. However, if Company D acquires Company E and the base year is recalculated to 200 MT CO₂e in 2018, then the target would need to be updated to require a reduction of 120 MT CO₂e in 2030.

For base year-dependent targets, historical recalculations of data are essential to maintain data integrity over the target period following significant changes. Structural and methodological changes affecting the scope of a company's emissions or other target-related data impact the consistency and reliability of base year data. Given

^s Note that emission factor updates in this context include only changes driven by methodological decisions. Emission factor updates due to real economy decarbonization activities would not contribute towards the significance threshold for recalculation.

that the required reduction in the target year is a direct trajectory from the base year value, changes that affect the data require an adjustment of base year data, if the change is significant, to remain credible. Updates to target coverage based on significant changes, on the other hand, are applicable to all target types given that they determine achievement based on target year data.

The frequency with which companies experience structural and methodological changes highlights the importance of addressing this topic. To date, the SBTi has introduced some requirements to address issues of historical base year and target coverage recalculations. In Version 4.0 of the SBTi Criteria and Recommendations, the mandatory five-year target recalculation and revalidation was introduced, with the practice being recommended in previous versions.³⁶ The most recent Version 5.1 of the SBTi Criteria states that science-based targets *“must be reviewed, and if necessary, recalculated and revalidated at a minimum every 5 years”* and additionally *“recalculated, as needed, to reflect significant changes.”* The Criteria was updated in April 2023 to introduce a maximum 5% quantitative significance threshold[†] for base year recalculations. Beyond this addition, SBTi guidance to date *“recommends companies to follow the GHG Protocol for base year recalculations.”*³⁷

The GHG Protocol tasks companies with self-determining if structural and methodological changes and the identification of significant errors should result in historical data recalculations. Specifically, the GHG Protocol states that *“companies shall develop a base year emissions recalculation policy”* and *“if applicable, the policy shall state any “significance threshold” applied for deciding on historic emissions recalculation.”*³⁸ While not discussed in the context of significant changes and base year recalculations, the GHG Protocol discusses the concept of materiality in determining how to address identified errors. The guidance states that *“while the concept of materiality involves a value judgment...as a rule of thumb, an error is considered to be materially misleading if its value exceeds 5% of the total inventory.”*³⁹

The question of how to address historical data recalculations and target coverage updates is beginning to feature in climate legislation across the globe (See Table 12 in Appendix C). An evaluation revealed that 6 of 13 national and regional climate regulations considered for this paper address significant changes in some capacity.

Of the 6 national and regional climate regulations addressing significant changes, only Australia and the European Union (EU) specifically address recalculations for base year emissions relating to climate targets. The other four geographies addressing changes in climate regulations, including China, Hong Kong, India and the United Kingdom, do not directly mention base year emissions.

The Australian National Greenhouse Gas and Energy Reporting (Safeguard Mechanism) Rule 2015 states that *“when making a baseline determination for a facility the Regulator will either specify a number as the baseline emissions number or describe a formula for the annual calculation of the baseline emissions number. A determination that is a formula will allow the Regulator to annually recalculate the baseline in line with updates.”*⁴⁰ The European Sustainability Reporting Standards (ESRS) E1 requires that companies *“from 2025 onwards, update the base year for GHG emissions reduction targets in five-year rolling periods.”* Furthermore, the guidance states that *“the baseline value and year shall not be changed unless significant changes in the target or reporting boundary occur.”*⁴¹ However, neither Australia nor the EU’s climate regulations define *“significant changes”* in this context. Creating guidance, such as through the SBTi’s 5% determination, may help to address this uncertainty. Many of the regulations in Table 6 also indicate that companies should provide an explanation or rationale when a change has occurred as to why this was the case and what specifically changed.

Legislation is increasingly turning to existing climate-related NGO standards for guidance on recalculations. Of the 13 nations and regions considered for this

[†] Note that significance thresholds in this context apply to net changes (as opposed to absolute changes).



paper, 11 reference, or plan to reference, the TCFD recommendations. The TCFD recommendations align with the SBTi's current guidance, stating that *"organizations should have a clear process for reviewing climate-related targets, at least every five years, and updating as necessary"* so that there is continued relevancy and efficacy.⁴¹ Of the 13 countries and regions evaluated, six reference, or plan to reference, ISSB standards. The ISSB standards state that *"an entity shall disclose information about its performance against each climate-related target and an analysis of trends or changes in the entity's performance."*⁴² The standards also state that *"if an entity redefines or replaces a metric [or target] in the reporting period, the entity shall: (a) disclose a revised comparative amount, unless it is impracticable to do so; (b) explain the changes; and (c) explain the reasons for those changes, including why the redefined or replacement metric provides more useful information."*⁴³

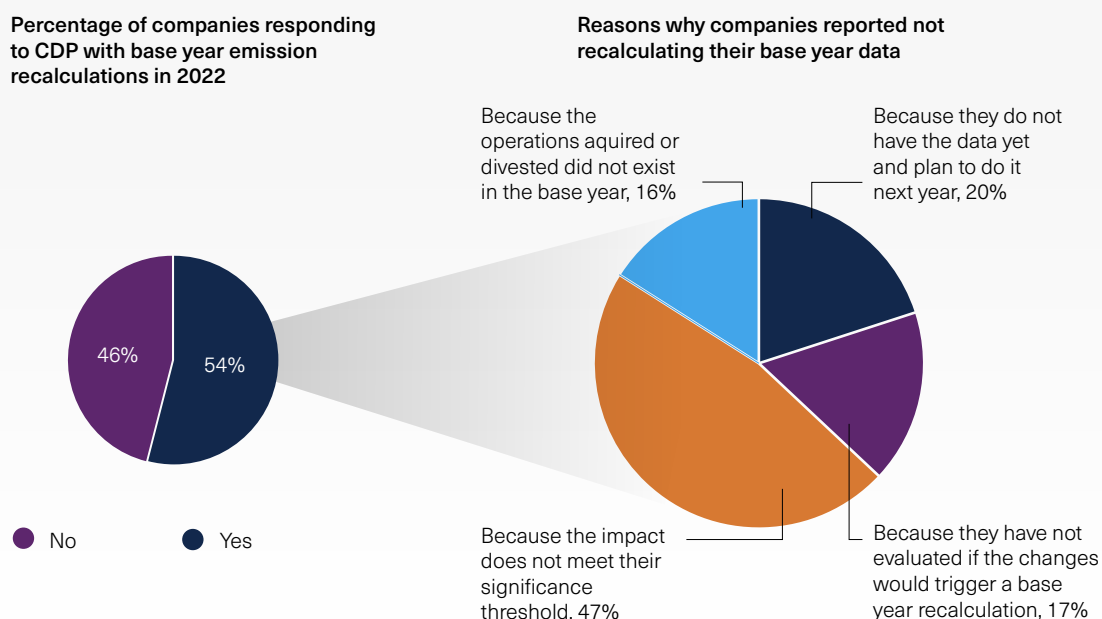
Additional leading global climate organizations similarly recommend or provide guidance relating to significant

changes and recalculations of base year data. Of the 13 climate-related NGO standards evaluated for this paper, 7 address significant changes and baseline or target coverage recalculations (see Table 15 in Appendix D). The Partnership for Carbon Accounting Financials (PCAF) standard specifically references the GHG Protocol's guidance for companies to establish a base year recalculation policy so that there is *"consistency, comparability, and relevance of the reported GHG emissions data over time,"* including a specific significance threshold.⁴⁴ CDP, the Glasgow Financial Alliance for Net-zero (GFANZ) and the International Organization for Standardization (ISO) address significant changes and base year recalculation in respective guidance.^{45, 46, 47} The UN Net-Zero Asset Owner Alliance (UN NZAOA), on the other hand, includes target coverage recalculation due to mergers and acquisitions, but does not address base year data specifically.⁴⁸



CHALLENGES

ALMOST HALF OF COMPANIES RESPONDING TO CDP IN 2022 EXPERIENCING STRUCTURAL AND/OR METHODOLOGICAL CHANGES DID NOT RECALCULATE THEIR BASE YEAR DATA



According to CDP data in 2022, roughly 46% of companies that indicated a structural, boundary, methodology or reporting year change did not recalculate base year data for their emissions inventories. Of this group, less than half indicated that they did not recalculate because the change did not meet their significance threshold.⁵⁰ Despite GHG Protocol guidance, many companies are not considering significance thresholds to recalculate their base year

emissions after a change, with 53% of companies failing to use a threshold. Participants in a corporate roundtable hosted by EY and the SBTi conducted for this paper indicated hesitancy from finance functions and senior leadership when facing potential recalculations, as these functions could incorrectly perceive restatements as evidence of mistakes, instead of a standard process that “ensures data consistency over time.”⁵¹



When discussing challenges relating to significant changes and associated recalculation thresholds, participants in a corporate roundtable hosted by EY and the SBTi on this topic noted that the GHG Protocol's guidance giving companies discretion over their own policies leaves room for uncertainties and inconsistencies in practice. Evidence from the SBTi's corporate survey similarly highlighted uncertainties relating to the interpretation of the SBTi's new 5% significance threshold for recalculation.^U For example, if a company undergoes two changes that are both less than the 5% threshold but cumulatively exceed 5%, companies face uncertainties of whether to recalculate or not. Additional questions from companies include whether changes should be evaluated against a threshold in all intervening years between the base year and target year (annually) or at other intervening milestone years throughout the target period.⁵²

Not only are there uncertainties relating to the application of the threshold, but also about what changes should trigger recalculations in the first place and the implications of those decisions. For example, this can happen when a company that is on track toward its science-based targets acquires another company that has not historically focused

on emissions reductions. In this case, a recalculation of base year data and target coverage would hinder the company's progress toward achieving its target. This might disincentivize a company with stronger climate policies from certain less mature entities in its acquisition plans. However, this may also incentivize companies to develop stronger climate practices to become more attractive for potential acquisitions.

Another relevant challenge is the feasibility of obtaining historical data necessary for recalculations. For example, in the case that a company switches from spend-based data to primary data, the company may not have access to primary data from previous years to conduct the recalculation. Another example could occur when one company acquires another. If the acquired company had not previously collected emissions or other relevant target-related data, the necessary historical data may not be available for the recalculation.

Sector-specific targets, such as those in the FLAG sector, require that GHG emissions inventories are to be separated for FLAG and non-FLAG emissions. As such, significant changes may affect both FLAG or non-FLAG emissions.

^U The SBTi's 2022 corporate survey asked respondents about the most relevant challenges to reporting progress towards science-based targets, of which 41% selected guidance being unclear on what is expected to be reported.

LEADING PRACTICES

Research demonstrates that recalculations of historical data, particularly base year data, should occur after structural or methodological changes to facilitate accurate and transparent measurement and reporting of target progress and achievement data. However, ambiguity and lack of consistency still exist, specifically for the following practices relating to significance thresholds for recalculation:

- Type: none, company-determined or standardized
- Subject of recalculation: recalculating only base year and target coverage, or calculating base year, target coverage and all intervening years
- Applicability over time: each change considered independently, cumulative changes considered over one year, or cumulative changes considered across years since the base year^v
- Applicability to scope coverage: changes considered by total of emission inventory or changes considered by percentage of individual scopes

Following the ranking methodology established in Table 8, which utilizes the assessment lenses identified in Table 6,^w four leading practices have been identified, relating to significance thresholds for recalculation:

01

Following standardized significance threshold(s) (e.g., the SBTi's 5% significance threshold)

02

Recalculating both base year and target coverage

03

Considering cumulative changes since the base year

04

Considering significance thresholds by percentage of individual scopes (scope 1, 2 and 3)

^v In this context, non-cumulative is defined as considering significant changes independently when comparing with a significance threshold for recalculation; cumulative within one year is defined as considering significant changes summed for one year when comparing with a significance threshold for recalculation; cumulative across years since the base year is defined as

considering significant changes summed for all years since the base year calculation when comparing with a significance threshold for recalculation.

^w See Appendix B.



EXAMINING ADDITIONAL METRICS

KEY FINDINGS:

- Currently, the SBTi does not provide detailed guidance relating to the disclosure of financial indicators or transition plans for companies. The GHG Protocol similarly does not address transition plans, but does discuss “*capital investments*” in target-setting.
- Of 13 national and regional climate legislations evaluated for this paper, 9 mention the disclosure of alternative indicators, including transition plans and financial metrics. Of the 13 climate organizations evaluated for this paper, 9 included guidance for transition plans and 10 included guidance for financial indicators.
- Review of CDP data revealed that in 2022, roughly 32% of companies reported strategic alignment with a transition plan of a 1.5°C world. 38% of companies also indicated the inclusion of financial accounting metrics as part of their transition.
- Through an analysis of current practices based on the five assessment lenses, leading practices were identified as follows:
 - Disclosing transition plans
 - Disclosing climate-related financial metrics (e.g., CapEx, OpEx and research and development spend)
 - Disclosing in a standardized format (i.e., aligned across guidance and regulations in the market)
 - Disclosing in all intervening years between the base year and target year (annually)

“While we have invested significant expenditures into emission reduction projects and research and development, our annual disclosures of target progress fail to take this into account, making it look like we are much further behind than we actually are.”
– Stakeholder comment

CURRENT STATE

When calculating progress toward targets, companies often face challenges relating to the accurate estimation of emissions and the delay between actions and actual emissions impacts. Though companies with science-based targets are required to disclose GHG inventories annually, this data may not reveal the full story of a company’s efforts toward reducing emissions. For

example, if a company invests CapEx into projects that will develop emissions reductions at some point in the future, such as solar panel installation, this progress would not be reflected in a current year GHG inventory. A 2022 white paper from the Organisation for Economic Co-operation and Development (OECD) highlights the need to consider additional indicators, stating:

“Over time, indicators on the actual performance against corporate targets will become more essential to evaluate actual progress. In order to provide a more nuanced perspective, to include credibility considerations, and to link more closely to real-economy actions, there is also a need to look beyond GHG emission-based metrics only.”⁵³

Non-emissions and implementation-oriented metrics can provide an early indication of climate actions that entities are taking towards their targets. Findings from CDP data analysis, stakeholder engagement and SBTi survey results indicate that, while there are numerous alternative indicators, companies are most frequently disclosing financial metrics (CapEx, OpEx, research and development spending) and transition plans. In the SBTi’s 2022 corporate survey, 15% of respondents reported that they evaluate CapEx deployment in line with target delivery

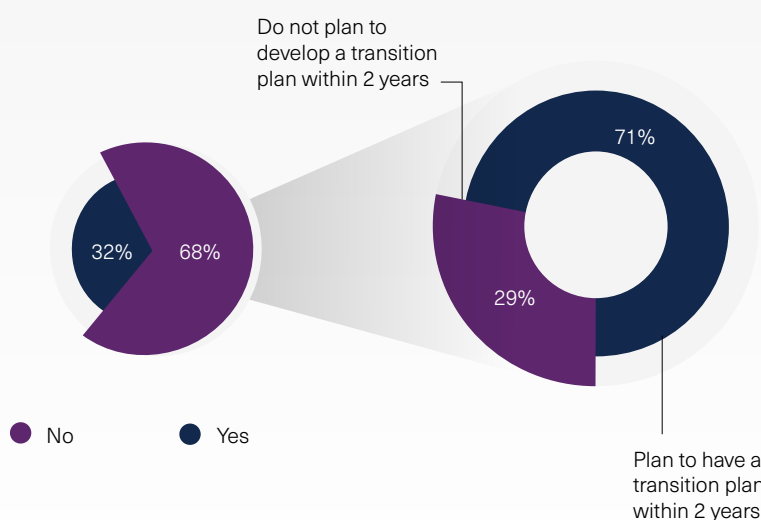
when assessing if they are on track for meeting their emission reduction targets.⁵⁴ When asked in the same survey how companies should demonstrate progress against targets, 47% of survey respondents indicated transition plans, including an expected trajectory and/or investments in place to achieve their target, as a relevant indicator.⁵⁵ “Disclosures by companies responding publicly to CDP further indicate transition plans are already being considered by many.

ROUGHLY ONE-THIRD OF COMPANIES RESPONDING TO CDP IN 2022 INDICATE STRATEGIC ALIGNMENT WITH A TRANSITION PLAN TO A 1.5°C WORLD

OF COMPANIES WITHOUT TRANSITION PLANS, ROUGHLY THREE-FOURTHS PLAN TO HAVE ONE WITHIN 2 YEARS

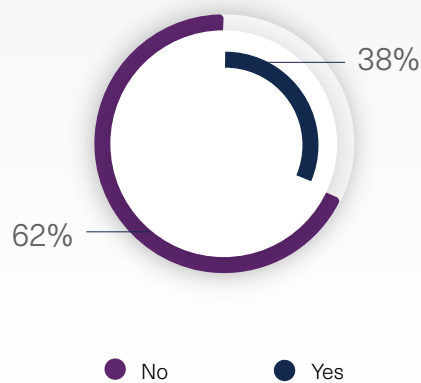
Percentage of companies responding to CDP indicating strategic alignment with a transition plan to a 1.5-degree world in 2022

Percentage of companies responding to CDP without a transition plan who plan to have one within 2 years in 2022



OF COMPANIES RESPONDING TO CDP IN 2022, 38% IDENTIFY SPENDING/REVENUE IN LINE WITH THEIR 1.5°C TRANSITION

Percentage of companies responding to CDP that identify spending/revenue in alignment with the transition to a 1.5-degree world in 2022



38% of companies indicated that they identify spending/revenue in their financial accounting aligned with the organization's transition to a 1.5°C world.⁵⁷

However, the SBTi does not currently require or provide detailed guidance on the disclosure of financial indicators or transition plans for companies. Instead, the SBTi's Corporate Manual states that *"companies are encouraged to develop comprehensive and actionable transition plans which indicate corporate actions that will be undertaken to align to their net-zero pathway and meet all climate targets."*⁵⁸

The GHG Protocol similarly does not address transition plans, but does discuss certain financial indicators. Specifically, the guidance states that *"long-term targets... facilitate long-term planning for large capital investments for GHG benefits."* When describing how to decide on the target ambition when setting a target, the GHG Protocol recommends that companies take into account "capital investments."⁵⁹



National and regional climate legislations have begun to include additional indicators for disclosure. Of 13 national and regional climate legislations evaluated for this paper, 9 mention the disclosure of alternative indicators, including transition plans and financial metrics (see Appendix C, Table 13). Specifically, guidance from Australia, Brazil, the EU, Hong Kong, India, New Zealand, Switzerland, the UK and the US all include transition plan disclosures in climate-related regulations or proposed regulations.⁶⁰⁻⁶⁷ Furthermore, climate-related regulations in the EU, India, New Zealand, the UK and the US include CapEx, OpEx and/or research and development spend.⁶⁸⁻⁷²

Additionally, leading global climate NGOs similarly recommend or provide guidance relating to transition plans and financial metrics. A 2022 assessment of voluntary net-zero initiatives determined that 79% of climate NGOs recommend the disclosure of a decarbonization strategy or transition plan to support a net-zero target.⁷³ Of the 13 climate NGOs evaluated for this paper, 9 included disclosure recommendations or guidance for transition plans (see Appendix D, Table 16) and 10 included disclosure recommendations or guidance for financial indicators (see Appendix D, Table 17).^x

The TCFD recommendations, which are referenced by 11 out of 13 regulatory standards assessed, specify the *“types of climate-related metrics that all organizations should report,”* which include:

- Climate-Related Opportunities: *“Proportion of revenue, assets, or other business activities aligned with climate-related opportunities”*
- Capital Deployment: *“Amount of capital expenditure, financing, or investment deployed toward climate-related risks and opportunities”*⁷⁴

The TCFD goes on to state that the recommendations

“encourages organizations to disclose key information from their transition plans as part of their disclosure of climate-related financial information,” including the following:

- *“current GHG emissions performance;*
- *impact on businesses, strategy, and financial planning from a low-carbon transition; and*
- *actions and activities to support transition, including GHG emissions reduction targets and planned changes to businesses and strategy”*⁷⁵

The ISSB standards, which 7 of 13 regulatory standards and guidance reference, state that “an entity shall disclose quantitative and qualitative information about: ...

- i. its investment and disposal plans (for example, plans for capital expenditure, major acquisitions and divestments, joint ventures, business transformation, innovation, new business areas, and asset retirements), including plans the entity is not contractually committed to; and
- ii. its planned sources of funding to implement its [sustainability] strategy”⁷⁶

^xThe 2022 assessment evaluated 33 net-zero initiatives, of which 26 recommended the disclosure of a decarbonization strategy or transition plan.



CHALLENGES

As previously described, numerous countries have developed regulations relating to the development and disclosure of transition plans. Similarly, climate-related NGOs have published varying standards, guidance and frameworks detailing what constitutes a credible transition plan. Given such variety, uncertainties remain about the definition of a transition plan, what should be included, and how guidance should be interpreted. However, recent efforts by climate-related NGOs and regulatory standards are moving toward convergence in the market around standardized definitions and interpretations (See Appendix C, Table 13 and Appendix D, Table 16).

Climate-related financial metrics are also inconsistently defined, and companies may differ in their interpretations of what should be included in climate-related OpEx, CapEx, or research and development spend. For example,

one company may interpret CapEx spend on a new digital procurement management system that also captures environmental data to be 100% climate-related, while another company would claim only 50% of that investment to be climate-related, and yet another may only claim 5%. Without standardized definitions, risks emerge relating to the accuracy, reliability and comparability of this data.

Furthermore, financial metrics may contain confidential or proprietary information. This can limit what companies are willing and able to disclose relating to CapEx, OpEx, and research and development spend. Stakeholders in the EY and SBTi corporate roundtables noted already experiencing pushback from finance and accounting departments related to the disclosure of climate-related financial metrics.

LEADING PRACTICES

Current state research conducted for this paper identified numerous practices relating to the disclosure of additional metrics. Variations include the following:

- Type: transition plans, financial indicators (CapEx, OpEx, research and development spending), or none
- Format: standardized disclosure^Y or company-determined format
- Applicability over time: in all intervening years between the base year and target year (annually), intervening milestone years or company-determined frequency

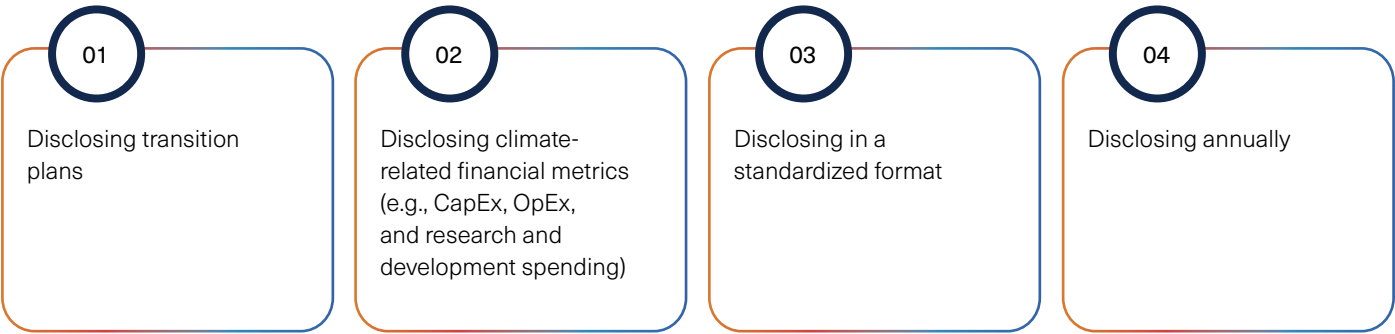
^Y Standardized disclosures are defined as those which are aligned with existing regulatory or climate-related NGO guidance or requirements. They follow consistent and repeatable reporting practices and guidance and may be sector-specific. Note that this paper does not prescribe a specific framework to standardize around for transition plans or financial indicators.



Following the ranking process established in the *Identifying leading practices* section of this paper and further described in detail in Appendix B Table 10, additional indicators are determined to be generally inconsistent with targets as they were set (see consistency

lens), given that these requirements have not historically been in place. As such, the implementation of such disclosure requirements or recommendations aligned with standardized frameworks in the market are a strategic consideration for the SBTi.

Looking at the other four lenses, the ranking methodology indicates four leading practices relating to additional metrics of progress considered for this paper:



ASSURING TARGET-RELATED DATA

KEY FINDINGS:

- Currently, the SBTi recommends, but does not require assurance of GHG emissions data. Similarly, the GHG Protocol does not require assurance of GHG data.
- Research found that 7 of 13 climate disclosure regulations considered for this paper included assurance recommendations or requirements over climate-related data. Of the 13 guidelines and standards evaluated for this paper, 11 included recommendations or requirements related to third-party assurance of GHG emissions data and 6 included disclosure recommendations or guidance related to third-party assurance of climate target-related data.
- Approximately 60%, 59% and 55% of organizations responding to CDP reported obtaining assurance over scope 1, 2, and 3 GHG emissions respectively. Reporting companies also obtained assurance over other target-related data, including 21% that obtained assurance over year-over-year changes in emissions, 9% that obtained assurance over progress against emission reduction targets, and 3% that obtained assurance over financial or other base year data used to set science-based targets.
- Through an analysis of current practices based on the five assessment lenses, leading practices were identified as follows:
 - Obtain limited assurance initially, and reasonable assurance over time.
 - Obtain assurance of base year data (for base year dependent targets).
 - Obtain assurance of target year data (for all target types).

CURRENT STATE

After calculating metrics relating to and underlying company progress toward science-based targets, companies and financial institutions may obtain third-party assurance of such target-related data.^z

Without assurance, companies may report inaccurate, incomplete and unreliable data, which would impact the validity of target progress and achievement. Third-party assurance may also increase company and stakeholder confidence in such data. On this topic, the OECD states:

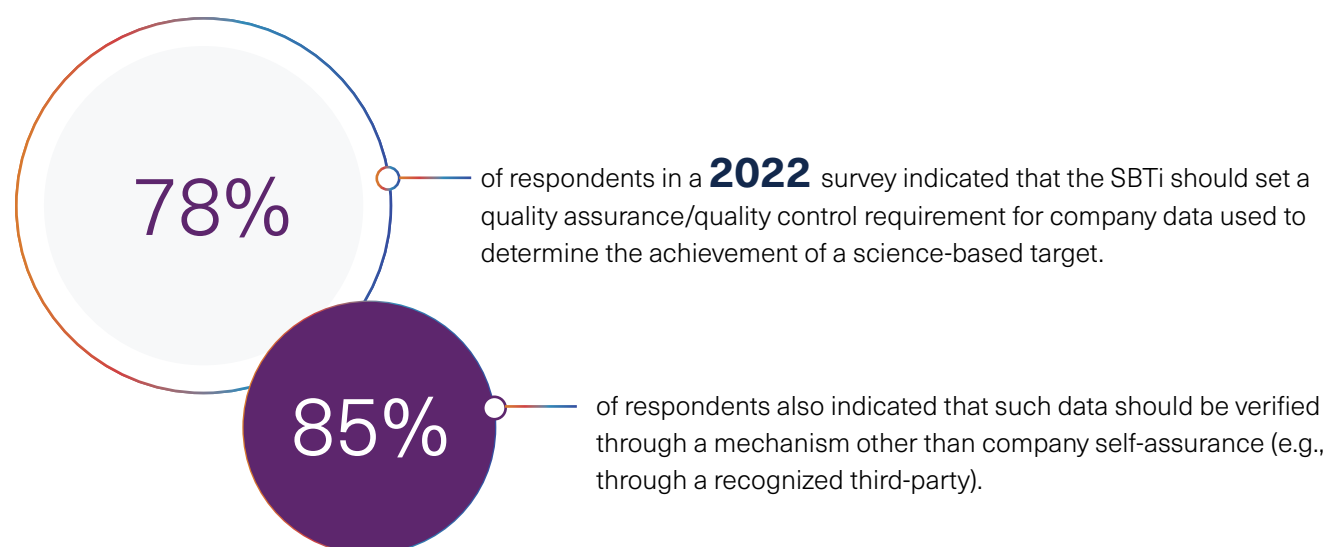
*"A lack of data availability and consistency, even for corporate-related assets where methodologies are available, continues to challenge climate-alignment assessments. Reporting standards and third-party data verification helps improve this."*⁷⁷

Currently, the SBTi recommends but does not require "verification and assurance of GHG emissions data," and does not address assurance of other target-related data (e.g., renewable electricity procurement).⁷⁸ Given that the role of assurance is to verify data alignment with specified criteria, this section focuses on the practices of assurance rather than the broader topic of data quality.

Similarly, the GHG Protocol does not require the assurance of GHG data. Instead, the GHG Protocol's Corporate Accounting and Reporting Standard specifies that when applicable, companies should disclose "an outline of any external assurance provided and a copy of any verification statement, if applicable, of the reported emissions data."⁷⁹

Research indicates that the market has a strong preference for an assurance requirement. 78% of respondents in a 2022 survey indicated that the SBTi should set a quality assurance/quality control requirement for company data used to determine the achievement of a science-based target.⁸⁰ 85% of respondents also indicated that such data should be verified through a mechanism other than company self-assurance (e.g., through a recognized third-party).⁸¹

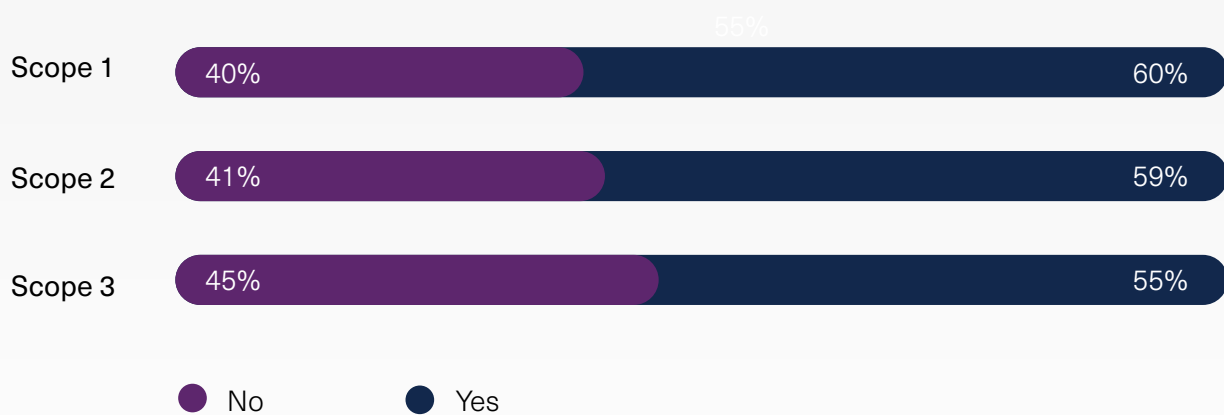
"The SBTi should consider adding an external assurance requirement for target data. Most companies are already doing it and it will help to increase the credibility of achievement claims."
– Stakeholder comment



^z Note that assurance of target-related data refers to assurance of data underlying assessments of target progress in this context. The targets themselves are not being assured. For example, assurance of target-related data for an absolute emissions reduction target may cover scope 1, 2, and 3 GHG emissions data.

MORE THAN HALF OF COMPANIES RESPONDING TO CDP IN 2022 OBTAIN ASSURANCE OVER SCOPE 1, 2, AND/OR 3 GHG EMISSIONS DATA

Percentage of companies responding to CDP that obtained assurance over scope 1, 2 & 3 emissions data in 2022



When engaging directly with internal and external stakeholders on the topic, EY interviews found that 88% of stakeholders agreed that the SBTi should set a third-party assurance requirement for target data.⁸²

Third-party assurance has become common practice for corporate GHG accounting. Approximately 60%, 59% and 55% of organizations responding to CDP reported obtaining assurance over reported scope 1, 2 and 3 GHG emissions, respectively.⁸³

Reporting companies also obtained assurance over other target-related data, including 21% that obtained assurance over year-over-year changes in emissions, 9% that obtained assurance over progress against emission reduction targets, and 3% that obtained assurance over financial or other base year data used to set science-based targets.⁸⁴

Assurance over base year data is particularly relevant for base year-dependent targets. When considering leading practices of base year data, an understanding of third-party assurance, including both limited and reasonable, is required (Table 7). As detailed below, reasonable assurance constitutes a more thorough evaluation of the data assessed, which requires additional company resources and, therefore, may impact the feasibility of obtaining reasonable assurance.

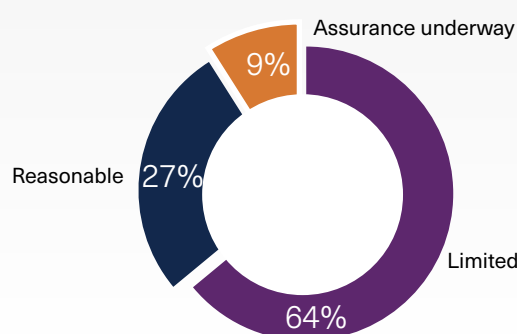


Table 7 – Limited versus reasonable assurance⁸⁵

	Limited assurance	Reasonable assurance
Classification	Review	Examination
Definition	Express a conclusion in a written report about whether the assurance provider is aware of any material modifications that should be made to the subject matter for it to be in accordance with [or based on] the criteria.	Express an opinion in a written report about whether the subject matter is in accordance with [or based on] the criteria in all material respects.
Primary general procedures	○ Inquiry and analytical procedures. ○ Limited risk-based/judgmental sampling.	○ Audit-level evidence through inquiry, physical inspection, observation, third-party confirmations, examination, analytical procedures, and other procedures. ○ Measurement uncertainty: additional scrutiny on estimations, assumptions and methodologies. ○ Additional procedures around completeness and accuracy of information provided by the entity. ○ Substantive testing, including statistical sampling.

ALMOST TWO THIRDS OF COMPANIES RESPONDING TO CDP IN 2022 OBTAINED LIMITED ASSURANCE AND ONE-FOURTH OBTAINED REASONABLE ASSURANCE OVER SCOPE 1 GHG EMISSIONS DATA

Type of assurance obtained over scope 1 data by companies responding to CDP in 2022



Of the companies responding to CDP that reported obtaining assurance over their scope 1 data, roughly 64% obtained limited assurance and 27% obtained reasonable assurance.⁸⁶

At the national and regional level, regulatory bodies are increasingly recommending or requiring assurance, as demonstrated by 7 of the 13 climate disclosure regulations considered for this paper (see Appendix C, Table 14). Specifically, regulation in New Zealand requires limited assurance, while regulation in India requires reasonable assurance.^{87,88} Both the US and EU include a phased approach, starting with limited assurance and ultimately requiring reasonable assurance.^{89,90} Regulations in Australia, Hong Kong and Singapore, on the other hand, do not specify between limited and reasonable assurance.^{91,92,93}

Leading global climate organizations have joined the call for third-party assurance of climate data. Of the 13 climate-related NGO guidelines and standards evaluated for this paper, 11 included recommendations or requirements related to third-party assurance of GHG

emissions data (see Appendix D, Table 18) and 6 included recommendations or requirements related to third-party assurance of climate target-related data (see Appendix D, Table 19).

The TCFD recommendations and ISSB standards emphasize the importance of verification of climate data. One of the *“elements to consider”* within the TCFD recommendations for transition plans is assurance. Specifically, Principle 6 of the TCFD’s Principles for Effective Disclosures is that *“disclosures should be reliable, verifiable, and objective.”*⁹⁴ Elaborating further on this principle, the TCFD states that *“disclosures should be defined, collected, recorded, and analyzed in such a way that the information reported is verifiable to ensure it is high quality.”*⁹⁵ The ISSB standards state that *“the usefulness of sustainability-related financial information is enhanced if it is comparable, verifiable, timely and understandable.”*⁹⁶ ISSB standards also specify that *“an entity shall prioritize Scope 3 greenhouse gas emissions data that is verified. Verification can provide users of general purpose financial reports with confidence that the information is complete, neutral and accurate.”*⁹⁷

CHALLENGES

Assurance represents an important tool in the verification of measured and disclosed data; however, it is important to note that the role of assurance is to confirm that data calculations align with the criteria specified by the company, not to improve the specificity of data. The stakeholders engaged throughout this research paper noted that data with assurance may not necessarily be more specific than unassured data. The GHG Protocol’s Scope 3 Calculation Guidance presents a hierarchy of data in terms of specificity, with product-level data being the most specific and corporate-level data being the least.⁹⁸ If, for example, one company obtained assurance over an inventory calculated using corporate-level data

and another company reported an inventory calculated using product-level data and did not receive assurance, the product-level inventory would be more specific, but it would not have the added confidence of completeness and accuracy that the less-specific assured corporate-level inventory has.

Stakeholders expressed concerns about the time and cost of hiring a third-party assurance provider and allocating responsibility to employees to manage the process.^{AA} This was a particular concern for smaller companies, such as small- and medium-sized enterprises (SMEs), and those headquartered in less-developed economies.^{AB}

^{AA} Companies are not currently required to obtain assurance over climate-related data in the status quo. As such, it is important to note that such concerns of feasibility are speculative relating to future requirements that may be imposed.

^{AB} The SBTi’s 2022 corporate survey asked respondents how assurance requirements for data underlying progress and achievement should differ. Responses included, in order of priority: 41% who selected the type of emissions being assured (e.g., scopes 1 and 2 versus scope 3), 39% who selected company type (SME, corporate, or financial institution), 39% who selected company size (by revenue), 38% who selected company size (by GHG inventory), and 14% who selected company type (by public or private status). 24% of respondents indicated a preference for no differentiation of assurance requirements.

Stakeholders also raised concerns relating to the assurance of scope 3 GHG emissions data, given questions relating to the availability of primary data and the more complicated methodologies required for calculations. For example, for FLAG targets, access to data that is representative of a company's value chain operations can be particularly challenging.

During the corporate roundtable hosted by EY and SBTi on this topic, representatives from companies also expressed

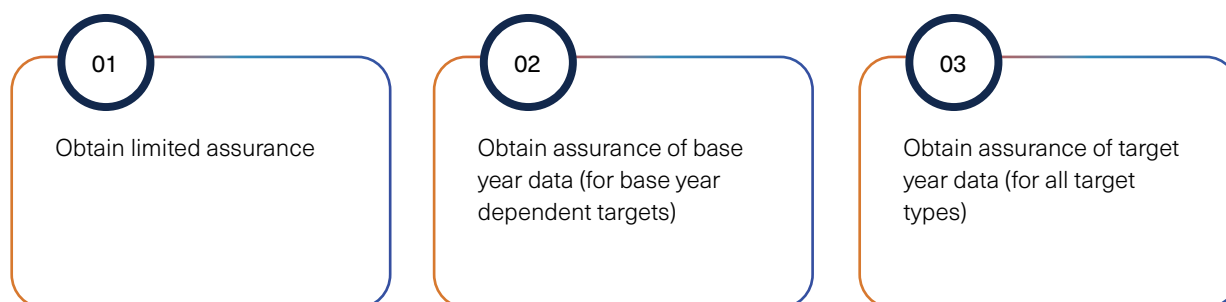
that allocating significant resources to assurance will make less available for mitigation activities. In order to address such concerns, certain regulations have implemented phased approaches for requiring assurance, starting with limited assurance only over scope 1 and 2 emissions, and progressing to reasonable assurance over scope 1, 2, and 3 emissions over time. Such a staggered approach may provide companies with the opportunity to allocate the necessary resources before such requirements are in place.

LEADING PRACTICES

The verification of metrics relating to and underlying company progress toward science-based targets will likely result in increased credibility of target progress and achievement claims. Specific assurance considerations include the following:

- Type: limited, reasonable or none
- Applicability over time: base year, target year, intervening milestone years or all intervening years (annually)

Following the ranking methodology established in Table 11^{AC}, three leading practices have been identified relating to assurance:



As the practice of third-party assurance becomes more commonplace, both voluntarily and via regulatory requirements, obtaining assurance annually and increasing the assurance level from limited to reasonable can be considered leading practice over time.

Similar to the disclosing of additional metrics, requirements for third-party assurance have not been in place to date. As such, there are trade-offs relating to target consistency to be considered when implementing these leading practices.

^{AC} See Appendix B.

CONCLUSION AND DISCUSSION

SUMMARY OF FINDINGS

This paper has explored the current state, challenges and leading practices associated with three key topics related to science-based target progress and achievement. To do so, the SBTi's eight target types have been aligned with the required metrics for assessing target achievement. The targets have also been characterized as either base year-dependent or base year-independent. Five lenses supported this analysis, including: 1) consistency with target, 2) achievement, 3) transparency, 4) feasibility, and 5) alignment with guidance.

The first key topic explored in this paper relates to the use of significance thresholds to determine base year recalculations and target coverage updates after structural or methodological changes have occurred. Analysis identified that standardized significance thresholds would be leading practice and that they should trigger the recalculation of the base year and target coverage, but not necessarily the interim years. Leading practice would also include the application of cumulative changes since the base year and as a percentage of individual scopes.

The second key topic includes additional metrics beyond target requirements to evaluate progress, specifically financial indicators and transition plans. Analysis determined that leading practice would include disclosure of standardized transition plans and financial indicators in all intervening years between the base year and target year (annually) by companies.

The third key topic covers assurance of data underlying target progress. Analysis determined that leading practice would be gaining limited assurance over data in the base year and target year. Considering increased feasibility over time and increased regulatory mandates, limited assurance over data in intervening years between the base year and target year (annually), and reasonable assurance over data in the base year and target year would also become leading practice.

LIMITATIONS AND NEXT STEPS

It is important to acknowledge and discuss certain limitations of this paper, as follows.

- While 13 regional and national regulations and 13 climate standards were reviewed, the climate landscape is evolving quickly and there may be other standards or emerging/in practice regulations that are or may be relevant to this work in the future.
- The methodology uses five assessment lenses to rank and identify leading practices; however, the process was not weighted, limiting the potentially larger impact of certain lenses.
- The paper does not consider practices that were not found in the landscape analysis. This should not be equated with a quality judgment and such practices may warrant future research.

- Often, third-party assurance is incorrectly positioned as a solution to issues of data quality. While this paper addresses the current state, challenges and leading practices relating to assurance over data underlying target progress, it does not address issues related to data quality and/or method selection for data underlying target progress.

Furthermore, the MRV ecosystem is vast and there are many other topics, questions and implementation considerations to be explored. Following the issuance of this paper, the SBTi will continue to conduct additional research related to measurement, reporting and verification of science-based target progress and achievement.



GLOSSARY ^{AD}

Term	Definition
Base year recalculation	Recalculation of base year metrics to reflect a structural change of the company or a methodological change in the data accounting methodology, including the discovery of errors that are individually or cumulatively significant.
Companies	Companies and Financial Institutions with science-based targets validated by the SBTi.
Leading practices	Leading practices are defined for the purposes of this paper as those practices which are most aligned with the lenses of 1) consistency with targets, 2) achievement, 3) transparency, 4) feasibility, and 5) alignment with guidance.
Market-based instruments	Broadly, for GHG accounting, the concept of market-based instruments refers to instruments that convey emissions attributes separate from emissions associated with actual or physical procurement. This applies across different activities and scopes (e.g., value chain mitigation, carbon credits, scope 1 biogas credits, scope 3 book-and-claim systems for Sustainable Aviation Fuel [SAF] and purchasing renewable market-based instruments on behalf of suppliers and/or customers to reflect in scope 3). Specifically, for the SBTi, the currently accepted market-based instruments are defined per the GHG Protocol Scope 2 Guidance, which includes the purchasing of scope 2 (e.g., energy, heat and cooling) generation mechanisms (e.g., renewable energy certificates [RECs] and power purchasing agreements [PPAs]) from suppliers with associated bundled or unbundled attribute claims.⁹⁹
Measurement	The accounting of companies' GHG and non-GHG metrics associated with science-based targets. As defined by WRI, "this may entail direct physical measurement of GHG emissions, estimating emissions or emissions reductions utilizing activity data and emission factors, calculating changes relevant to sustainable development, and collecting information about support for climate change mitigation." ¹⁰⁰

^{AD} The SBTi is undergoing a process to strengthen its technical governance and as part of this process is formalizing procedures for developing and revising standards. Please note that the concepts and terminology in this glossary are subject to change.

Term	Definition
Net-zero	Setting corporate net-zero targets aligned with meeting societal climate goals means: (a) reducing scope 1, 2 and 3 emissions to zero or a residual level consistent with reaching net-zero emissions at the global or sector level in eligible 1.5°C scenarios or sector pathways and (b) neutralizing any residual emissions at the net-zero target date, and any GHG emissions released into the atmosphere thereafter. ¹⁰¹
Reporting	Presenting data to internal management and external users, such as regulators, shareholders, the general public or specific stakeholder groups, of GHG and non-GHG metrics associated with a science-based target or targets. ¹⁰²
SBTi target types	The various science-based targets accepted and validated by the SBTi, including absolute emissions reduction, emissions intensity, renewable electricity, supplier/customer engagement, net-zero, portfolio coverage, portfolio temperature rating and no deforestation targets.
Significance threshold	"A qualitative and/or quantitative criterion used to define any significant change to the data, inventory boundary, methods, or any other relevant factors." ¹⁰³
Standardized disclosures	Standardized disclosures are defined as those which are aligned with existing regulatory or climate-related NGO guidance or requirements. They follow consistent and repeatable reporting practices and guidance.
Structural change	"A change in the organizational or operational boundaries of a company that result in the transfer of ownership or control of emissions from one company to another. Structural changes usually result from a transfer of ownership of emissions, such as mergers, acquisitions and divestitures, but can also include outsourcing/ insourcing." ¹⁰⁴
Target achievement	The evidence of the accomplishment of an established target in the target year.
Target coverage	The scope of metrics, operations, and emissions inventory scopes and categories included in the boundaries of a science-based target.

Term	Definition
Target period	The time frame between the base year and target year during which performance metrics are assessed against the target. ¹⁰⁵
Target progress	The evidence of advancement toward achieving an established target prior to the target year and after the base year. Progress refers to actions and/or improvements in performance that demonstrate or serve as credible proxies for positive change toward fulfilling commitments. ¹⁰⁶
Transition plan	A time-bound action plan that outlines how an organization will pivot its existing assets, operations and business model toward a trajectory aligned with established science-based targets. According to CDP, transition plans are considered credible if they support a strategy for climate transition, contain verifiable and quantifiable key performance indicators which are tracked regularly, are integrated into an organization's existing mainstream filings, and provide an accountability mechanism. ¹⁰⁷
Verification	In the context of this paper, the process for evaluating a statement of historical data and information related to GHG and non-GHG metrics to determine if the statement is materially correct and conforms to specified criteria. ¹⁰⁸



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