

# Study on Status of Global Developments and Trends in Science Based Target Setting

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**Abstract:** In order to mitigate the effects of climate change, more than 170 countries around the world have signed the Paris Agreement, which provides a unified plan and arrangement for global action to combat climate change. The response to climate change has far-reaching impacts on enterprises and financial institutions, and it is necessary to adopt scientific and effective methods to set carbon targets, and scientific target (SBT) setting is one of the internationally recognized representative methods. This paper examines the status of global scientific target setting and setting trends up to the end of 2022, which will be beneficial for businesses and financial institutions to better respond to the challenges and opportunities posed by climate change and international trade policy adjustments.

**Keywords:** Science Based Targets, Climate Change, State Of Development

## 1. Introduction

The Science Based Targets initiative (SBTi) is an international initiative launched in 2014 by the United Nations Global Compact (UNGC), the Center for Global Environmental Information and Research (CDP), the World Resources Institute (WRI), and the World Wide Fund for Nature (WWF), with the aim of assisting companies in setting climate-based carbon reduction targets. science-based carbon reduction targets to ensure that the magnitude and rate of greenhouse gas emissions reductions set by companies are consistent with the Paris Agreement, which aims to limit the increase in global average temperature to 2°C above pre-industrial levels and to work towards limiting the temperature increase to 1.5°C above pre-industrial levels. Setting a Science-Based Target (SBT), which objectively and scientifically assesses what a company needs to achieve in terms of global GHG emissions reductions as determined by relevant carbon budgets, rather than setting a target based on what any one company can achieve, can help a company to enhance its competitive advantage and brand image, drive innovation and reduce management risk, and can reduce waste and improve efficiency, which will ultimately bring many benefits to the company. The paper will analyze the current status of the development of the international certification of the Science-Based Target Initiative (SBTi) to provide a reference for enterprises to carry out the research on the certification of carbon reduction targets<sup>[1]</sup>.

## 2. Science Based Targets pathway

Science-Based Targets Initiative (SBTi) certification is a commitment by an enterprise to endeavor to set science-based carbon targets in accordance with the Science-Based Targets Initiative (SBTi) eligibility criteria. Carbon targets submitted by an enterprise are approved for inclusion in SBTi after review by the audit team designated by the SBTi working group, and the enterprise's science-based carbon targets are publicly displayed on the SBTi website and other publicity platforms. As shown in Figure 1, when an enterprise submits a letter of commitment indicating its intention to participate in the call for action, it can be publicly labeled as "Committed" on the SBTi website. The enterprise should set a scientific carbon target within 24 months, and then announce the specific carbon target after the formal review and approval by SBTi, and the enterprise will be labeled as "Targets Set", that is, it will be certified by SBTi.

The technical guidelines for SBTi certification consist mainly of Call to Action Guidelines, GHG Accounting Guidelines, Generic Guidelines and Industry Guidelines. The Call to Action Guide refers to the ScienceBased Targets Initiative (SBTi) Call to Action Guide, which focuses on the SBTi Initiative, why companies should join the SBTi Initiative, and the basic process of SBTi certification, as well as providing an appendix of technical guidelines and tools for target setting. SBTi's GHG accounting

guidelines are based on the System of Greenhouse Gas Accounting (SGGA) developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), and the scope of the accounting typically includes Scope 1 (direct emissions such as fuel combustion) and Scope 2 (indirect emissions such as electricity and heat), while Scope 3 (other indirect emissions such as supply chain) may be considered in a combination of trade-offs. The generic guidelines include the Science Based Target Initiative Criteria and Recommendations, the Basis for Setting Science Based Targets, the Science Based Target Setting Manual, the Science Based Target Setting Tool, and the Target Audit Protocol. In particular, SBTi provides three available methods for companies to set science-based targets (Absolute Emissions Shrinkage, Sectoral Emissions Reduction, and Economic Intensity Shrinkage), all of which include the three key components of carbon budgets, emissions scenarios, and allocation methods<sup>[1]</sup>. The industry guides are mainly developed by relevant third-party organizations to develop technical guides for corresponding industries based on the Industry Guide Development Framework formulated by SBTi, which currently covers 13 industries, electric power, civil aviation, finance, information and communications, apparel and footwear, construction, iron and steel, cement, oil and gas, transportation, agriculture and forestry, aluminum and chemical industry, and so on.

The key components of a science-based targets setting methodology include 1) a carbon budget (the total amount of greenhouse gases that can be emitted to keep the global temperature rise well below 2 degrees Celsius and within 1.5 degrees Celsius); 2) an emissions scenario (identifying the magnitude and timing of emission reductions), and 3) an allocation methodology (determining how to allocate the carbon budget among firms, categorized as convergence or contraction).

There are three main types of science-specific carbon target-setting approaches. First, is the Absolute Contraction Approach. The absolute emissions contraction method uses absolute emission reductions to set absolute targets. With this approach, all firms reduce absolute emissions at the same rate, regardless of initial emissions performance. Therefore, the definition of an absolute emission reduction target should be the overall reduction of greenhouse gas emissions up to the target year compared to the base year, with the minimum reduction required for the target being a linear reduction of 2.5 per cent per annum under the scenario of a "global average temperature rise well below 2 degrees Celsius"; Setting an annual linear emission reduction target of 4.2% under the scenario of "no more than 1.5 degrees Celsius of global average warming". This approach is simple and straightforward and can be used to set and track targets applicable to most industries. Example: 35% reduction in CO<sub>2</sub> equivalent emissions per year by 2025 compared to 2018 levels.

Second, the Sectoral Decarbonization Approach (SDA). The Sectoral Decarbonization Approach uses emissions intensity convergence to set physical intensity targets, which are defined in terms of emission reductions associated with specific business metrics, and assumes that global emissions from key sectors will converge by 2060. For example, it is assumed that by 2060 the emission intensity of iron and steel production in China, the United States and Brazil will be at the same level, disregarding current differences. The methodology covers Scope I and Scope II emissions and has limited applicability to Scope III. The Sectoral Emissions Reduction Method (SERM) uses the B2DS scenarios presented in the IEA's Energy Technology Perspectives (ETP) 2017 report, which contain emissions and activity projections for calculating sectoral emissions reduction pathways based on scenarios with a global temperature rise well below 2 degrees Celsius (IEA, 2017). As the IEA does not provide data for a scenario with a global temperature rise of 1.5 degrees Celsius, SBTi does not currently offer a sectoral abatement methodology option for a 1.5 degree Celsius target.

Third, the economic intensity contraction method economic intensity contraction method, i.e., greenhouse gas emissions per unit of value added (GEVA) uses economic intensity contraction to set economic intensity targets. The target set using the GEVA methodology is expressed as a reduction in emissions intensity per unit of value added (in dollars), and firms must reduce their GHG emissions per unit of value added by 7% per year. Based on the assumption of an absolute emissions reduction of about 75% from 2010 levels by 2050, the 7% reduction rate is broadly consistent with the highly credible emission reduction pathway of the United Nations Intergovernmental Panel on Climate Change (RCP2.6), with a level of ambition between the IEA's 2DS and B2DS scenarios. For example, Husqvarna Group AB, a manufacturer of outdoor power products, has committed to a 30% reduction in Scope I and Scope II emissions per unit of value added by 2020 compared to the 2015 base year.

### 3. Regional and sectoral distribution of global scientific carbon target setting

2022 saw significant growth in the number of companies and financial institutions setting science-based targets, despite an increasingly challenging global backdrop of more frequent and destructive extreme weather, conflict and economic and political instability<sup>[2]</sup>.

In terms of the number of global enterprises and financial institutions, according to the public data on the SBTi website, as of the end of December 2022, 4,230 global enterprises have committed to joining the SBTi, of which nearly half have a market capitalization of more than \$23 trillion, and 2,151 enterprises have set targets (Targets Set), accounting for about 48% of all enterprises, including well-known companies such as Dell, Hewlett-Packard, Cisco, Walmart, Carlsberg, Levi's, Ikea, Fujitsu, Tesco, Coca-Cola, Kellogg's, Pfizer, Procter & Gamble, Sony and others. The number of companies and financial institutions setting sciencebased targets continued to grow. In 2022, 1,097 companies had their targets validated, a number greater than the total of the previous seven years combined.

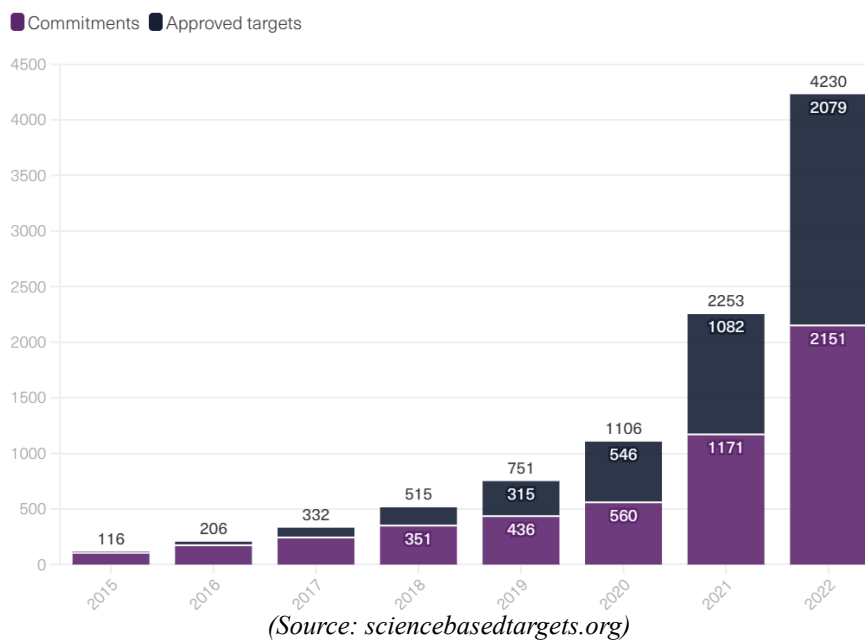
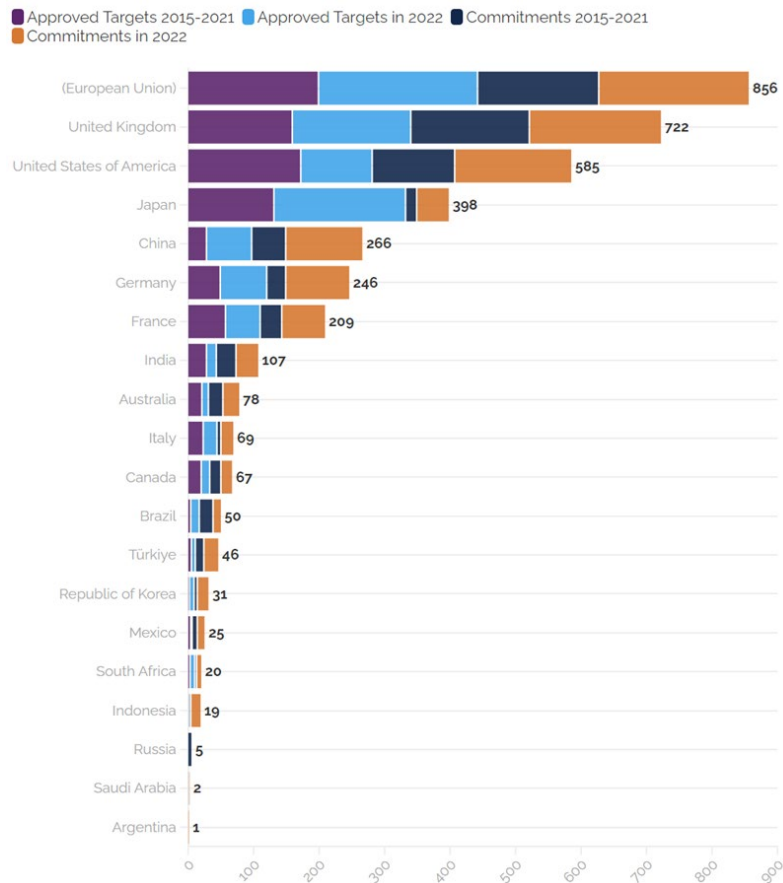


Figure 1: Cumulative number of companies with approved targets and commitments between 2015-2022

As can be seen in Figure 1, the number of companies setting science-based carbon targets has grown rapidly from 2015 to 2022. From 116 companies and organizations in 2015 to 4,230 companies and organizations in 2022, in addition, the submission rate of science-based carbon target setting and the certification pass rate are similar, which shows the determination and initiative of global companies and financial institutions to set sciencebased targets.

In terms of the global distribution of businesses and financial institutions, companies with sciencebased targets or commitments to set targets account for more than one-third (34%) of the global economy's market capitalization by the end of 2022, according to the SBTi 2022 annual report. And in the global distribution of science-based carbon target certifications, the number of companies in G20 member countries that are certified to sciencebased targets from 2015-2021 is also increasing year by year. As can be seen in Figure 2, both the number of companies that have been certified and the number of companies that have committed to submitting a sciencebased target plan have shown a substantial increase. The national and regional distribution of these enterprises also shows that Europe, as the birthplace of SBTi, has the most active enterprises in the region (55%), followed by enterprises in Asia and North America (19% and 18% respectively). Of the 426 SBTi companies in Asia, Japan has 169 companies accounting for 40%, followed by China (including Hong Kong, Macao and Taiwan) and India with 21% (91 companies) and 15% (64 companies) respectively. Japan has the highest number of companies setting targets for 2022 (201), followed by the UK (181) and the US (109). Among the G20, South Korea, Brazil, China and South Africa also saw strong growth in the number of companies with verified targets. Companies from five countries - Albania, Malta, Myanmar, Romania and Tunisia validated sciencebased carbon targets for the first time in 2022. In addition, companies from five other countries committed to science-based carbon targets for the first time: Argentina, Liechtenstein,

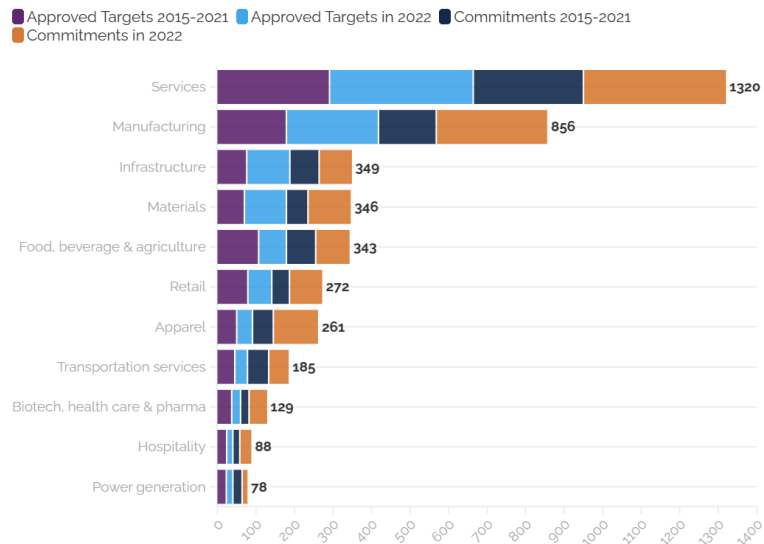
Morocco, Sierra Leone, and Trinidad and Tobago, the first Caribbean country to have a committed company. By the end of 2022, companies in 61 countries have set proven science-based carbon targets, and companies in a further 16 countries have committed to setting targets. In general, The European Union (EU), as a G20 member, is represented in this chart, with Germany, France and Italy excluded from the count of validated targets and commitments in the EU. Japan has the highest number of companies setting targets for 2022, followed by the UK and the US. Asia saw the fastest growth in the proportion of companies setting targets, with growth also seen in Africa and Latin America.



(Source: sciencebasedtargets.org)

Figure 2: G20 Breakdown in validated targets and commitments Country view of G20-based companies with approved targets and commitments as of December 2022

Of the 2,151 SBTi firms globally, the industry distribution is shown in Figure 3. Of these firms are predominantly industrial (47%), with the top ten subsectors being professional and technical services, food and beverage manufacturing, textiles, apparel, and footwear, finance, real estate, software and information technology services, electrical machinery and equipment manufacturing, construction, consumer durables and housewares manufacturing, and Retail Trade. According to data published on the SBTi 2022 website, the services and manufacturing sectors have the highest number of companies that have set targets for 2022. With 373 and 239 companies respectively, these sectors account for more than half of the validated targets. However, in 2022, the infrastructure sector overtook food, beverages and agriculture to become the third largest sector with 112 companies with verified targets. The industry with the highest growth rate is materials, where companies set 109 targets in 2022 compared to 42 in 2021, an increase of 160%. Thirty-three companies in the Transportation Services sector set targets, a 65% increase from 2021. There was limited change in the number of targets set in the three sectors with the lowest adoption rates of science-based carbon targets. In 2022, the power generation sector is responsible for 17 targets, the biotechnology, healthcare and pharmaceuticals sector for 23 targets, and the hospitality sector for 16 targets. Considering the urgent need to decarbonize electricity production globally, the position of the power generation sector as the sector with the lowest number of targets set for 2022 is worrying.



(Source: sciencebasedtargets.org)

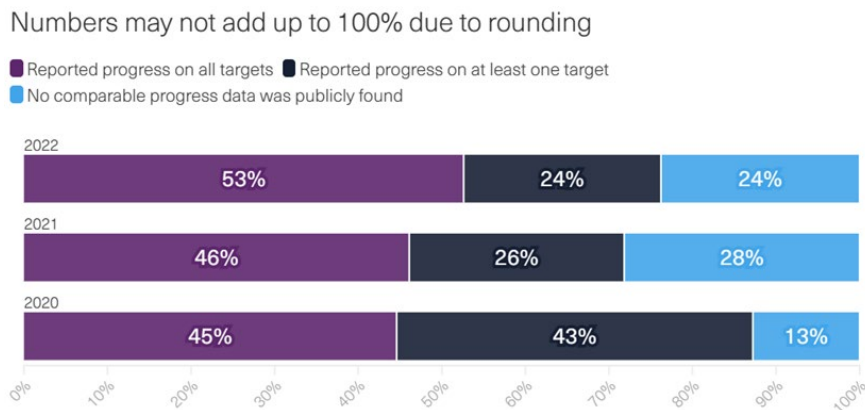
Figure 3: Total number of companies by industry with approved targets and commitments as of December 2022

#### 4. Reported Progress on the sciencebased targets setting enterprise

According to the United Nations Framework Convention on Climate Change (UNFCCC), progress reporting is integral to the credibility of a company's emissions reduction targets. It helps build trust, demonstrates successful strategies, and encourages other participants to make ambitious commitments. To support the accountability of science-based carbon targets, SBTi requires all target-setting organizations to publicly report annually on their company-wide GHG emissions inventories and progress against published targets<sup>[2]</sup>.

Regarding the setting of sciencebased targets, SBTi has developed a comprehensive set of science-based carbon target-setting criteria and detailed operational guidelines covering target setting, submission, verification and disclosure, and has provided some convenient tools for enterprises and financial institutions to calculate the relevant indicators. However, in practice, enterprises and financial institutions still have many deficiencies and challenges in setting and implementing science-based carbon targets.

According to publicly available data on the SBTi website (Figure 3), more than three-quarters (76%) of the companies with science-based carbon targets have publicly reported progress on their targets in some form, compared to 72% in 2021 and 87% in 2020. Twenty-four percent of all companies did not find or report public information on progress towards their science-based carbon targets, or lacked information and contextual data.



(Source: sciencebasedtargets.org)

Figure 4: Reporting status of companies with approved targets in 2022

Figures in this graph refer to near-term and long-term targets of companies (excluding SMEs and financial institutions). Figures for 2022 are based on the latest publicly available information found on target progress at the time of the analysis. Figures for the years 2021 and 2020 were retrieved from the SBTi Progress Report 2021 and 2020 respectively. As can be seen in Figure 4, more than half (53%) of the 1,186 companies with science-based carbon targets in 2022 have fully reported progress on all of their near- and long-term targets. About one-quarter (23%) of respondents reported at least one target, but information on other targets was reported in ways that were not comparable, or lacked information and contextual data, or were not publicly discoverable. As of December 2022, 68% (57) of the companies<sup>84</sup> that used SBTi's Corporate Net Zero Standard to set their net zero targets were found to have publicly reported information on their net zero targets to the CDP in 2022, including plans to neutralize any unabated emissions and take action to reduce emissions outside of their value chains.

## 5. Conclusion

In order to mitigate the natural and economic harms that climate change has brought and may bring, countries around the world have introduced many countermeasures one after another. The Science Based Target (SBT) is an important way from accounting for carbon emissions to realizing the Paris Agreement, and an important means for enterprises and financial institutions to avoid the risks of climate transition. SBTi will show companies how much and how fast they need to reduce their greenhouse gas emissions to prevent the worst effects of climate change, guiding them on a clear path to decarbonization. The companies that have made commitments under the Science-Based Targeting Initiative standard now account for 35% of the world's total market capitalization, covering more than 27% of the world's potentially significant climate impacts. On average globally, the manufacturing sector leads all sectors, accounting for about 25-30 per cent of global GHG emissions due to its long and complex value chain, and the agri-food sector as a whole accounts for about 20-25 per cent of global GHG emissions<sup>[3]</sup>. The science, technology, media and communications industry's own emissions play a significant role in contributing to GHG emissions reductions, as they involve a wide range of other industries.

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