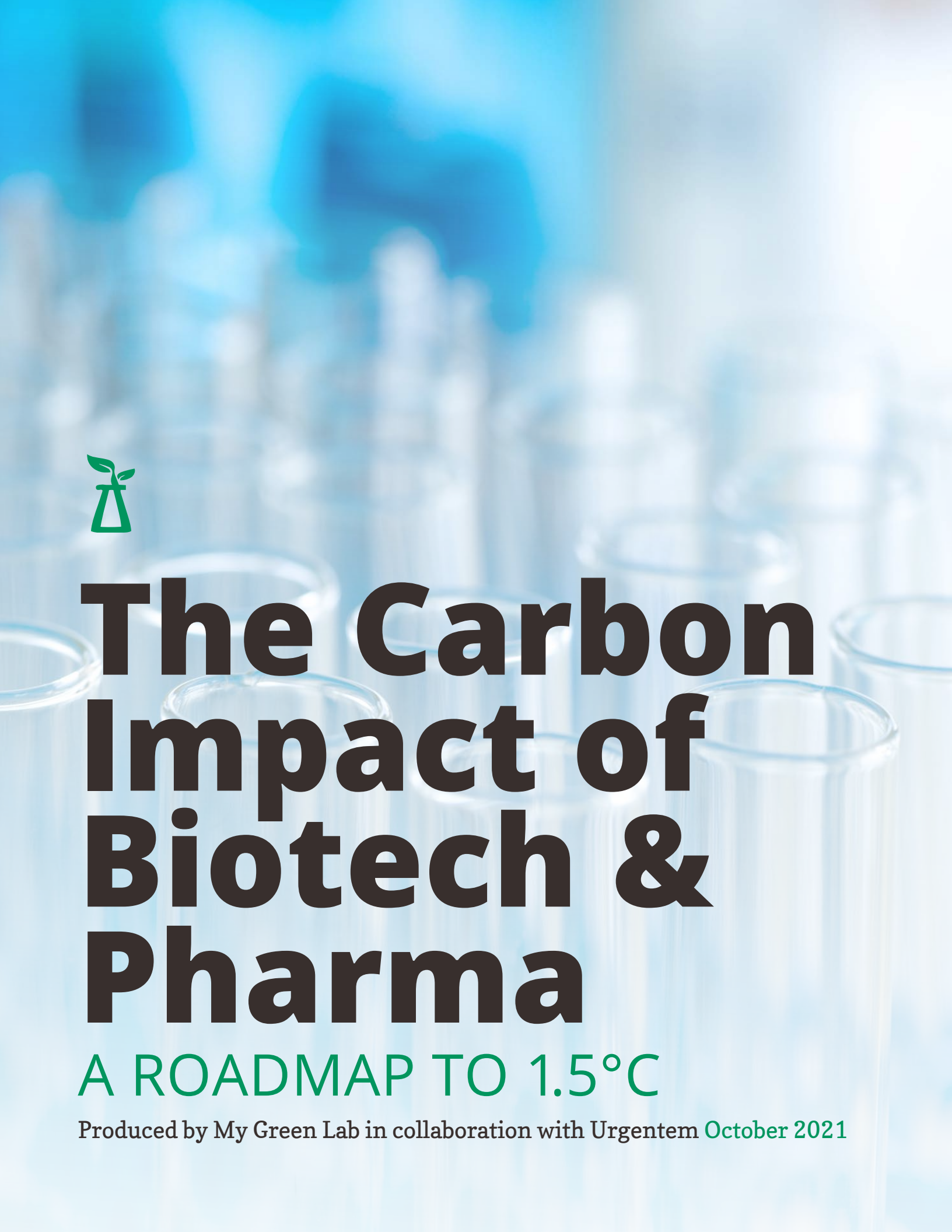


The Carbon Impact of Biotech & Pharma

A ROADMAP TO 1.5°C

Produced by My Green Lab in collaboration with Urgentem October 2021

Executive Summary

The following study is authored by My Green Lab, the leading non-profit organization promoting sustainability in science, with support from Urgentem, an award-winning independent provider of emissions data, climate risk analytics and advisory services. This study leverages data from 234 publicly-listed companies to produce a comprehensive profile of the carbon impact of the biotechnology and pharmaceutical industry, and compares that profile to other industry sectors. This report is the first to quantify Scope 1 and 2 as well as Scope 3, the indirect emissions across the industry's value chain.

Biotech and Pharma are among the world's largest carbon-emitting industries and must be a part of the global climate solution. As a whole, the industries' climate commitments are not ambitious enough to keep warming below the 1.5˚C threshold that the UN's Intergovernmental Panel on Climate Change (IPCC) warns we cannot cross.

Summary of Key Findings

01

While the largest companies by revenue have reduced carbon emissions year on year since at least 2015, the majority of companies within the biotechnology and pharmaceutical industry do not have climate commitments aligned with a 1.5˚C world. Companies must establish more ambitious targets, and those commitments must be backed up by measurable actions.

02

The global biotechnology and pharmaceutical industry has a significant carbon footprint (197 million tCO_2e), more than the forestry and paper industry, the semiconductor industry, and equal to nearly half the annual carbon output of the United Kingdom.

03

Scope 3 emissions are nearly five times larger than Scope 1 and 2 emissions combined, therefore it is critical to consider the entire value chain when evaluating the carbon footprint of biotech and pharma.

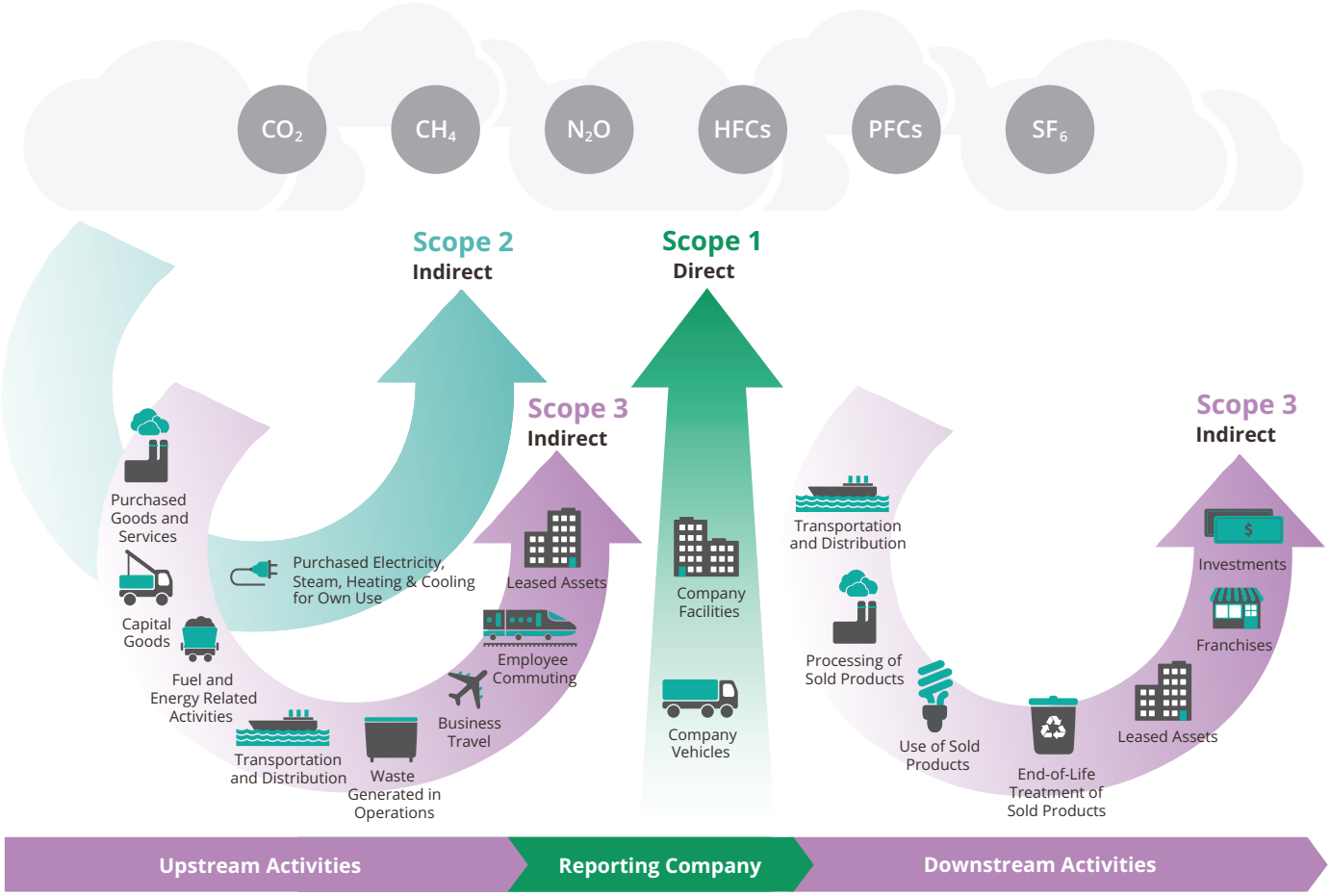
04

Purchased Goods and Services as well as the Use of Sold Goods dominate Scope 3 emissions and should be the target for carbon reductions in the industry's value chain.

The GHG Protocol Corporate Accounting and Reporting Standard[1] classifies carbon emissions into three different scopes, divided by direct and indirect emissions:

Direct Emissions:
Scope 1 includes direct emissions from owned or controlled sources

Indirect Emissions:
Scope 2 includes carbon emissions from purchased energy consumed by the reporting company
Scope 3 includes all other indirect emissions upstream or downstream in a company's value chain



Credit: Greenhouse Gas Protocol — Corporate Value Chain (Scope 3) Accounting and Reporting Standard

For most industries – and as this study found, biotech and pharma is no exception – Scope 3 emissions are significantly larger than Scope 1 and 2 combined. To understand the true carbon impact of an industry, it is therefore critical to evaluate the entire carbon footprint, including Scope 3 emissions in the upstream and downstream value chain.

1 Corporate Value Chain (Scope 3) Accounting and Reporting Standard https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf

About My Green Lab

My Green Lab® is a non-profit environmental organization with a mission to build a global culture of sustainability in science. The organization is the world leader in developing internationally recognized sustainability standards for laboratories and laboratory products—bringing sustainability to the community responsible for the world's life-changing medical and technical innovations. Laboratories are some of the most resource-intensive spaces in any industry, but they don't have to be. By introducing a new perspective and proven best practices within a carefully crafted framework, My Green Lab has inspired tens of thousands of scientists and lab professionals to make a positive change in their labs by reducing the environmental impact of their work.

My Green Lab Certification is the global gold standard for laboratory sustainability best practices and the cornerstone of My Green Lab's mission to build a global culture of sustainability in science. Selected as a key indicator of progress for the UNFCCC High-Level Climate Champion's 2030 Breakthrough campaign, the program covers fourteen topics including energy, water, waste, chemistry/materials, and engagement, and provides both scientists and the teams that support laboratories with actionable strategies to make real and impactful environmental changes. To date, My Green Lab has supported over 700 labs worldwide, engaging over 5,000 scientists from 30 different countries.

The **ACT® Environmental Impact Factor Label** is the world's premier eco-label for laboratory products. The ACT program ensures Accountability, Consistency, and Transparency in the reporting of environmental impact data to enable sustainable laboratory procurement. It was designed by both scientists and procurement specialists to provide clear, third-party verified information about the sustainability profile of laboratory products. By providing needed transparency around manufacturing, energy and water use, packaging, and end-of-life impacts, ACT makes it easy to choose environmentally preferable products and to reduce the carbon impact of laboratory supply chains.

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Acknowledgments

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About Urgentem

My Green Lab based this evaluation on reported and modeled emissions data through a partnership with Urgentem—an award-winning independent provider of emissions data, climate risk analytics, and advisory services. Urgentem's datasets are used primarily by financial institutions such as the European Central Bank for Climate Stress Testing and other public bodies.

Outline

List of Figures

Introduction

The groundbreaking race to develop and distribute COVID-19 vaccines has demonstrated like almost nothing before the incredible positive impact and critical importance of the global biotechnology and pharmaceutical industry. However, life-changing breakthroughs can also come at a significant environmental cost.

A 2018 study found that the global pharmaceutical industry's carbon intensity was 55% higher than the automotive industry in 2015.[2] The 2019 climate footprint of healthcare was two gigatons of carbon dioxide equivalent, representing 4.4% of total global emissions, with the majority (71%) derived from the healthcare supply chain, which includes biotech and pharma.[3] The global research enterprise includes millions of laboratories, consuming five to ten times the energy per square foot of a typical office space.[4] Further, the biotechnology market is predicted to grow by 15% per year, and pharmaceutical market by 11%, reaching $2.44 trillion and $970 billion, respectively by 2028.[5,6]

Given the carbon intensity and rapid growth of the biotechnology and pharmaceutical industry sector, it is both critical and timely to examine the industry's carbon profile as well as opportunities to improve it. This study leverages a robust dataset of 234 publicly-listed companies to provide a comprehensive evaluation of the biotech and pharma sector and how it compares in intensity and total emissions to other carbon-intensive industry sectors.[7] This evaluation excludes the impact of institutions and organizations that are not publicly listed and for which emissions information is not readily available, such as government labs, universities, healthcare systems and privately-held companies. Therefore, the total carbon emissions of the scientific industry overall are, in fact, much higher than what is included within the scope of this study.

This study is the first to quantify the carbon impact of the extensive upstream and downstream value chain of biotech and pharma by evaluating Scope 3 emissions. This report then identifies critical hotspots that are opportunities for positive change while charting the industry's progress towards meeting Paris Climate Agreement targets.

The conclusions are clear: the global biotech and pharmaceutical industry is a significant contributor to climate change, and it must become part of the climate solution. The total emissions (197 million metric tonnes CO_2-equivalent (tCO_2-e))[8] of the industry are significant, equal to nearly half the annual carbon output of the United Kingdom. While the largest companies by revenue are making progress towards a zero-carbon future, the industry, as a whole, needs more ambitious carbon commitments backed up by measurable action to align with a 1.5˚C goal. The biotechnology and pharmaceutical industry overcomes difficult challenges every day. It is now time for the industry to confront climate change and serve as a model for the rest of the world to follow, starting with its own footprint.

[2] Carbon footprint of the global pharmaceutical industry and relative impact of its major players (2008) sciencedirect.com/science/article/abs/pii/S0959652618336084.

[3] Healthcare Without Harm and ARUP (2019) Health Care's Climate Footprint – How the Health Sector Contributes to the Global Climate Crisis and Opportunities for Action (2019) https://noharm-global.org/sites/default/files/documents-files/5961/HealthCaresClimateFootprint_090619.pdf.

[4] Laboratories for the 21st Century: An Introduction to Low-Energy Design (2008) https://www.nrel.gov/docs/fy08osti/29413.pdf.

[5] Biotechnology Market Size Worth $2.44 Trillion By 2028 (2021) https://www.grandviewresearch.com/press-release/global-biotechnology-market.

[6] Pharmaceutical Manufacturing Market Size, Share & Trends Analysis Report (2021) https://www.grandviewresearch.com/industry-analysis/pharmaceutical-manufacturing-market

[7] These 234 publicly listed companies are classified as Biotechnology and Pharmaceutical by the Sustainable Accounting Standards Board (SASB) Standard Industry Classification System (SICS) sub-category

[8] This study used publicly reported and inferred data from the Urgentem database, further detailed in the methodology section

KEY FINDINGS

01

While the largest companies by revenue are reducing carbon emissions year on year, the biotech and pharma industry is not yet aligned with a 1.5-degree world. The industry must set more ambitious targets, and those commitments must be backed up by measurable action.

While the biotechnology and pharmaceutical industry sector has a significant global impact and is carbon intensive (particularly for Scope 1 and 2 emissions), the trends over the past five years show some positive signs of progress, particularly for the largest companies by revenue. The top 25 companies have reduced their annual Scope 1 and 2 carbon intensity by an average of 5.63% per year since 2015. The top 15 companies have performed even better, reducing carbon emissions by an average of 9.26% year-on-year. If you include Scope 3 emissions in the total, carbon impact has increased, but this is likely due to greater reporting rather than an actual increase in emissions.

Figure 1: 5-Year Industry intensity trends

Biotech and Pharma: Carbon Intensity (tCO_2e/$M Rev.), 2015-2020

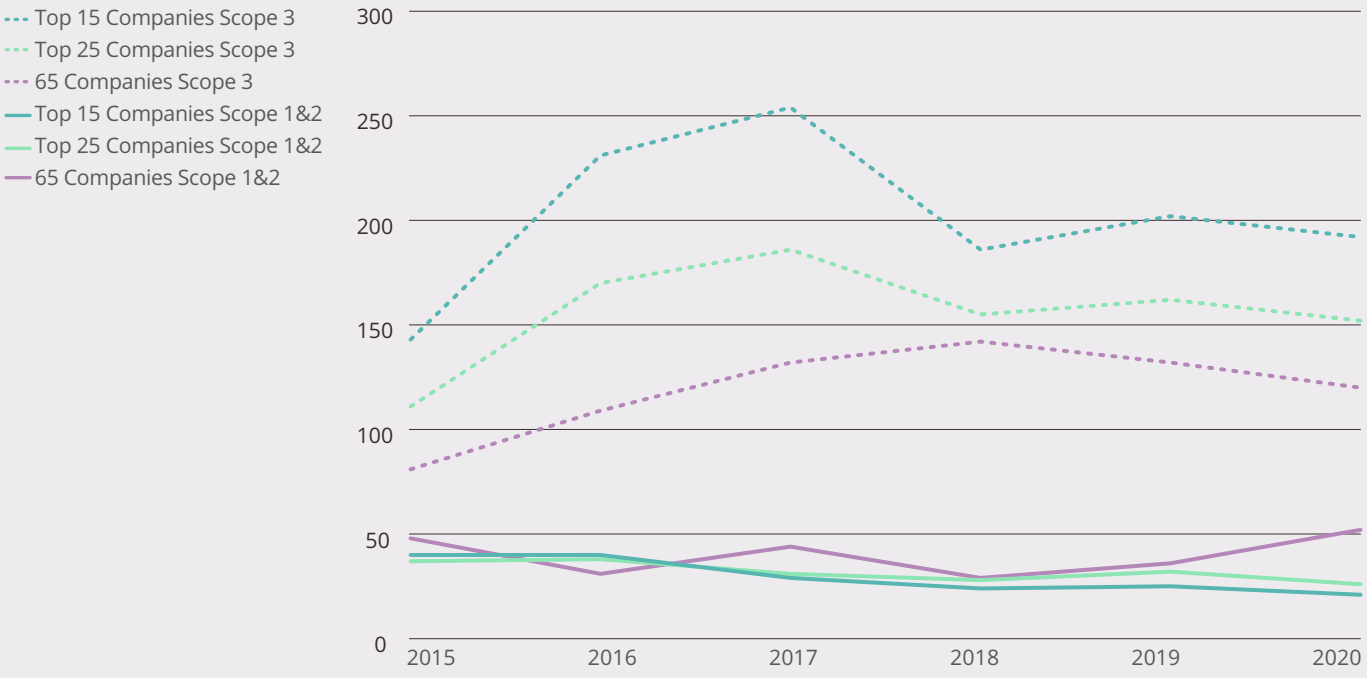


Figure 2: 2030 Target Temperature Alignment[14]

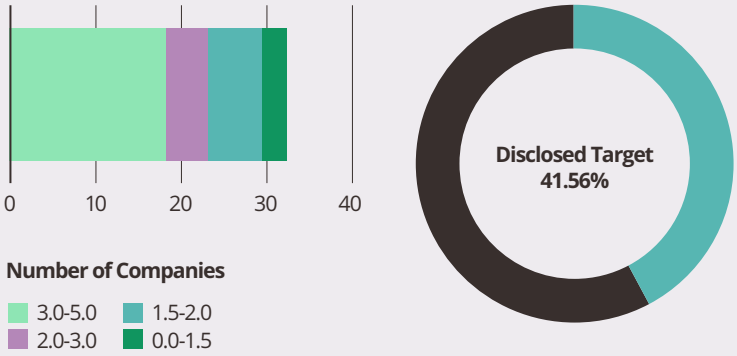
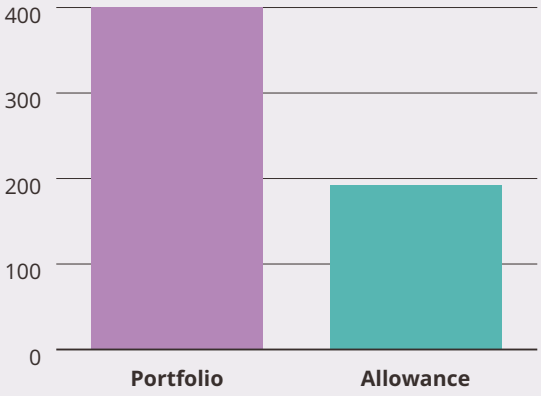


Figure 3: IPCC 1.5˚Low Energy Scenario Reductions Needed by 2030[15]



Unfortunately, when evaluating a broader cross-section of the industry, 65 companies with the best quality data available for the past 5 years, the trend is not positive.[9] Carbon intensity has increased over the past five years with an average year-on-year increase of 1.54% for Scope 1 and 2 emissions. Over the same time, Scope 3 emissions have increased year-on-year by an average of 9.64%. Though it appears that Scope 3 emissions have peaked and begun to decline, wider uptake of reporting may cause this number to grow.

Another positive trend is the growing number of companies in the industry that are committing to science-based targets and joining the UNFCCC's Race to Zero.[10] At the time this report was published, 31% of the largest companies by revenue in pharma and medtech[11] have committed to the Race to Zero, meaning they have pledged to cut total carbon emissions by 50% by 2030 and reach net-zero emissions by 2050 or sooner.[12]

While the largest companies are leading with ambitious carbon targets, and we are starting to see year-on-year reductions, the rest of the industry is lagging. Of the 74 companies in our dataset for which the best data is available, only 42% have established a carbon reduction target.[13] Of that 42%, only three companies have targets aligned with a 1.5˚C warming scenario by 2030. The remaining companies are aligned with 2-3˚C warming or 3-5˚C warming, which is simply insufficient to ensure we avoid the most devasting impacts of global climate change.

Even if every company in the biotech and pharma industry sets ambitious carbon reduction targets, these commitments must be backed up by tangible and measurable progress to be credible. We must move rapidly beyond commitment to action. To meet the IPCC's 1.5˚Low Energy Demand Scenario by 2030, the industry must achieve an annual carbon reduction of 7.03% per year beginning now, including Scope 3 emissions. The longer companies wait to begin reducing emissions, the steeper their annual reductions must become to reach net-zero by 2050 and the more irreversible and cascading impacts of climate change are locked in.

[9] 5-Year Industry Carbon Trend Data includes 65 companies with best quality data (Category 1 and Category 2) with data available for the past five years. Category 1 and Category 2 data are further defined in the methodology section.

[10] https://racetozero.unfccc.int/

[11] This study uses the SASB SICS sub-category of Biotechnology and Pharmaceutical, which does not align exactly with the Pharma and Medtech categories used by the Race to Zero, though there is substantial overlap.

[12] Pharma & Medtech announce critical climate breakthrough (2021) https://racetozero.unfccc.int/pharma-med-tech-announce-critical-climate-breakthrough/

[13] Target alignment data includes 74 companies for which best quality data (Category 1 and Category 2) is available. Category 1 and Category 2 data are further explained in the methodology section.

[14] Sourced from Urgentem Element6 Climate Analytics Platform

[15] Sourced from Urgentem Element6 Climate Analytics Platform

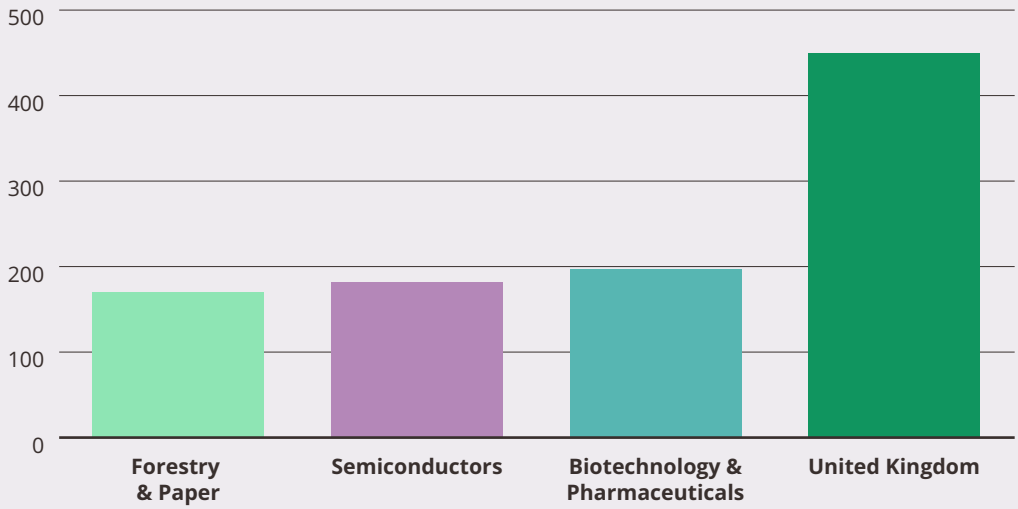
02

The global biotechnology and pharmaceutical industry has a significant carbon footprint (197 million tCO_2-e), nearly half the annual carbon output of the United Kingdom.

The biotechnology and pharmaceutical industry is the 25th-largest carbon-emitting industry in the world. Based upon an evaluation of publicly reported and inferred data for the Scope 1, 2 and 3 emissions of 234 publicly-listed companies classified as biotechnology and/or pharmaceutical, the total carbon output of the industry was 197 million tCO_2-e, which is more than the total emissions of the semiconductor industry (182 million tCO_2-e) and the forestry and paper industry (170 million tCO_2-e), both substantial contributors to global climate change in their own right. More surprising still, the industry's output is nearly half the annual emissions of the UK in 2020 (414 million tCO_2-e).[16]

Considering only Scope 1 and 2, the biotechnology and pharmaceutical industry is very carbon-intensive, ranking 15th out of 38. While the industry needs to evaluate and address the entire value chain, emissions from Scope 1 and 2 remain crucial opportunities for carbon savings, so biotech and pharma must not ignore the impact of their operations. Directly controlled emissions, however, are only a portion of the industry's overall carbon footprint.

Figure 4: Total Sector Annual Carbon Output Comparison
Total Annual Emissions (tCO_2e) in Millions



[16] While it is difficult to compare a country's carbon emission to an industry sector, this comparison provides an instructive illustration for the order of magnitude of the industries impact. 2020 UK greenhouse gas emissions, provisional figures (2021) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972583/2020_Provisional_emissions_statistics_report.pdf

03

Scope 3 emissions are nearly five times larger than scope 1 and 2 emissions, so it is critical to consider the entire value chain when evaluating the carbon footprint of biotech and pharma.

Scope 3 emissions for the biotechnology and pharmaceutical industry overall are 4.7 times larger than Scope 1 and 2 emissions combined (34.5 million tCO_2-e for Scope 1 and 2, as compared to 162.7 million tCO_2-e for Scope 3). The significance of this ratio becomes apparent when comparing industries to one another: while the carbon impact of indirect emissions in a company's value chain are generally higher than emissions captured in Scope 1 and 2, the median ratio of Scope 1 and 2 to Scope 3 emissions is 9.4, almost twice that of the pharmaceutical and biotech industry.

Therefore, when factoring in Scope 3 emissions, the biotechnology and pharmaceutical industry appears less carbon-intensive as compared to other intensive industries, ranking only 33rd. This is in contrast to the ranking above, excluding Scope 3, where the biotechnology and pharmaceutical industry ranked 15th out of 38.

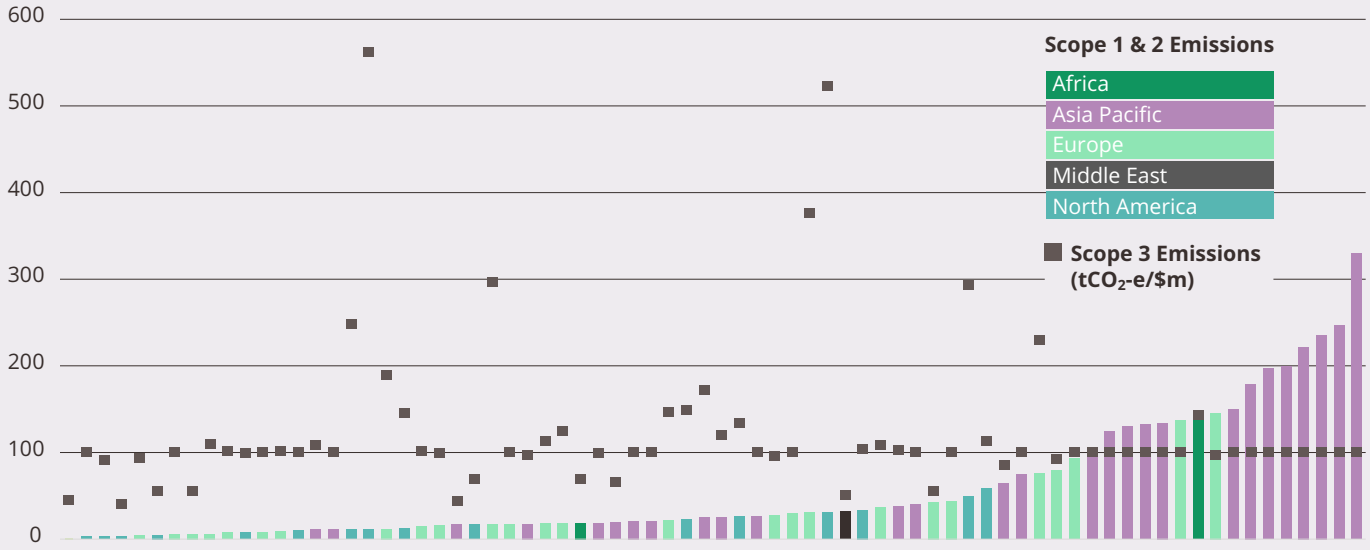
This difference may be real or the result of inconsistent approaches taken for evaluating Scope 3 emissions throughout this industry (and others), which will require additional research and engagement from companies in the sector. Based upon an evaluation of the 74 companies with best quality data, emissions are highly variable from one company to the next: total reported Scope 1, 2 and 3 emissions range from 44.4 million metric tonnes CO_2 equivalent per million USD in Revenue (tCO_2-e/$m) to 573.2 tCO_2-e/$m. This could be explained by a variety of factors, including variability in reporting methodologies between each company.

This variability may also be due to the nature of the research and the type of manufacturing conducted in-house, which is a topic for further investigation. A more detailed breakdown of the carbon impact between research and production would be helpful to understand the drivers of impact. The variability may also be due to how companies utilize contract research and contract manufacturing organizations, which is a growing trend.[17] Outsourcing research allows for increased capacity and specialization without adding to the company's operational overhead and Scope 1 and 2 carbon footprint. These dynamics underscore the importance of evaluating total emissions across a company's entire supply chain.

Based on reported emission data from 2015 – 2020, the biotechnology and pharmaceutical industry has only recently begun to report Scope 3 emission data in a widespread and meaningful capacity. Scope 3 emissions in the sector increased significantly during 2015 and 2016 as the largest companies by revenue began to include Scope 3 in their reporting. However, there remains a high degree of variability between the intensity of Scope 3 emission data, ranging from 41.1 tCO_2-e/$m at the lowest end to 561.1 tCO_2-e/$m at the high end.

[17] Current Trends and Strategic Options in the Pharma CDMO Market (2019): https://www.pwc.de/de/gesundheitswesen-und-pharma/studie-pharma-cdmo-market.pdf

Figure 5: Company Level Comparison of Scope 1, 2 and Scope 3
Relative Carbon Intensities, Selected Pharma and Biotech Dataset



There is also a correlation between region and carbon intensity. North American and European companies tend to have much lower carbon intensities for Scope 1 and 2 (161.1 tCO_2-e/$m, on average) than their Asia-Pacific counterparts, (750.5 tCO_2-e/$m, on average). The regional difference may in part be explained by the tendency of North American- and European-headquartered companies to focus on research and development in-house while outsourcing manufacturing. Companies with headquarters in the Asia-Pacific Region also tend to have more carbon-intensive energy grids, particularly in China and India, though this is changing.[18] Further, the quality of reporting may influence these contrasts: currently, only the largest European and US biotech and pharmaceutical companies report their Scope 3 data. For most of the companies headquartered in Asia Pacific and the Middle East, Scope 3 data has been inferred.

Ultimately, sector-level reporting standardization that guides this industry's carbon disclosure practices, particularly of Scope 3 emissions, are necessary to better inform comparisons between companies and enable performance benchmarking. The Pharmaceutical Environmental Group has made progress on standardizing Scope 3 reporting through a guidance document published in 2020, though companies have considerable flexibility regarding how they report and apply the guidance.[19] A common calculation methodology using Environmentally-Extended Input Output (EEIO) emission factors based on national GHG data can only generate a rough estimate. Product, service or company-level emission data would be more accurate and could be shared between companies that have similar supply chains. This challenge in biotech and pharma is shared by other sectors and is an opportunity for continued industry collaboration.

[18] Assessing China's Energy and Climate Goals (2021) https://www.americanprogress.org/issues/security/reports/2021/05/06/499096/assessing-chinas-energy-climate-goals/

[19] Scope 3 greenhouse gas emissions calculation: guidance for the pharmaceutical industry (2020) https://pscinitiative.org/resource?resource=779

04

Purchased Goods and Services as well as the Use of Sold Goods dominate Scope 3 emissions and should be the target for carbon reductions.

The high variability in emissions between companies cited above demonstrates that more consistent reporting is needed. However, the primary contributors to Scope 3 emissions across the biotechnology and pharmaceutical industry are clear: Category 1, 'Purchased Goods and Services' dominates at 48%, while Category 11, 'Use of Sold Goods', comes in second, at 28%. Category 2, 'Capital Goods' also makes a substantial contribution at 8% of the total. The Scope 3 materiality distribution across categories is similar to that found in Medical Technologies, Healthcare, and Apparel. Like in those industries, Scope 3 reductions should focus on the supply chain of purchased goods and services and the carbon impact created through the use of those goods and services. Decarbonizing Scope 3 emissions will require companies to engage their customers and suppliers to reduce their emissions through energy efficiency, waste reduction, resource efficiency as well as encouraging the purchasing of renewable energy and/or carbon offsets.

Figure 6: Scope Heatmap Industry Comparison

Scope 3 Sector Profile		Biotechnology & Pharmaceuticals	Medical Technology	Apparel & Textiles	Health Care Retail
1	Purchased Goods and Services	48%	41%	44%	43%
2	Capital Goods	8%	10%	3%	9%
3	Fuel- and Energy-Related Activities	2%	2%	1%	2%
4	Upstream Transportation and Distribution	1%	3%	3%	2%
5	Waste Generated in Operations	1%	0%	0%	0%
6	Business Travel	2%	2%	0%	2%
7	Employee Commuting	1%	2%	0%	4%
8	Upstream Leased Assets	1%	1%	0%	1%
9	Downstream Transportation and Distribution	3%	3%	2%	4%
10	Processing of Sold Products	3%	4%	0%	4%
11	Use of Sold Products	29%	29%	43%	25%
12	End-of-Life Treatment of Sold Products	1%	1%	3%	1%
13	Downstream Leased Assets	0%	0%	0%	0%
14	Franchises	0%	2%	1%	2%
15	Investments	1%	1%	0%	2%

From Commitment to Measurable Action

To meet Paris Climate Agreement targets, the industry must continue to improve the quality and comparability of reporting, while taking rapid, measurable action to reduce emissions now.

Accurate reporting will provide a clear baseline from which to measure improvements as well as identify key hotspots for change. After targets aligned with a 1.5 degree world for both 2030 and 2050 are set, practical action plans must be put in place to reduce emissions within the control of each company (Scope 1 and 2) and encourage suppliers and customers to measure and reduce their own emissions (Scope 3). Sharing data on a pre-competitive basis across the industry will improve the quality and actionability of reporting, as will the adoption of common industry-wide sustainability frameworks.

My Green Lab Certification and the ACT® Label are examples of common industry-wide frameworks that are crucial tools for turning commitments into measurable outcomes. They provide a roadmap of practical opportunities for companies, scientists, and suppliers to take positive action. Among other impact categories, My Green Lab Certification focuses on reducing energy consumption for Scope 1 and 2 emissions through laboratory operations, as well as the laboratories that a company contracts within its supply chain. The ACT program empowers companies reduce their lab suppliers' impact by providing the transparency and third-party verification necessary to identify and select lower-emission products. The ACT evaluation framework also ensures the products a company makes are produced in a sustainable manner and operate efficiently.

In recognition of its potential for impact, My Green Lab Certification was recently selected as a key indicator of progress for the UNFCCC High-Level Climate Champions' 2030 Breakthroughs campaign. This campaign has established critical breakthrough outcomes, measurable industry targets for turning commitments into action. The 2030 Breakthrough Outcome states that "95% of labs across major pharma and med-tech companies are My Green Lab certified to the green level by 2030".[20] Achieving that 'Breakthrough Outcome', along with other decarbonization strategies, will be crucial to ensure that the industry progresses along its pathway to a net-zero future. Developing a robust Green Lab program at every company will help instill a culture of sustainability within the organization, which has benefits that go well beyond energy, water, and waste reductions. For example, a positive culture of sustainability can influence better purchasing decisions and reduce the downstream impact of products sold, both key targets for Scope 3 carbon savings.

Biotech and pharmaceutical companies have the technical acumen, culture of innovation, and financial resources required to be a global leader in environmental sustainability. Perhaps no other industry has more experience making long-term capital investments to tackle some of the world's most complex problems for the benefit of society. Just as the industry showed the world the best that science had to offer with the response to COVID-19, the industry must turn now to the greatest threat of our time, climate change, and become a model for other sectors to follow.

UNFCCC High-Level Climate Champions' 2030 Breakthroughs outcome is that

95%

of labs across major pharma and med tech companies are My Green Lab certified to the green level by 2030

[20] Upgrading Our Systems Together: A global challenge to accelerate sectors breakthroughs for COP26 -- and beyond (2021) https://racetozero.unfccc.int/wp-content/uploads/2021/08/2020-Breakthroughs-Upgrading-our-sytems-together.pdf

Opportunities for Continued Research

More research will be needed into the drivers of Scope 1 and 2 emissions and the distribution of those emissions between research and manufacturing.

Further, case studies on the specific carbon reduction benefits of interventions like My Green Lab Certification and sustainable procurement through programs like ACT are needed to better understand their alignment with carbon reduction targets. My Green Lab will be charting the industry's progress relevant to the crucial activities identified in this report, including consistent and standardized reporting of Scope 1, 2 and 3 and encouraging industry-wide Scope 3 emissions reporting that allows meaningful comparison between companies and the sharing of data. We will also conduct further examination into areas that remain poorly quantified, such as the carbon emissions of clinical trials.[21] This study will be updated regularly for the UN Conference of Parties in order to provide consistent monitoring of the industry's progress towards a zero carbon future.

[21] A strategy to reduce the carbon footprint of clinical trials (2021) https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)01384-2/fulltext

Carbon Footprint Methodology

Urgentem offers a unique dataset that covers greenhouse gas (GHG) emissions data for more than 30,000 securities globally over the last 10 years.

These historical emissions include Scope 1, Scope 2 and all 15 categories of Scope 3 (value-chain) emissions. Urgentem covers granular Scope 3 emissions, which are of utmost importance for deriving the carbon footprint of a firm, encompassing all the CO_2-e emitted throughout the value chain. To put the importance of Scope 3 emissions into perspective, it should be noted that they represent more than 85% of the world's overall footprint. However, Scope 3 emissions are difficult to measure and are rarely reported by firms.

Urgentem has developed a statistically robust inference model to estimate Scope 3 information if a corporation fails to report this data. To ensure transparency, the dataset makes it possible to distinguish whether the emissions have been reported by the firm itself or estimated using the Urgentem inference model. Second, Urgentem offers long time series (ten years) of companies' emissions with consistency across all relevant data points. Finally, Urgentem ensures a very high quality of data given that it relies on sophisticated, multi-stage data-cleaning and validation processes and outlier treatment, complemented by bilateral undertakings with the companies themselves to validate the results.

Urgentem classifies Scope 1 and 2 emissions data into various quality categories. Category 1 is data that has been fully reported and third party assured, while Category 2 includes complete reporting without third-party assurance. For the purposes of this analysis, companies with data quality 1 and 2 were used for comparison between sectors and trends over time.

Carbon target data and their temperature scores are based on publicly reported targets data that are collected and treated by Urgentem. Only the targets which have sufficient detail on base years, target years, reductions, and coverage have been used for this analysis. Targets data suffers from a reporting lag, so the analysis includes only targets set in or before 2020.

Urgentem translates carbon reduction targets into temperature scores through an innovative methodology developed by the Science Based Targets Initiative, alongside Urgentem. This methodology allows the comparison and aggregation of target ambition at the sector level.[22]

Scope 3 emissions represent more than

85%

of the world's overall footprint

[22] Temperature Rating Methodology: A temperature rating method for targets, corporates, and portfolios (2021) https://sciencebasedtargets.org/resources/legacy/2020/09/Temperature-Rating-Methodology-V1.pdf

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