Using carbon credits to meet corporate climate targets

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MSCI Carbon Markets
Powered by Trove Research

VCMI Voluntary Carbon Markets Integrity Initiative

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Bibliography

1. Trove Research's calculated Implied Temperature Rise model was created independently by Trove Research before the merger with MSCI . The model uses a different methodology to MSCI and therefore outputs are not comparable.

Executive Summary

This report has been conducted for the VCMI by MSCI Carbon Markets (formerly Trove Research) with support from Rockefeller Philanthropy Advisors. The report presents a detailed analysis of how the use of carbon credits could close the emissions gaps for companies with science-based targets, deploy additional finance in mitigating beyond value chain emissions and how this could affect the number of companies setting climate commitments and the strength of those targets.

Emissions gap

Across all firms with climate targets the gap between current emissions and targets is **c.400 $MtCO_2e$** for Scope 1 & 2. This increases to **c.2 $GtCO_2e$** in 2030. The gap in Scope 3 emissions targets is even larger, at around **1.4 $GtCO_2e$** today and over **7 $GtCO_2e$** by 2030.

Closing the Scope 3 gap with carbon credits

Assuming only firms that are on-track to achieve SBTi approved Scope 1 & 2 emissions targets are eligible to use carbon credits to close the gap in Scope 3 emissions, this could create a demand for carbon credits of **640 Mt** today and **2.2 $GtCO_2e$** in 2030, if no limitations were put in place with regards to the maximum amount of carbon credits used. On the assumption that carbon credits cost $30/tCO2e, this demand could generate an additional expenditure on carbon credits of **$19bn** today and **$65bn** in 2030. If the use of carbon credits is limited to 50% of Scope 3 emissions today, and 25% in 2030, the finance required would be **$19bn** and **$3bn** respectively.

Reducing the minimum threshold for the lower VCMI claim tier ("silver")

Reducing the minimum threshold for the lower VCMI tier "Silver" from 20% to 10% would increase the number of companies eligible for "Silver" by around 30% (6 firms with 2Mt of emissions), based on the firms currently on-track for Scope 1, 2 and 3 under SBTi targets and using carbon credits. Currently, SBTi firms that are on-track for Scope 1, 2 and 3 targets cover only 0.6% of their emissions with carbon credits – equivalent to an expenditure of **$0.2bn** at $30/t. If, however, all on-track firms used carbon credits up to a maximum of 10% of their total emissions footprint, this would require **$10bn** in finance (at $30/t) and mitigate some **320 MtCO2e** of beyond value chain emissions.

Incentivising more climate action

The above figures are based only on the number of companies that have declared emissions targets today. Allowing companies to use carbon credits to meet their emissions targets should encourage more companies to set ambitious climate targets as it will lower the costs of reducing emissions.

The analysis in this report estimates that if companies are allowed to use carbon credits to meet 50% of their total emissions gap (Scope 1, 2 and 3) we could expect to see around **1,000** more companies setting ambitious climate targets representing some **$10 trillion** in market capital. **400** of these new firms would be expected to set SBTi approved targets. If these new targets are achieved the average Implied Temperature Rise of companies with climate targets would reduce by **0.5°C** from 2.5°C to 2.0°C.

Recommendations

Thousands of companies have made public declarations to dramatically reduce their carbon emissions. Many of these are significantly behind in meeting their near-term targets, and many other companies are reluctant to set science-based targets because of the difficulty in achieving them.

The use of carbon credits could significantly support the climate ambition and impact of corporates. High-quality carbon credits with strong benefits for the climate, society and nature, are often several times cheaper than the cost of reducing corporate emissions, especially in hard to abate sectors. Allowing companies to use these high-quality credits against their targets would encourage more firms to adopt ambitious climate targets and deliver better outcomes for the climate, broader environment and society.

1. Introduction

Information Classification: GENERAL

1. Introduction

Context

This report presents an analysis of the potential impact of allowing companies to use carbon credits as part of their climate mitigation efforts. The report forms part of a broader set of research supported by the Voluntary Carbon Market Integrity initiative (VMCI) on barriers to companies committing to and achieving ambitious climate targets.

The use of carbon credits as part of corporate climate mitigation efforts is hotly debated. For some it provides a cost-effective means to achieve better climate outcomes at lower costs. For others it is a way to avoid making the fundamental (and costly) changes necessary to reduce emissions.

The Voluntary Carbon Market Integrity Initiative's (VCMI) provisional guidance in June 2022 encouraged firms to use carbon credits but only in addition to mitigation actions in line with science-based targets ("gold" and "silver" tiers). For many firms, however, achieving science-based targets for Scopes 1, 2 and 3 is prohibitively expensive. To ensure these companies remained engaged with the decarbonisation journey, the VCMI created an additional tier ("bronze"). This would allow firms to use carbon credits as part of the mitigation for Scope 3 emissions, but only up to 2030.

Until now there has been little research on how the use of carbon credits would impact the ambition of firms and the effect on the climate. Several research papers have explored the benefits of trading emission rights at the national and international level and for the forestry sector (Piris-Cabezas et al., 2023, Pietracci et al., 2023, Yu et al., 2021, Hof et al., 2017), but not in relation to voluntary corporate climate action.

The purpose of this report is to provide quantified analysis of the effect of firms using carbon credits in their near-term climate strategies. The underlying hypothesis is that by providing access to the global carbon credit market companies will be willing to set more ambitious targets and go further in achieving them.

This report

Two main lines of analysis are explored in this report. The first assesses the extent to which companies are on or off-track in relation to their climate targets, either under the Science Based Targets initiative (SBTi) or self-declared (Section 2). This provides a measure of the scale of the opportunity for carbon credits to help in align company performance with their stated targets. This is a static analysis based on companies with climate targets today. [1]

Section 3 takes a dynamic approach looking at how the inclusion of carbon credits could encourage more firms to set ambitious climate targets. The analysis compares the level of climate ambition in different sectors with estimates of the cost of abatement in each sector. Climate ambition is measured in three ways: (i) number of companies signed up to SBTi net zero targets as a proportion of all companies with climate targets, by sector, (ii) market capitalisation of companies signed up to SBTi as a proportion of world corporate market capital, by sector. [2] (3) strength of the targets from all companies with climate targets as captured through the Trove Research's metric of "Implied Temperature Rise (ITR)". Sections 4 and 5 show the potential impact on emissions and additional finance required by allowing companies to use carbon credits in their mitigation efforts.

About MSCI Carbon Markets and Trove Research

This project was conducted by Trove Research using Trove Research data, models and classifications. Trove Research was acquired by MSCI on 1 November 2023 and is now known as MSCI Carbon Markets. The approach and methods in this work differ from that taken by MSCI ESG Research.

Acknowledgements

We are grateful for the support provided by VCMI to help fund this work. We also acknowledge the kind support of colleagues in MSCI and Enerdata who assisted with cost of abatement and global market capitalisation data.

1. Trove Research's climate commitments database as of September 2023. 2. Market capitalisation of a company is calculated by multiplying its total shares outstanding by the market value per share.

2. Extent of on/off-track in relation to climate performance

Information Classification: GENERAL

2.1 Methodology

Overview

This section assesses the extent to which companies are on or off-track to achieve their stated emissions targets. Company emissions data and climate targets are taken from Trove Research's database of over 10,000 companies, although not all companies have emission targets. Both emissions and targets relate to absolute emissions, not emissions intensity, and cover only near-term targets up to 2035. We have not attempted to assess performance against intensity targets as part of this report. Intensity targets cover a relatively small proportion of all company climate targets. In our dataset some 15% of companies have intensity-based commitments, but over 95% of these also have absolute targets. Dragomir et al. (2023) show that absolute targets are preferred in the short, medium, and long term and that intensity targets are much less ambitious than absolute targets. Therefore, we focus on absolute targets as a measure of performance against a clearly defined start- and end-point.

Off- and on-track performance gap has been calculated separately for Scopes 1 & 2 and for Scope 3 emissions and targets. Using emissions corresponding to baseline years for each target, we calculate the expected emission for each target at the most recently captured emissions year. This calculation uses a linear annual reduction from baseline to target year.

Where multiple targets exist within the timeframe (e.g. Scope 1 by 2025 and a combined Scope 1 & 2 by 2030), the strongest effective target is used to evaluate performance. When a combined target is for Scopes 1, 2 & 3, we assume that Scope 3 will be reduced by the specified target (since usually the dominant effect). For firms with a 1.5°C aligned target line a 4.2% annual reduction for Scopes 1 & 2 from 2019 was assumed, and 2.5% annual reduction for Scope 3. [1] We assume that when a company meets its own target, it maintains emissions from that point. We also assume that in absence of targets, emissions will similarly persist at the most recent year's level.

Companies are assessed on the degree to which they are on-track or off-track relative to their target. A company that has emissions higher than their target is off-track, and one with emissions lower than their target is on-track.

The extent of on or off-track is presented as percentage. The calculation is as follows:

$$Target\ completion\ gap\ (\%) =$$

$$1 - \frac{base\ year\ emissions - reporting\ year\ emissions}{base\ year\ emissions - target\ year\ emissions} x\ 100$$

Carbon credit prices

The modelling assumes that high-quality carbon credits cost \$30/tCO_2e. This estimate is based on an analysis of carbon credit prices over the last 3 years using Trove Research's database of over 20,000 transaction datapoints.

This price assumption is considerably higher than the volume weighted average market price of \$5-8/tCO2e seen over the last 6 months. This is because the volume weighted average price includes a mix of project types, vintages and quality. Within this mix high-quality projects with strong co-benefits, for example nature-restoration projects have traded in the region of \$30/t. New, high-quality, nature-restoration projects can also have breakeven prices in excess of these price levels.

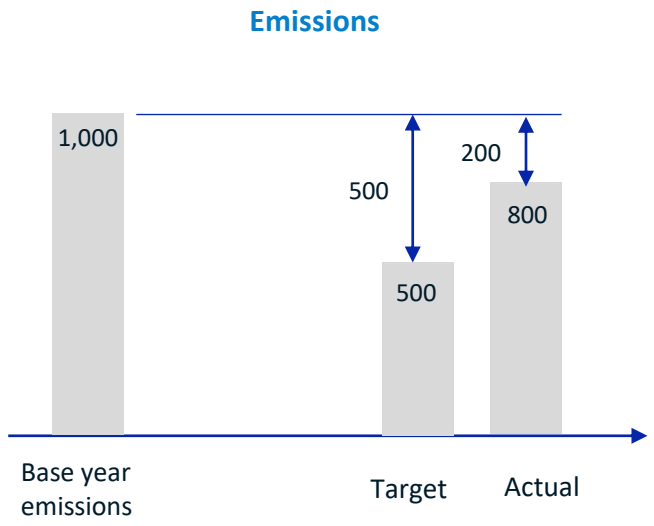
1. SBTi Corporate Net-Zero Standard, Version 1.1, April 2023, https://sciencebasedtargets.org/resources/files/Net-Zero-Standard.pdf

2.1 Methodology (cont'd)

The examples below illustrate how the degree of on or off-track is calculated. Two types of off-track are shown and one on-track. The summary statistics for on-track / off-track for all firms in the database are show on the following page.

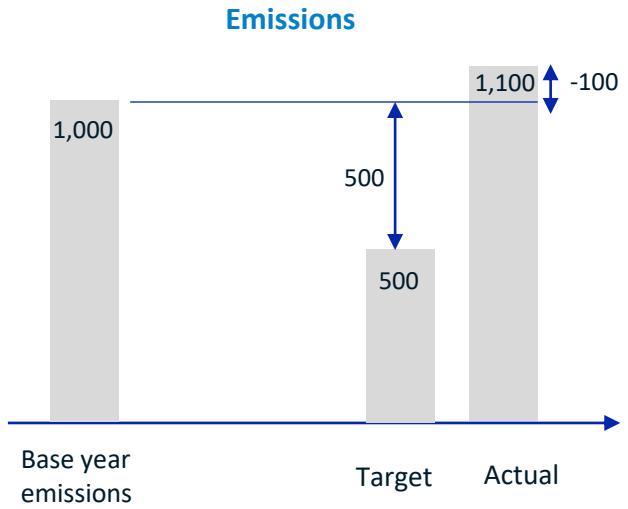
Example Off-track

A company with a 50% absolute reduction target, base year emissions of 1,000 tCO_2e and reporting year emissions of 800 tCO_2e would be *off-track.* The percentage gap to target completion would be 1 – (1,000 - 800) / (1,000 - 500) **= 60%.**



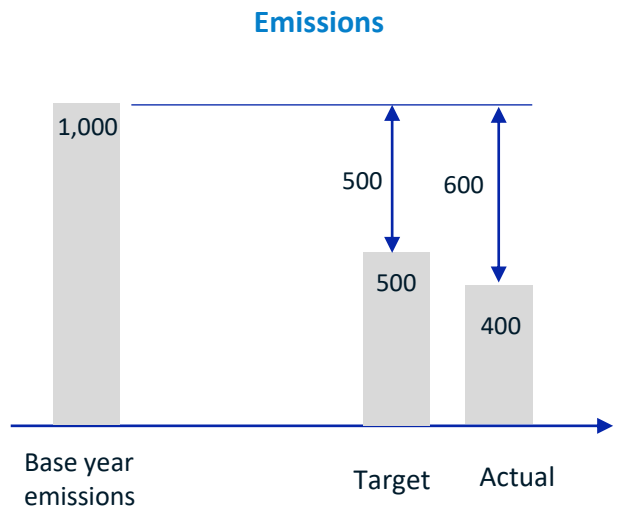
Example Off-track

A company with a 50% absolute reduction target, base year emissions of 1,000 tCO_2e and a reporting year emissions of 1,100 tCO_2e would be *off-track.* The percentage gap to target completion would be 1 – (1,000 – 1,100) / (1,000 - 500) **= 120%.**



Example On-track

A company with a 50% absolute reduction target, base year emissions of 1,000 tCO_2e and reporting year emissions of 400 tCO_2e would *on-track.* The percentage gap to target completion would be 1 – (1,000 - 400) / (1,000 - 500) = **- 20%.**



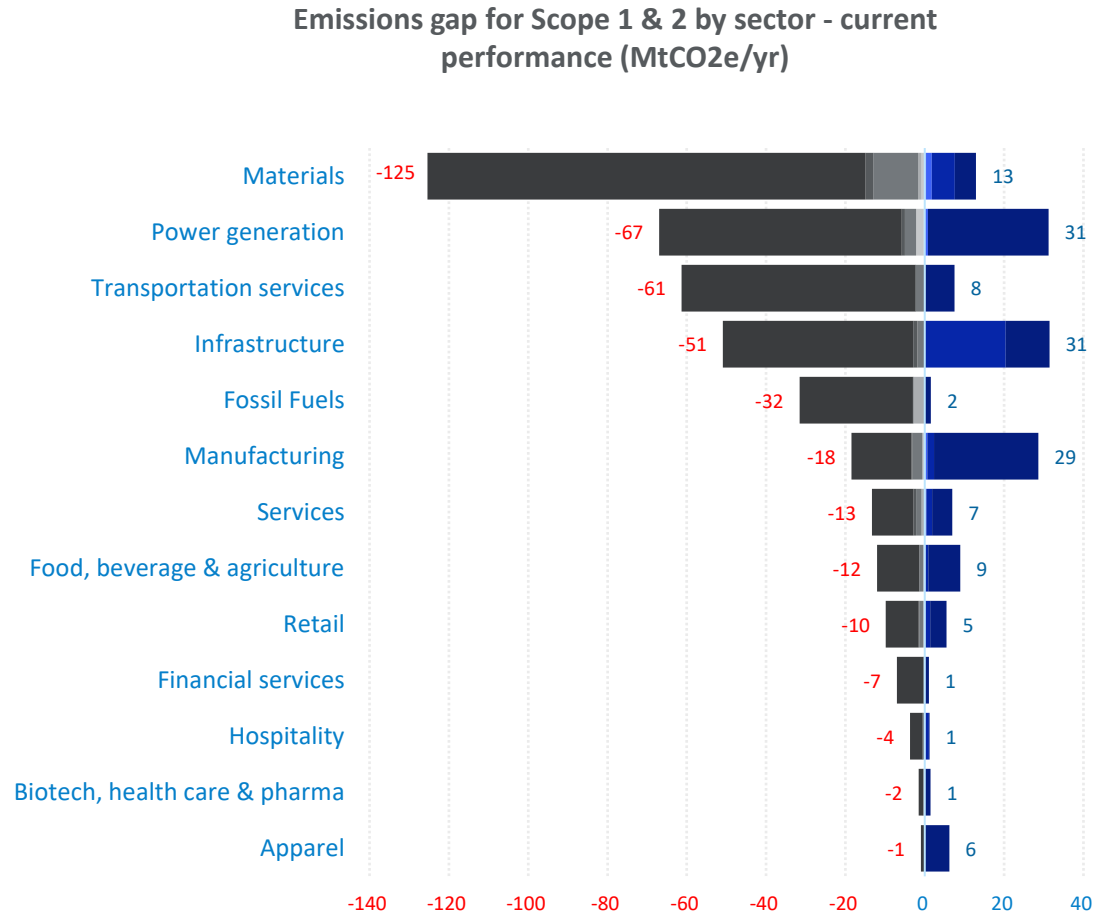
1. SBTi Corporate Net-Zero Standard, Version 1.1, April 2023, https://sciencebasedtargets.org/resources/files/Net-Zero-Standard.pdf

2.1 Methodology (cont'd)

The table and figure below show the gap for Scope 1 & 2 emissions for current performance against a company's own targets.

Emissions gap for Scope 1 & 2 by sector - current performance (MtCO2e/yr)

Sector	TOTAL Off-track	Off-track					On-track					TOTAL On-track
		> 100%	50 - 100%	25 - 50%	10 - 25%	0 - 10%	0 - 10%	10 - 25%	25 - 50%	50 – 100%	> 100%	
Materials	-125	-110	-13	-1	-1	-0	0	0	1	6	5	13
Power generation	-67	-61	-4	0	-2	-0	0	0	1	0	30	31
Transportation services	-61	-59	-2	-0	0	-0	0	0	0	0	7	8
Infrastructure	-51	-48	-3	-0	-0	-0	0	0	0	20	11	31
Fossil Fuels	-32	-29	-0	-3	-0	0	0	0	0	0	2	2
Manufacturing	-18	-15	-3	-0	-0	-0	0	0	0	2	26	29
Services	-13	-10	-2	-1	-0	0	0	0	0	1	5	7
Food, beverage & agriculture	-12	-11	-1	-0	-0	-0	0	0	0	1	8	9
Retail	-10	-8	-1	-0	-0	-0	0	0	0	1	4	5
Financial services	-7	-7	-0	-0	-0	-0	0	0	0	0	1	1
Hospitality	-4	-3	-1	-0	-0	-0	0	0	0	1	0	1
Biotech, health care & pharma	-2	-1	-0	-0	-0	-0	0	0	0	0	1	1
Apparel	-1	-1	-0	-0	-0	-0	0	0	0	0	6	6
TOTAL	**-403**	**-364**	**-30**	**-6**	**-3**	**-0**	**0**	**1**	**3**	**33**	**108**	**144**



Source: Trove Research database of corporate climate commitments

Information Classification: GENERAL

2.2 Summary of emissions gap - all scenarios

The table below summarises the performance gap for eight different scenarios. The following four pages show the gaps by sector for the four main scenarios of Scope 1 & 2 vs Scope 3, and current vs projected performance.

These scenarios vary in three ways: (i) Scopes 1 & 2 vs Scope 3; (ii) current vs projected performance in 2030; and (iii) companies' own targets vs SBTi's 1.5°C aligned near-term targets.[1] The table shows the significant gap when Scope 3 emissions are considered, amounting to 1.4Gt on current performance and reaching over 7Gt/yr in 2030.

Summary of emissions performance gap

Scope Coverage	Scenarios		Off-track		On-track	
			# of Companies	Emissions gap (MtCO2e/yr)	# of Companies	Emissions gap (MtCO2e/yr)
Scenarios shown in following pages						
Scope 1 & 2	**Current performance**	Companies' own targets	1,337	- 403	1,055	144
		1.5°C aligned targets	1,285	- 378	1,059	171
	Projected performance in 2030	Companies' own targets	1,684	- 1,953	569	0
		1.5°C aligned targets	1,729	- 2,052	524	51
Scope 3	**Current performance**	Companies' own targets	931	- 1,410	625	1,351
		1.5°C aligned targets	912	- 1,416	615	1,055
	Projected performance in 2030	Companies' own targets	849	- 7,394	606	0
		1.5°C aligned targets	857	- 7,514	598	*246*

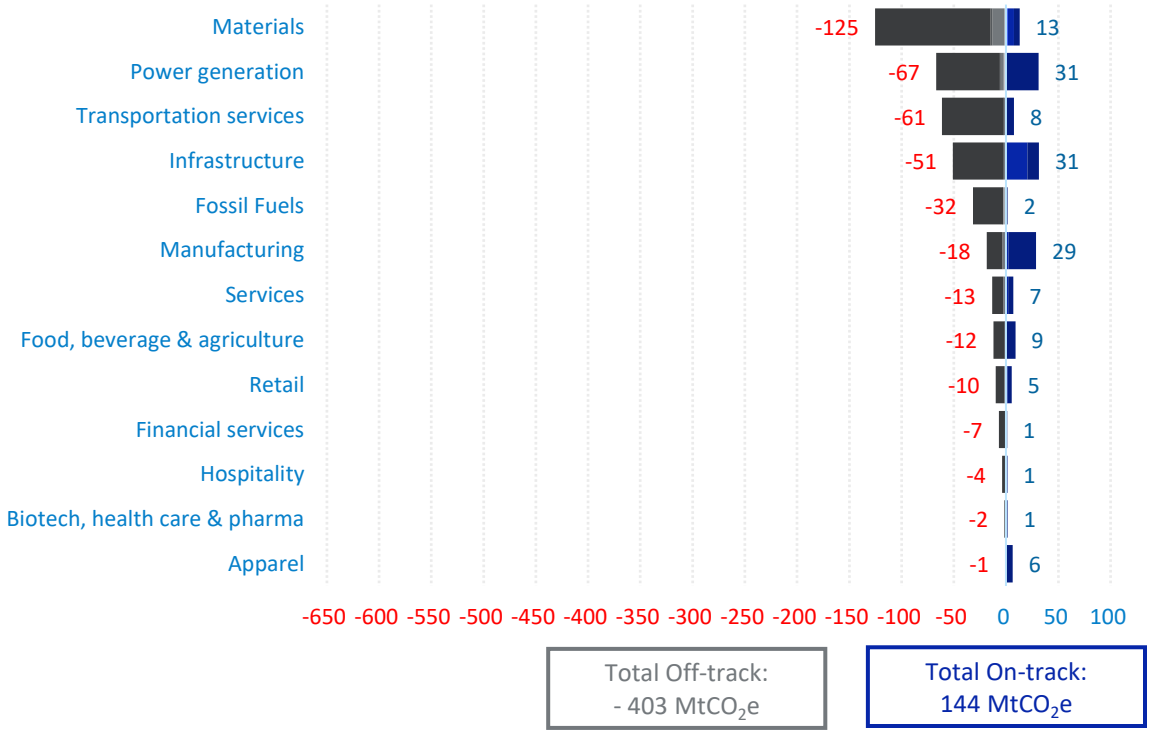
1. The 1.5°C aligned near-term targets scenario assumes that all companies in the analysis that have self-declared targets will seek SBTi validation and as a result their targets will be aligned to SBTi's cross sector 1.5° C pathway.

2.3 Scope 1 & 2 – current performance

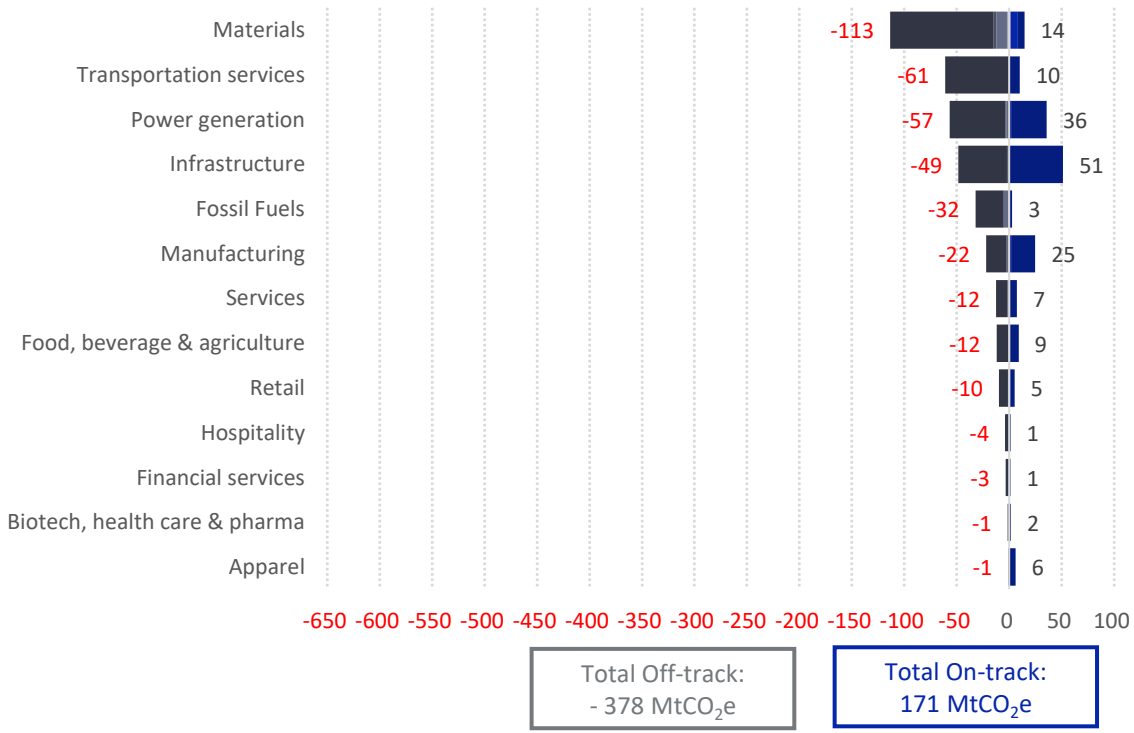
The charts below show the current emissions performance, against achieving companies' own near-term targets vs. 1.5°C aligned targets for Scope 1 & 2.

The figure on the left shows that the sector with the largest off-track emissions performance gap is the Materials sector, which is currently 125 $MtCO_2e$ away from meeting its targets for Scope 1 & 2. The best performing sector is Infrastructure (total on-track performance of 31 $MtCO_2e$), with 87 companies in this sector going beyond their Scope 1 & 2 targets (see Appendix A.1). When sector-based targets are compared to the 1.5°C aligned targets, the Materials sector would still have the largest performance deficit at 113 $MtCO_2e$, and the Infrastructure sector would remain the best performing (51 $MtCO_2e$).

Current performance against own targets for Scope 1 & 2 (MtCO2e)



Current performance against 1.5°C aligned targets for Scope 1 & 2 (MtCO2e)



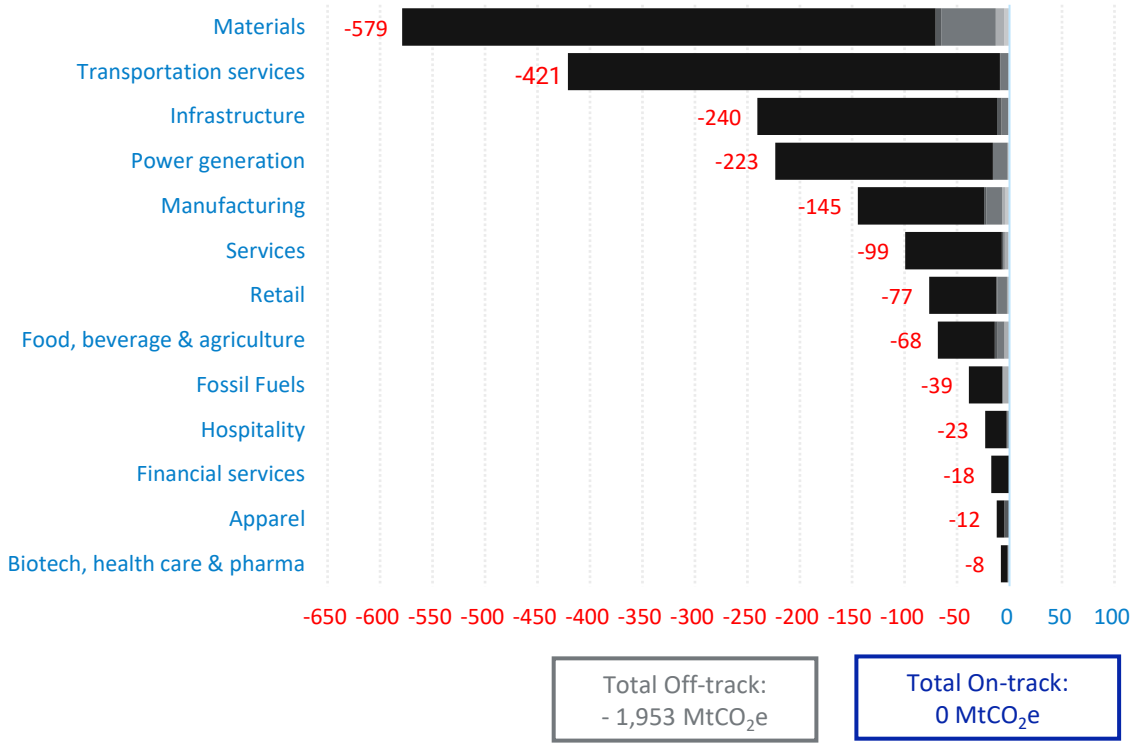
Information Classification: GENERAL

2.4 Scope 1 & 2 - projected performance in 2030

The charts below show the projected emissions performance in 2030 against achieving companies' own near-term targets vs. 1.5°C aligned targets for Scope 1 & 2 at different levels of being off-and on-track.

The patterns are similar as for current emissions but amplified. Emissions gap is zero as companies that are projected to be on-track in 2030 have met their targets. The sector with the largest projected off-track emissions gap is Materials, which would be expected to be 579 $MtCO_2e$ away from meeting its targets for Scope 1 & 2 in 2030 if current trends continue. Biotech is expected to be the sector with the lowest gap by 2030, represented by 76 companies being off-track and 18 companies meeting their targets (Appendix A.2). When sector-based targets are compared to the 1.5°C aligned targets through to 2030, Materials would still have the largest performance deficit at 621 $MtCO_2e$ (see figure on the right), and Infrastructure would be the best performing (35 $MtCO_2e$), as their targets are stronger compared to 1.5°C trajectory.

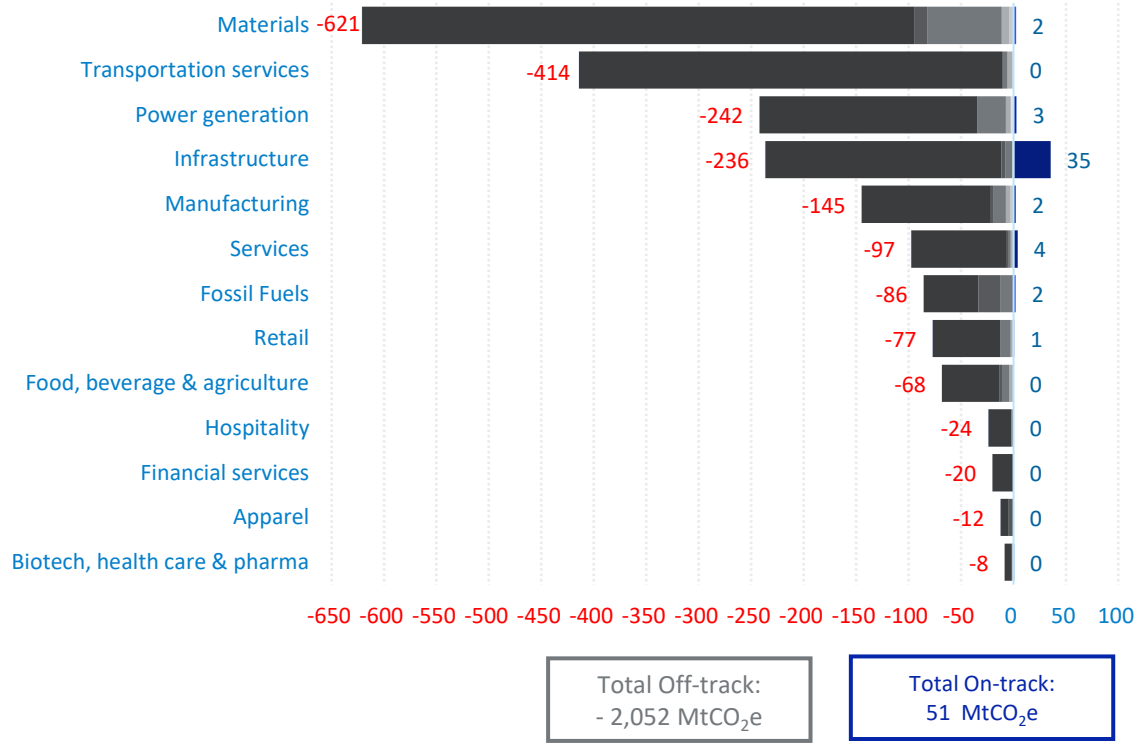
Projected performance in 2030 against own targets for Scope 1 & 2 (MtCO2e)



Total Off-track: - 1,953 $MtCO_2e$

Total On-track: 0 $MtCO_2e$

Projected performance in 2030 against 1.5°C aligned targets for Scope 1 & 2 (MtCO2e)



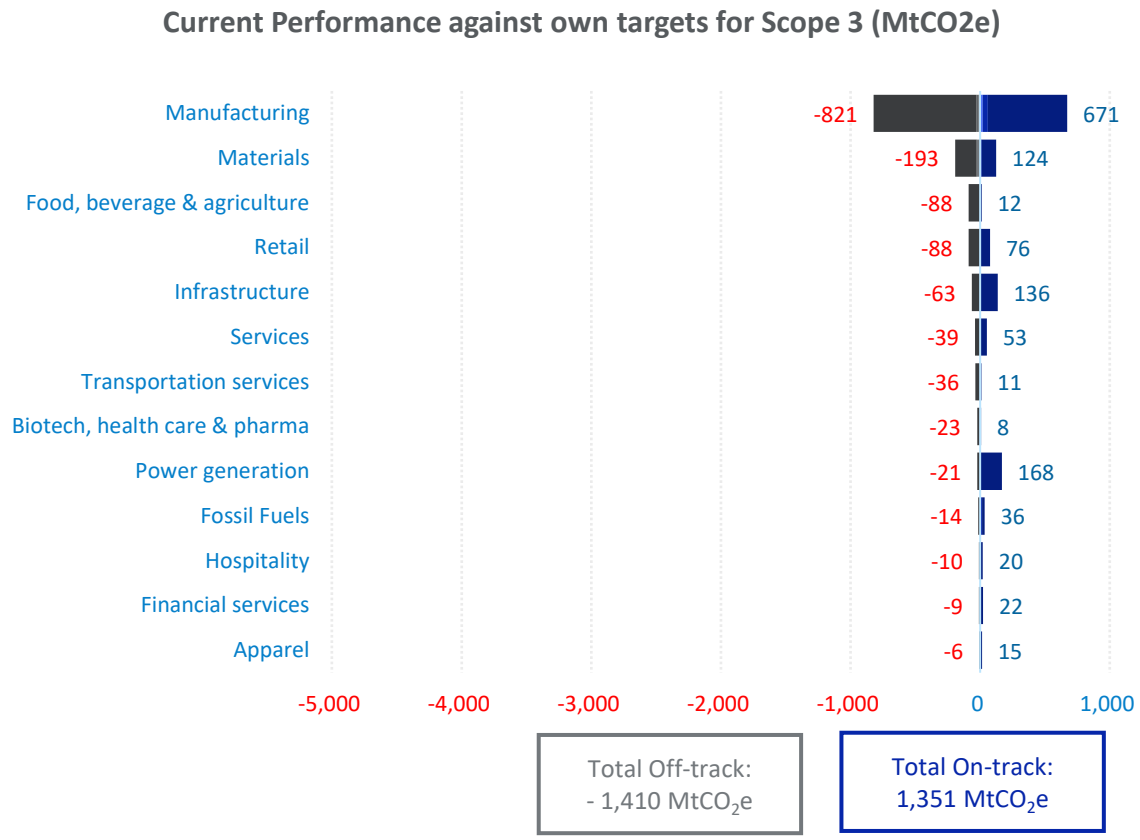
Total Off-track: - 2,052 $MtCO_2e$

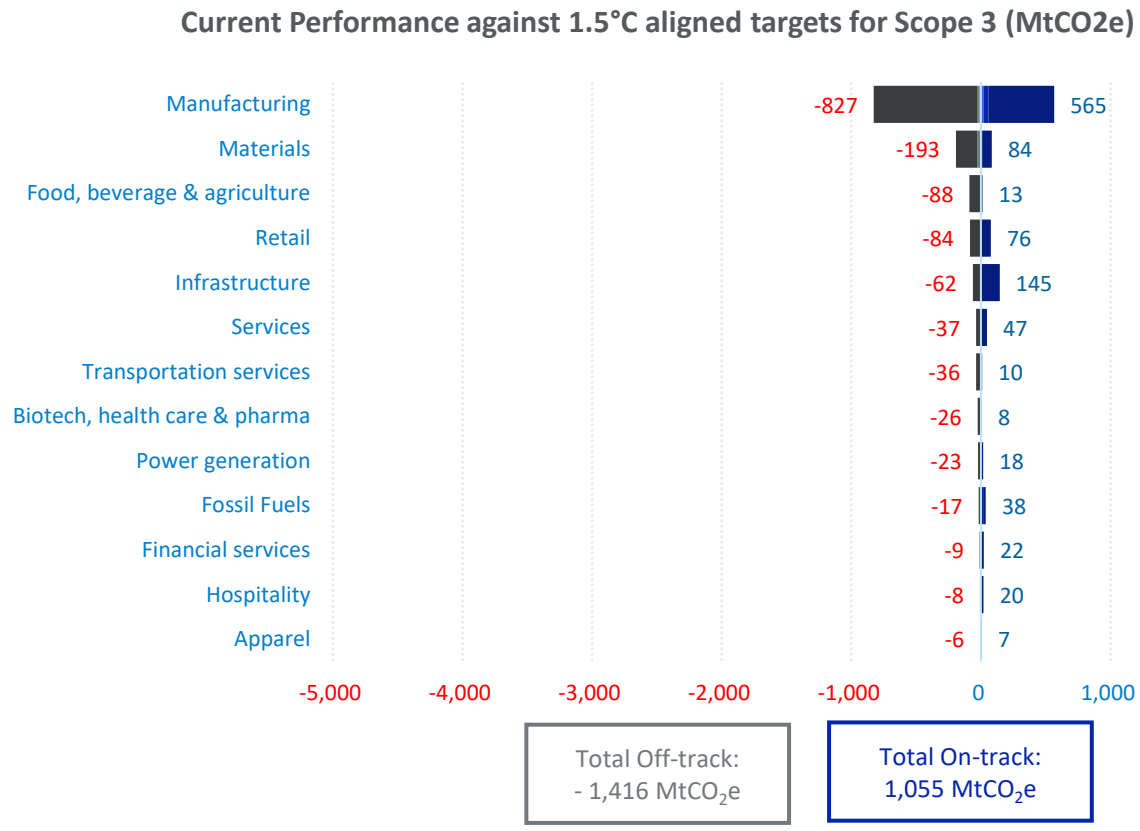
Total On-track: 51 $MtCO_2e$

2.5 Scope 3 only - current performance

The charts below show the current emissions performance, against achieving companies' own near-term targets vs. 1.5°C aligned targets for Scope 3 only at different levels of being off-and on-track.

Again, the sector with the largest off-track emissions gap is Manufacturing, which is currently 821 $MtCO_2e$ away from meeting its targets for Scope 3. However, Manufacturing also has the largest on-track performance of 671 $MtCO_2e$, with 89 companies in this sector going beyond their Scope 3 targets (Appendix A.3). When we project the sector-based targets to the 1.5°C aligned targets, instead of each sector's own Scope 3 targets, the Manufacturing sector would still have the largest performance deficit at 827 $MtCO_2e$, and the same sector would also have the largest on-track performance (565 $MtCO_2e$).



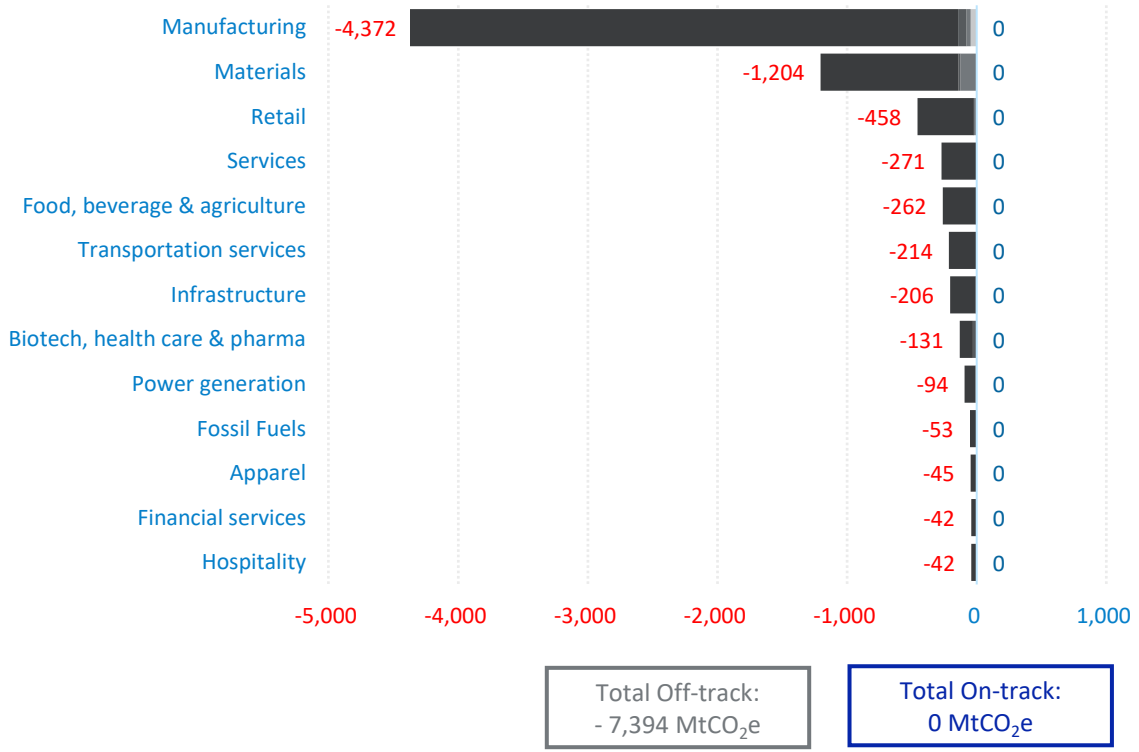


2.6 Scope 3 only - projected performance in 2030

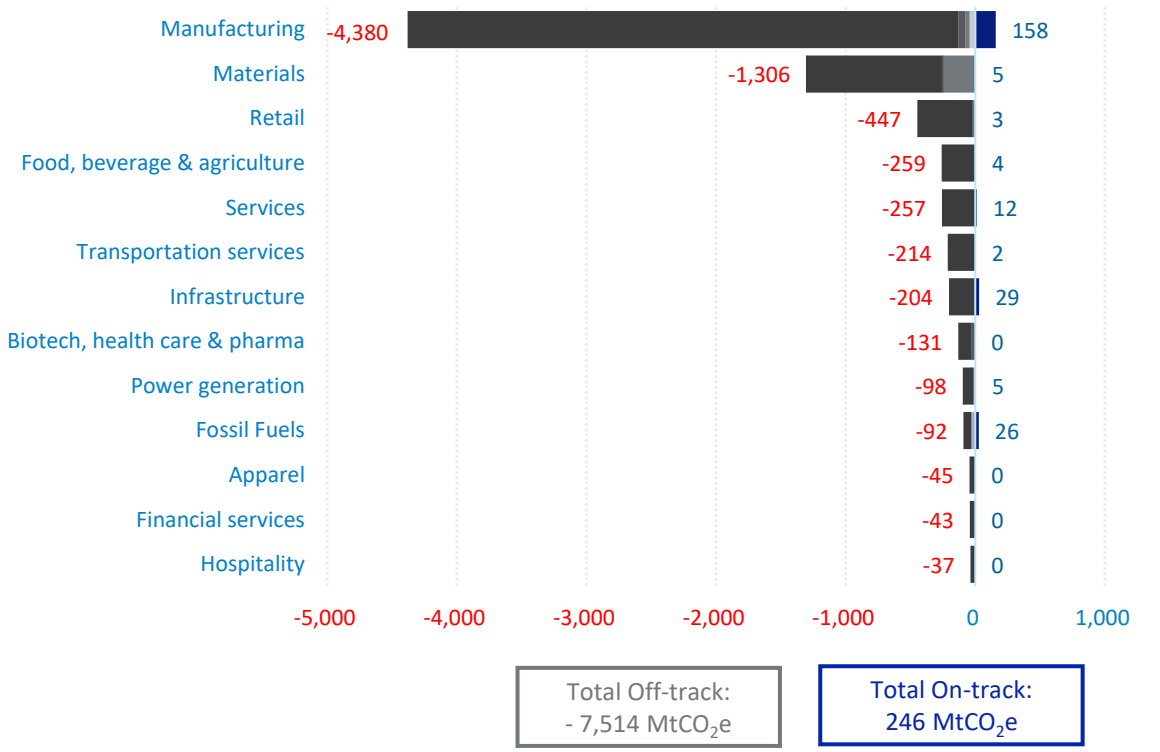
The charts below show the projected emissions performance in 2030, against achieving companies' own near-term targets vs. 1.5°C aligned targets for Scope 3 at different levels of being off-and on-track.

The figure on the left shows that the sector with the largest projected off-track emissions performance gap is Manufacturing, which is projected to be c. 4,400 $MtCO_2e$ away from meeting its targets for Scope 3 in 2030 if current trends continue. Financial Services and Hospitality are expected to have the smallest projected performance gaps in 2030 at 42 $MtCO_2e$ each, with 78 and 14 companies in the two sectors respectively projected to meet their Scope 3 targets (see Appendix A.4). When projected to the 1.5°C aligned targets through to 2030, Manufacturing would still have the largest performance deficit at 4,380 $MtCO_2e$ (see figure on the right), with Hospitality having the smallest performance gap (37 $MtCO_2e$).

Projected performance in 2030 against own targets for Scope 3 (MtCO2e)



Projected performance in 2030 against 1.5°C aligned targets for Scope 3 (MtCO2e)



3. Cost of abatement vs climate outcomes

Information Classification: GENERAL

3.1 Data and methodology

Methodology

The purpose of this section is to compare the cost of reducing emissions in different sectors with their climate ambition. From this it is possible to infer how corporate climate ambition could change if access to lower cost forms of abatement (i.e., carbon credits) were permitted as part of decarbonisation efforts.

Defining abatement costs

Different sectors face different costs of abatement. Hard-to-abate sectors are often seen as comprising energy intensive processes such as steel, cement and petrochemicals, and these tend to face the steepest abatement costs. Other sectors such as shipping or buildings have more alternatives to choose lower carbon sources of energy. In each sector the costs of abatement vary depending on how much abatement is being considered, and the analysis needs to assess sectors on a comparable basis. We do this by taking the same point on the abatement cost curves for each sector – a 40% reduction. This is based on the IPCC's estimate that to keep within the 1.5°C limit, global emissions need to be reduced by at least 43% by 2030 compared to 2019 levels, and at least 60% by 2035. [1]

Measuring climate ambition

Our analysis uses three measures of climate ambition in each sector: a) the number of companies setting SBTi targets and committing to do so within two years (compared to the Trove Research's universe of corporate climate commitments database), b) the percentage of global market cap of companies setting SBTi targets (compared to global market cap), and c) the Trove Research's calculated Implied Temperature Rise (ITR) of targets. These climate outcomes are represented by the y-axis of each chart in the following slides and correlated with the cost of abatement. A line of best fit is created through the data points using a natural exponential function. For the first two charts showing the percentage of companies setting targets, the functions fix the Y intercept at 100%. This is because it is assumed that if the cost of abatement were zero, all companies would set SBTi NZ targets and have a 1.5°C ITR.

In the SBTi framework, companies set climate targets aligned to science-based emission reduction pathways aimed at limiting global warming to meet the goals of the Paris Agreement. As of end of September 2023, over 6,000 companies have set or have committed to set SBTi targets. However, the number of companies signed up to SBTi is a crude measure of climate intent as firms vary hugely in size. We therefore assess the proportion of companies with SBTi targets by market capitalisation with reference to the MSCI ACWI Investable Market Index (IMI).

Measuring and comparing climate ambition is a complex task, which also needs to account for a company's emissions so that the baseline years of targets can be accounted for, and targeted reductions put into context. As a result, Trove Research has developed an ITR tool that synthesises a company's emissions and targets data into a single comparable metric. The Trove Research's calculated ITR score for a company estimates the temperature the planet would warm to above pre-industrial levels if every other company behaved in the same way and hit their climate targets. Only companies where an ITR score has been calculated have been modelled and analysed and this would include SBTi and self-declared climate targets.

1. IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.001

3.1 Data and methodology (cont'd)

Data sources

The primary data source analysis of corporate emissions is Trove Research's database of corporate emissions and climate commitments covering over 10,000 firms. The database contains extensive corporate climate commitments for company-level climate targets. Climate targets are drawn from company annual and sustainability reports, combined with data from the Science Based Targets initiative (SBTi). The Trove Research database categorises these targets into five key target types: SBTi net zero, self-declared net zero, SBTi validated emission reduction, self-declared emission reduction and commitment to SBTi with the intention to set a target in the next two years (see Appendix A.5 for definitions and groupings).

Data on the cost of abatement in different sectors was drawn from multiple sources including models and published research. Key sources included:

- Enerdata's long-term Marginal Abatement Cost Curves (MACC) generated by the globally recognised POLES Energy Forecasting Model (global 2030 for all available economic sectors MAC curves for EnerBlue scenario – based on the successful achievement of NDCs and other national pledges)[1].
- Goldman Sachs Global Investment Research – Carbonomics 2022 MAC Curves.
- Mission Possible Partnership's (MPP). MPP's work focuses on industrial decarbonisation in seven hard-to-abate resources and mobility sectors; namely industry (aluminium, cement and concrete - not published yet), chemicals (ammonia), steel and transportation (aviation, shipping and trucking).

Academic and grey research papers were also consulted. This includes work done by the International Energy Agency's (IEA) Energy Technology perspectives publications, Network for Greening the Financial System's (NGFS) publications, as well as other peer reviewed academic papers on the cost of abatement in different sectors.

Considerable efforts were made to aggregate and standardise the data from each source to enable a comparison across sectors at a broadly similar level of abatement. This involved excluding some data sources that estimated abatement costs at very low or high levels of abatement. The electricity generation sector was also excluded from analysis. This is because in many countries power generation sector is governed by national regulations and policies, and hence utility companies do not have the opportunity to set climate targets independently.

1. https://www.enerdata.net/research/marginal-abatement-cost-curves-MACCs-forecast.html .

3.2 Cost of abatement methodology

The table below summarises the range for each sectors' cost of abatement at approximately a 40% reduction in emissions.

Summary of sectors and cost of abatement at 40% abatement

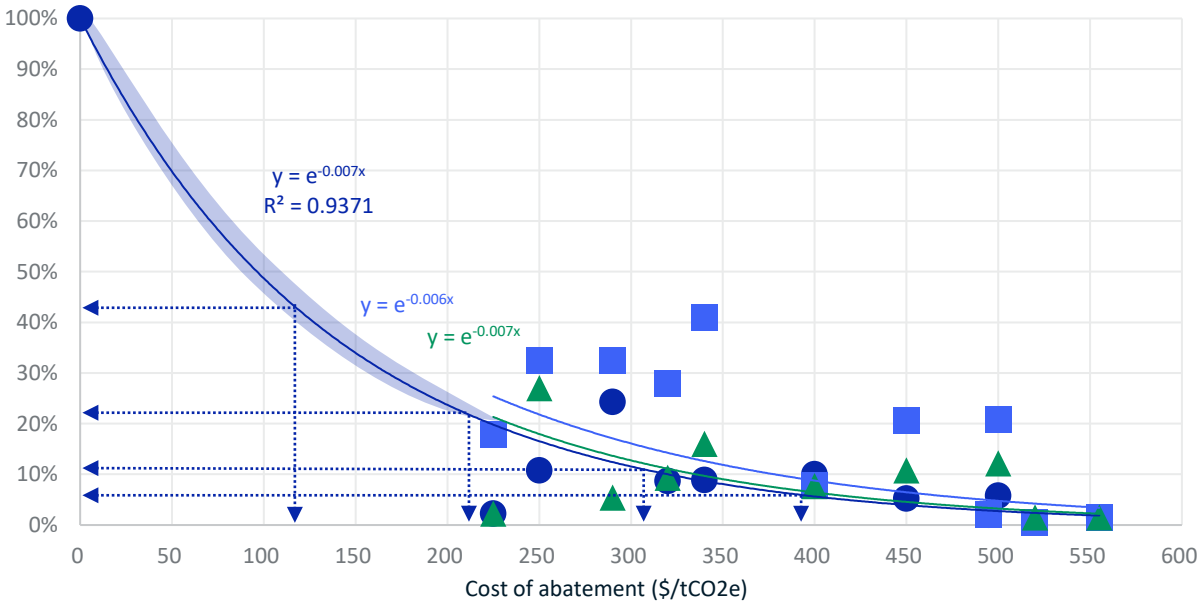
Sectors	Sector definition	Estimated cost of abatement (USD/tCO_2e)	
		Range	Average
Aviation	Transportation of goods and passengers in planes	200 - 600	400
Chemicals and chemical processes (inc. Ammonia)	Includes all chemicals and petrochemicals, but excludes petrochemical feedstocks (ISIC Divisions 20 and 21)	250 - 650	450
Electricity generation	Power generation (electric utilities and independent power producers and energy traders – inc. fossil, alternative and nuclear energy)	50 - 300	175
Non-ferrous metals and processes (inc. Aluminium)	Includes aluminium, copper, other non-ferrous metals (lead, nickel, tin, titanium, zinc, copper alloys) and precious metals	450 - 660	555
Non-metallic minerals and processes	Includes the production of glass, ceramic and cement (ISIC Division 23)	100 - 580	340
Other energy transformation (Fossil fuels)	Includes all other energy transformation processes, including refining, oil/gas/coal/biomass processing, hydrogen production	440 - 600	520
Other transport (Rail)	Transportation of goods and passengers via railway	200 - 300	250
Residential	Buildings - Households	180 - 400	290
Road Transport	Transportation of goods and passengers in cars, motorcycles, buses and trucks	200 - 800	500
Services	Buildings - tertiary sector (all economic activities outside industry and agriculture)	180 - 460	320
Shipping	Transportation of goods and passengers via seaways	130 – 200	165
Iron & Steel and processes	Manufacture and casting of iron and steel (ISIC Group 241 and Class 2431)	350 - 640	495

3.3 Proportion of companies with SBTi targets vs. cost of abatement

The chart below shows the correlation between sectors' average cost of abatement and proportion of companies that have set or committed to set Science-based Targets (SBT). [1] The trendline indicates that for all three SBTi target types, more companies have been setting or committed to set SBTi targets in sectors that have, on average, a lower cost of abatement. [2]

The number of firms setting SBTi targets has steadily increased with just over 6,000 companies as of end of September having an SBTi approved target or having committed to setting one in the following two years. These companies are shown as a proportion of all companies in Trove Research's database setting climate targets within each sector. [3] For example, c.39% of companies in "Road Transport" sector in Trove Research's database have set / committed to SBTi targets. The analysis shows that, on average, sectors with lower abatement costs have a higher proportion of companies signed up to SBTi.

Proportion of companies with SBTi targets vs cost of abatement



Proportion of companies with SBTi targets

Sectors	Average cost of abatement USD/tCO2e	SBTi NZ	SBTi ER	SBTi Committed	Total
Non-ferrous metals	555	1%	1%	1%	3%
Other energy transformation	520	n/a	0%	1%	1%
Road Transport	500	6%	21%	12%	39%
Steel	495	2%	2%	n/a	4%
Chemicals and Chemical processes (inc. Ammonia)	450	5%	21%	11%	37%
Aviation	400	10%	8%	8%	26%
Non-metallic minerals	340	9%	41%	16%	63%
Services	320	9%	28%	9%	46%
Residential	290	24%	32%	5%	61%
Other Transport (Rail)	250	11%	32%	27%	70%
Shipping	225	2%	18%	2%	22%
Electricity generation	175	10%	16%	6%	32%

SBTi NZ – Companies with SBTi Net Zero targets

SBTi ER – Companies with SBTi Emission Reduction targets

SBTi Committed – Companies with a commitment to set SBTi targets within two years

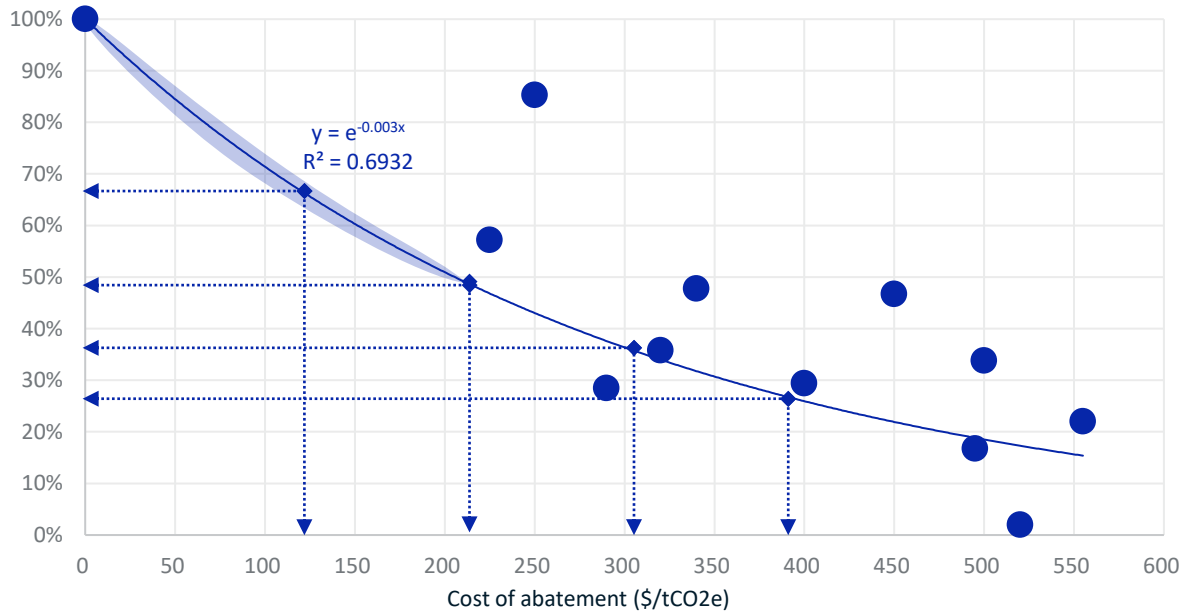
1. The proportion (%) of companies setting SBTi targets in this analysis, is in relation to all companies with climate targets in the Trove Research's database, over 9,000 companies (Appendix A.5). 2. Assumption is made that if cost of abatement is zero, all companies would set SBTi net zero targets. The highlighted part of the curve is interpolated using this assumption. 3. We refer to climate targets that are not submitted and validated to SBTi as self-declared climate targets.

3.4 Proportion of SBTi targets using market cap-weighted vs. cost of abatement

The chart below shows the correlation between sectors' average cost of abatement and market cap-weighted proportion of companies that have set or committed to set Science-based Targets (SBT). [1] The trendline indicates that for lower cost of abatement, companies with SBTs or commitments would represent a higher proportion of the global market cap. [2]

According to SBTi's 2022 report examining progress in science-based targets globally, at the end of 2022 companies with SBTs or commitments represented 34% of the global economy by market cap. [3] Our analysis, using MSCI AWCI IMI to represent the global economy, shows that at the end of May 2023, companies with SBTi targets or SBTi commitments represented 45% of the global economy. For example, c.29% of global aviation companies by market cap have set / committed to SBTi targets. The analysis shows that sectors with higher abatement costs, such as non-ferrous metals and other energy transformation, have a lower share of companies (measured as % of global market capitalisation) with SBTi targets, than sectors with lower abatement costs.

% of global market cap with SBTs or commitments vs Cost of abatement



Proportion of global market cap with SBTs or commitments

Sectors	Average cost of abatement USD/tCO2e	% of global market cap in SBTi
Non-ferrous metals	555	22%
Other energy transformation (Fossil fuels)	520	2%
Road Transport	500	34%
Steel	495	17%
Chemicals and Chemical processes (inc. Ammonia)	450	47%
Aviation	400	29%
Non-metallic minerals	340	48%
Services	320	36%
Residential	290	28%
Other Transport (Rail)	250	85%
Shipping	225	57%
Electricity generation	175	28%

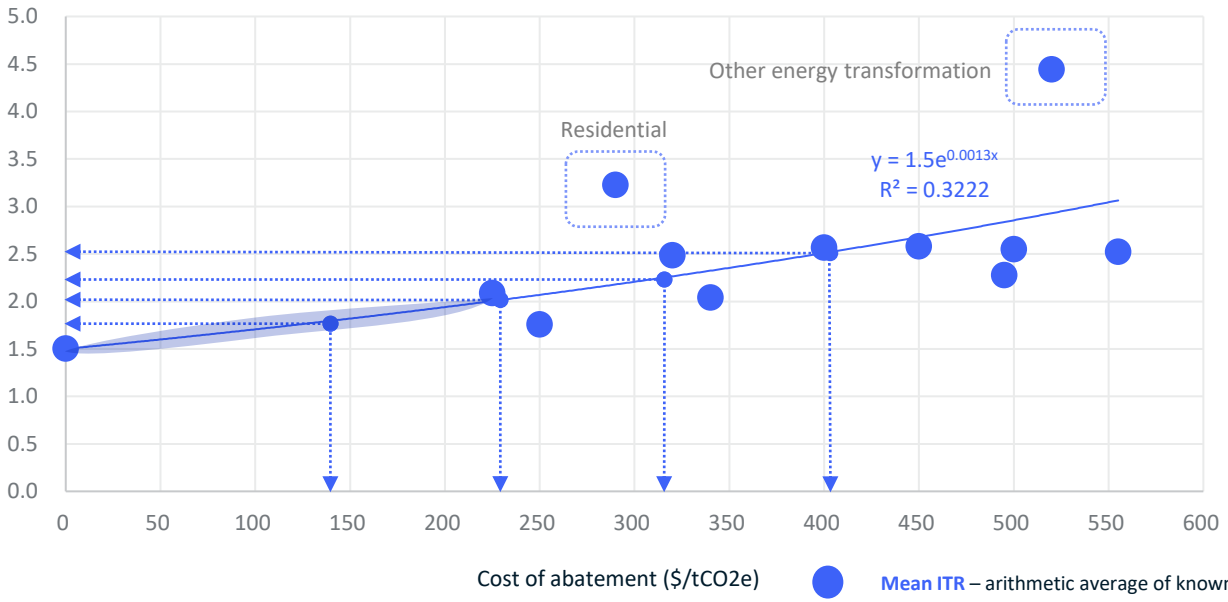
1. The market-cap weighted proportion of companies signed up to SBTi (either via having targets validated by SBTi or commitment to do so within two years) in the MSCI ACWI IMI, the investment universe of large/mid and small cap companies across developed and emerging market countries covering approximately 99% of the global equity investment opportunity by free float-adjusted market capitalization. 2. Assumption is made that if cost of abatement is zero, SBTi would cover the whole global market cap companies represented by the MSCI ACWI IMI. The highlighted part of the curve is interpolated using this assumption. 3. SBTi Monitoring Report 2022

3.5 Implied Temperature Rise (ITR)[1] vs. cost of abatement

The chart below shows the correlation between sectors' average cost of abatement and Trove Research's calculated Implied Temperature Rise (ITR)[1]. ITR is a recognised indicator that compares the climate effectiveness of company climate targets on a consistent basis.[1] The trendline indicates that sectors with lower average cost of abatement, have on average a lower ITR. [2]

The Trove Research ITR model combines all types of corporate climate targets (not just SBTi targets). It also includes current and expected purchases of carbon credits, e.g., under a (current or future) carbon neutral or net zero target. This enables a more complete comparison of corporate climate ambition via this ITR score. The ITR shows what the expected global temperature rise would be if every company behaved like the one in question and allows comparison of company targets across sectors. For example, average ITR for chemical companies is 2.6°C vs that of fossil fuels which is 4.4°C. Our analysis shows that cost of abatement "elasticity" of average ITR is positive, assuming a natural exponential trendline intercepting the y-axis at 1.5°C, implying that a reduction of abatement cost infers that companies would on average reduce their ITR.

Trove Research's calculated ITR (°C) vs Cost of abatement [1]



Trove Research's calculated ITR (°C) vs Cost of abatement [1]

Sectors	Average cost of abatement USD/tCO2e	Mean ITR [1] (°C)
Non-ferrous metals	555	2.5
Other energy transformation (Fossil fuels)	520	4.4
Road Transport	500	2.5
Steel	495	2.3
Chemicals and Chemical processes (inc. Ammonia)	450	2.6
Aviation	400	2.6
Non-metallic minerals	340	2.0
Services	320	2.5
Residential	290	3.2
Other Transport (Rail)	250	1.8
Shipping	225	2.1
Electricity generation	175	2.6

1. *Trove Research's calculated Implied Temperature Rise model was created independently by Trove Research before the merger with MSCI. The model uses a different methodology to MSCI and outputs are not directly comparable.*
2. *Assumes that if cost of abatement is zero, all companies would have a 1.5°C ITR as they would have set the most ambitious net zero targets to limit global warming to meet the goals of the Paris Agreement. The highlighted part of the curve is interpolated using this assumption.*

3.6 Potential climate outcomes of allowing use of carbon credits

The analysis below shows the potential effect of allowing companies to use carbon credits as part of their mitigation activities, on the basis that carbon credits provide lower cost abatement options. This is modelled through a blended cost of abatement, assuming a split between carbon credits and internal abatement. The analysis suggests that if firms are allowed to use carbon credits to meet 50% of their shortfall some 1,000 new firms could sign up to SBTi targets (set targets and commit to set targets) – an increase of nearly 20% on the number of firms committing today. These firms could represent a market cap of $10 trillion.

The left-hand table below shows the blended cost of abatement based on each sectors' average cost of abatement and assuming an average high-quality carbon credit price of 30 USD/tCO_2e. The blended cost is run for three different scenarios assuming 25%, 50% and 75% share of carbon credits. The estimated impact on all three climate outcomes is show in the following section and summarised below in the table to the right.

Blended cost of abatement

Sectors	Average cost of abatement (USD/tCO2e)	Average price of high-quality carbon credit (USD/tCO2e)	Blended abatement cost assuming % use of carbon credits (USD/tCO2e)		
			25%	50%	75%
Non-ferrous metals	555	30	424	293	161
Other energy transformation	520	30	398	275	153
Road Transport	500	30	383	265	148
Steel	495	30	379	263	146
Chemicals and Chemical processes (inc. Ammonia)	450	30	345	240	135
Aviation	400	30	308	215	123
Non-metallic minerals	340	30	263	185	108
Services	320	30	248	175	103
Residential	290	30	225	160	95
Other Transport (Rail)	250	30	195	140	85
Shipping	225	30	176	128	79
Electricity generation	175	30	139	103	66
Average	**395**	**30**	**304**	**213**	**121**

Potential impact of allowing use of carbon credits on different climate outcomes

Scenarios - % use of carbon credits	Increase in no. of companies setting SBTi targets or commitments (compared to Trove Research's database)[1]				Increase in global market cap of companies setting SBTi targets (compared to global market cap) [2]		Decrease in average Implied Temperature Rise (ITR) of targets[3]	
	%	SBTi NZ	SBTi ER	SBTi Committed	%	USD Trillions	%	°C
25%	5%	46	131	126	9%	3.9	- 10%	- 0.25
50%	16%	146	419	403	23%	9.9	- 20%	- 0.5
75%	35%	320	916	882	40%	21.2	- 28%	- 0.7

1. Number of companies setting SBTi NZ targets as of Trove Research's latest Corporate Climate Commitment monthly report. 2. Market cap of all companies in the MSCI ACWI IMI that have signed up to SBTi. 3. The overall average ITR for all companies in Trove Research's current dataset is 2.5°C, and this assumes that all of the companies succeed in achieving their targets.

4. Flexibility analysis - allowing carbon credits to bridge Scope 3 emissions gap for SBTi targets

Information Classification: GENERAL

4.1 Current off-track emissions gap for Scope 3 SBTi targets

Section 2 showed the degree to which different sectors were on or off-track relative to their targets. The new VCMI claims codes are likely to focus on allowing carbon credits to be used only for Scope 3 emissions, with companies needing to achieve their Scope 1 & 2 emissions targets. The table below shows the current estimated emissions performance gap for Scope 3 in each region and sector for companies with targets approved by SBTi (including 1.5°C, 2°C and committed to set targets), subject to Scope 1 & 2 emissions being on-track.

According to this analysis, some 295 companies are currently off-track relative to their science-based Scope 3 targets (whilst being on-track for Scope 1 & 2 targets), with a total estimated emissions performance gap of 644 MtCO2e. The sector with the largest emissions gap is manufacturing (544 $MtCO_2e$), with 62 companies being off-track to meet Scope 3 SBTi targets. The largest emissions gap for Scope 3 is in North America, where 59 companies are off-track with an emissions gap of 455 $MtCO_2e$. While 174 companies in Europe are off-track to meet Scope 3 SBTi targets, the region has a smaller emissions gap of 75 $MtCO_2e$.

Current off-track emissions performance gap for Scope 3 SBTi targets by sector and region (on-track for Scope 1 & 2)

Sector	Asia		Europe		Latin America		Middle East & Africa		North America		Total Emissions Gap MtCO2e	Total Number of Companies
	Emissions Gap MtCO2e	Number of Companies	Emissions Gap MtCO2e	Number of Companies	Emissions Gap MtCO2e	Number of Companies	Emissions Gap MtCO2e	Number of Companies	Emissions Gap MtCO2e	Number of Companies		
Apparel	0	0	0	7	0	0	0	0	1	3	**2**	**10**
Biotech, health care & pharma	0	3	2	3	0	0	0	0	3	2	**5**	**8**
Financial services	0	4	2	20	0	0	0	0	0	4	**2**	**28**
Food, beverage & agriculture	1	2	2	16	5	4	0	0	3	5	**11**	**27**
Fossil Fuels	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Hospitality	0	0	0	5	0	0	0	0	1	3	**1**	**8**
Infrastructure	1	3	20	18	0	0	0	0	0	2	**21**	**23**
Manufacturing	95	19	26	33	0	0	0	0	424	10	**544**	**62**
Materials	1	2	7	12	1	2	0	0	1	1	**9**	**17**
Power generation	0	0	6	4	0	2	0	0	0	0	**6**	**6**
Retail	6	7	5	10	0	1	0	0	3	7	**15**	**25**
Services	3	10	3	39	0	0	1	2	19	19	**26**	**70**
Transportation services	0	1	2	7	0	0	0	0	0	3	**2**	**11**
Total	**108**	**51**	**75**	**174**	**6**	**9**	**1**	**2**	**455**	**59**	**644**	**295**

4.2 Finance deployed to close current off-track emissions gap for Scope 3 SBTi targets

The table below summarises the financial implications for each sector and region[1] of using high-quality carbon credits to close 100% of the current emissions gap for Scope 3 targets. This assumes an average carbon credit price of 30 USD/tCO_2e and requires firms to meet their Scope 1 & 2 emissions targets to be eligible to use credits for meeting Scope 3 targets.

Our analysis estimates that allowing companies to use carbon credits to close the emissions gap for these firms would require an annual expenditure of around **$19 bn.** The sector with the largest finance deployed is manufacturing ($16 bn), with 62 companies being off-track to meet Scope 3 SBTi targets. Most of the additional finance deployed would be in North America ($13.6 bn), followed by Asia ($3.2 bn) and Europe ($2.3 bn).

Expenditure requirement for closing 100% of current off-track SBTi Scope 3 emissions performance gap with carbon credits (on-track for Scope 1 & 2) (USD Million) (2)

Sector	Asia	Europe	Latin America	Middle East & Africa	North America	Total
Apparel	0	14	0	0	33	**47**
Biotech, health care & pharma	13	59	0	0	87	**159**
Financial services	0	62	0	0	3	**65**
Food, beverage & agriculture	32	56	146	0	96	**329**
Fossil Fuels	0	0	0	0	0	**0**
Hospitality	0	8	0	0	16	**25**
Infrastructure	27	610	0	0	5	**642**
Manufacturing	2,848	765	0	0	12,712	**16,325**
Materials	19	225	18	0	21	**283**
Power generation	0	171	6	0	0	**178**
Retail	194	153	2	0	88	**437**
Services	103	88	0	17	576	**785**
Transportation services	0	53	0	0	6	**59**
Total	**3,237**	**2,265**	**172**	**17**	**13,643**	**19,333**

1. 'Region' assigned to a company corresponds to where the company is headquartered, not the region in which emissions are generated.

2. Assumes $30/$tCO_2$ carbon credit price

4.3 Off-track emissions gap for Scope 3 SBTi targets in 2030

The table below shows the estimated emissions gap in 2030 for Scope 3 in each region and sector for companies with SBTi targets or commitments, subject to Scope 1 & 2 emissions performance is on-track. The analysis estimates that, in 2030, 150 companies will be off-track relative to their science-based Scope 3 targets, with a total estimated emissions performance gap of **2.2 $GtCO_2e$** .

The sector with the largest emissions gap in 2030 is still expected to be manufacturing (1.9 $GtCO_2e$), with 31 companies off-track to meet Scope 3 SBTi targets. The largest emissions gap for Scope 3 in 2030 is again observed in North America, where 31 companies are off-track with an emissions gap of 1.8 $GtCO_2e$. In Asia, 26 companies are off-track to meet Scope 3 SBTi targets but with a smaller emissions gap of 151 $MtCO_2e$.

Off-track emissions performance gap for Scope 3 SBTi targets in 2030 by sector and region (on-track for Scope 1 & 2)

Sector	Asia		Europe		Latin America		Middle East & Africa		North America		Total Emissions Gap MtCO2e	Total Number of Companies
	Emissions Gap MtCO2e	Number of Companies	Emissions Gap MtCO2e	Number of Companies	Emissions Gap MtCO2e	Number of Companies	Emissions Gap MtCO2e	Number of Companies	Emissions Gap MtCO2e	Number of Companies		
Apparel	0	0	2	6	0	0	0	0	4	1	**6**	**7**
Biotech, health care & pharma	0	1	10	2	0	0	0	0	29	2	**39**	**5**
Financial services	0	3	1	10	0	0	0	0	1	4	**2**	**17**
Food, beverage & agriculture	1	1	4	9	8	1	0	0	3	2	**16**	**13**
Fossil Fuels	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Hospitality	0	0	1	3	0	0	0	0	1	1	**1**	**4**
Infrastructure	5	3	16	8	0	0	0	0	0	1	**21**	**12**
Manufacturing	143	11	59	14	0	0	0	0	1,714	6	**1,916**	**31**
Materials	0	0	35	7	0	0	0	0	64	2	**98**	**9**
Power generation	0	0	26	3	0	0	0	0	0	0	**26**	**3**
Retail	1	2	25	7	0	0	0	0	1	3	**27**	**12**
Services	0	4	12	20	0	0	5	2	5	9	**22**	**35**
Transportation services	0	1	0	1	0	0	0	0	0	0	**0**	**2**
Total	**151**	**26**	**189**	**90**	**8**	**1**	**5**	**2**	**1,821**	**31**	**2,174**	**150**

4.4 Finance deployed to close off-track emissions gap for Scope 3 SBTi targets in 2030

The table below summarises the financial impact for each sector and region, of closing 100% of the estimated emissions performance gap in 2030 for Scope 3 with carbon credits, assuming an average high-quality carbon credit price of 30 USD/tCO_2e. On the basis that only firms that are on-track for meeting Scope 1 & 2 emissions targets are eligible to use carbon credits, closing the Scope 3 emissions gap in 2030 would require an annual expenditure of some **$65 bn** in 2030**.**

The sector with the largest need for finance is manufacturing ($57 bn), with 31 companies being off-track to meet Scope 3 SBTi targets. Most of the additional finance deployed would be in North America ($55 bn), followed by Europe ($5.7 bn) and Asia ($4.5 bn).

Expenditure requirement for closing Scope 3 off-track emissions performance gap in 2030 with carbon credits (on-track for Scope 1 & 2) (USD Million) [1]

Sector	Asia	Europe	Latin America	Middle East & Africa	North America	Total
Apparel	0	62	0	0	105	**168**
Biotech, health care & pharma	3	297	0	0	857	**1,158**
Financial services	4	31	0	0	23	**59**
Food, beverage & agriculture	21	107	236	0	103	**467**
Fossil Fuels	0	0	0	0	0	**0**
Hospitality	0	18	0	0	21	**40**
Infrastructure	148	477	0	0	14	**640**
Manufacturing	4,300	1,777	0	0	51,417	**57,495**
Materials	0	1,036	0	0	1,910	**2,947**
Power generation	0	767	0	0	0	**767**
Retail	40	744	0	0	37	**821**
Services	10	361	0	149	136	**655**
Transportation services	0	3	0	0	0	**4**
Total	**4,527**	**5,680**	**236**	**149**	**54,626**	**65,218**

1. *Assumes $30/tCO2 carbon credit price*

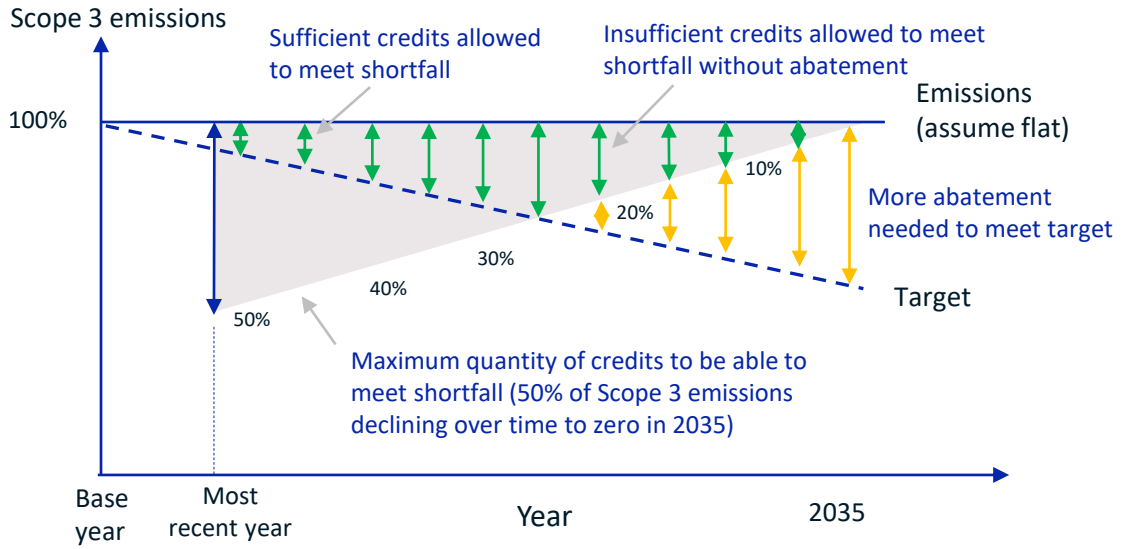
4.5 Limiting the use of carbon credits to bridge Scope 3 emissions gap for SBTi targets

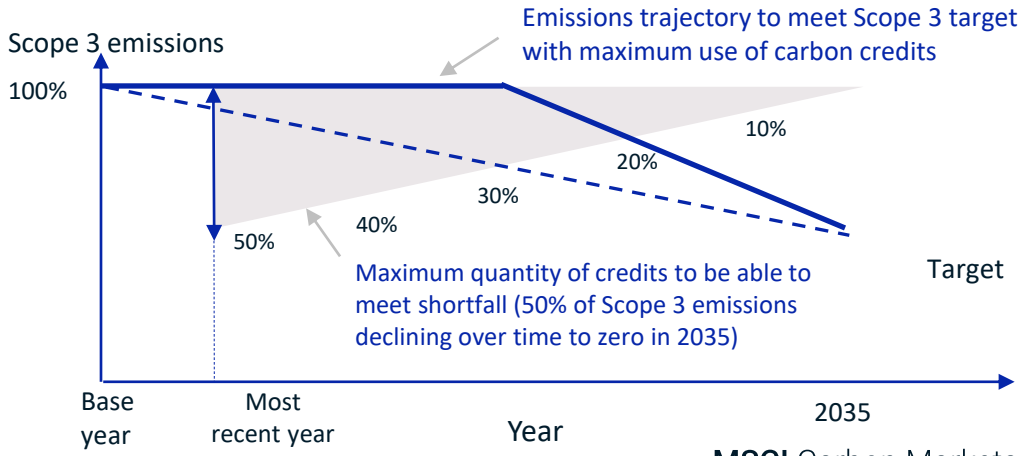
The analysis on the previous pages assumes 100% of the Scope 3 emissions gap is closed by use of carbon credits. To ensure that companies that face challenges in meeting their interim Scope 3 targets remain engaged with the decarbonisation journey, VCMI created an additional tier ("bronze") in its June 2022 draft claims code. This would allow firms to use carbon credits as part of the mitigation for Scope 3 emissions, but only for a period of time (up to 2030), and up to a maximum of 50% of the Scope 3 footprint, declining over time.

Our analysis of companies that are on-track for Scope 1 & 2 emissions, shows that applying this cap on the use of credits to meet Scope 3 emissions would not be constraining. In other words, all companies' Scope 3 emissions gap are less than 50% of their Scope 3 most recent year's emissions. This is illustrated in the top figure right. In this example emissions are assumed to remain flat, and the maximum volume of credits that could be used starts at 50% and declines over time to zero by 2035. Because target trajectories start from very recent years, the current gap is less than 50% of emissions in all cases. Firms would therefore not be constrained in their use of credits until several years into the future. Over time however, as the threshold use of carbon credits declines, abatement of Scope 3 emissions needs to increase to meet the Scope 3 target.

Adopting a 50% Scope 3 emissions threshold, would therefore deliver the same outcomes as presented on the previous pages. All 295 companies that are currently off-track relative to their science-based Scope 3 targets (whilst being on-track for Scope 1 & 2 targets) today, would be able to bridge their total estimated emissions performance gap of 644 MtCO2e at an estimated cost of around $19bn.

VCMI "bronze" tier illustration





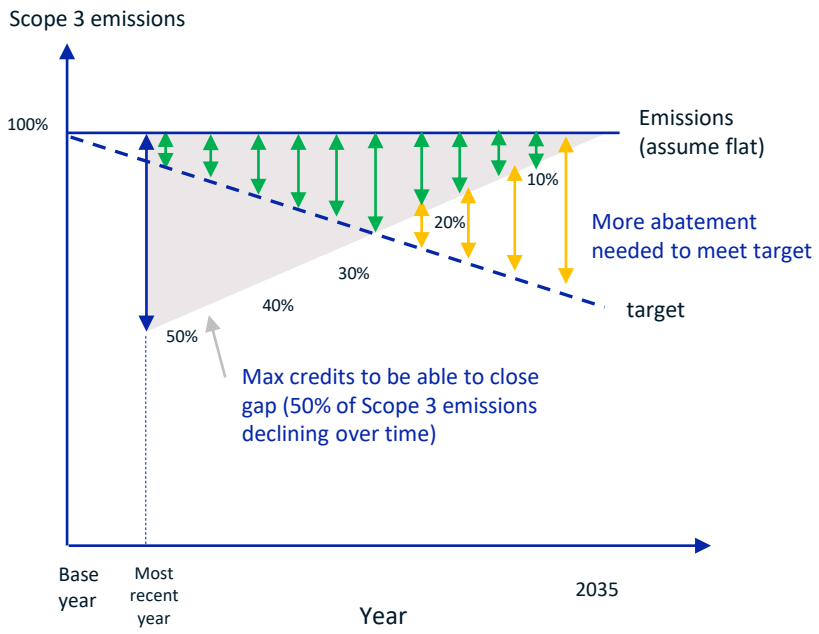
Information Classification: GENERAL

4.5 Limiting the use of carbon credits to bridge Scope 3 emissions gap for SBTi targets (cont'd)

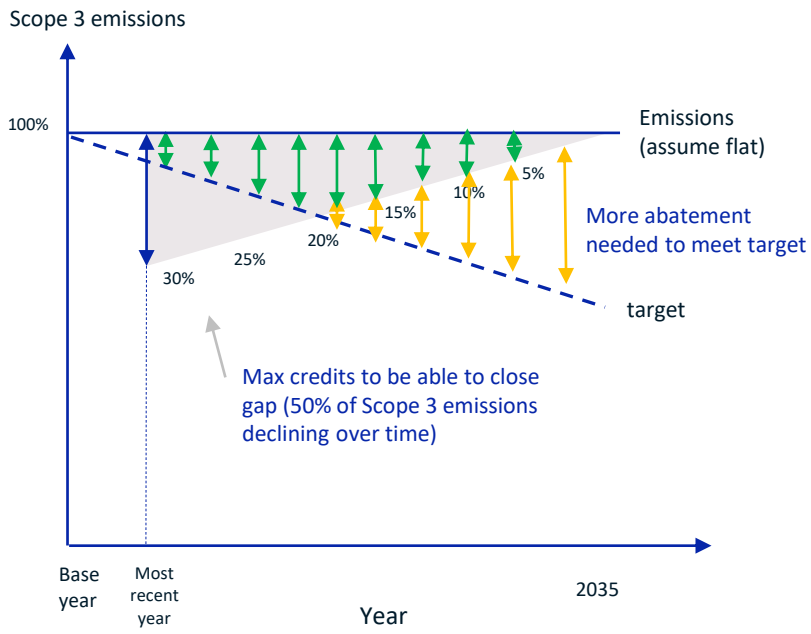
The figures below illustrate the effect of changing the quantity of carbon credits eligible for use against Scope 3 targets. Examples of an initial allocation of 50%, 30% and 20% are shown with thresholds declining linearly to zero by 2035. The examples also assume the target reduces linearly from the base year and emissions remain flat. As the threshold reduces fewer credits are allowed to be used in the initial years and the date at which the gap exceeds the carbon credit threshold gets nearer.

VCMI "bronze" tier illustration - differing credit use thresholds

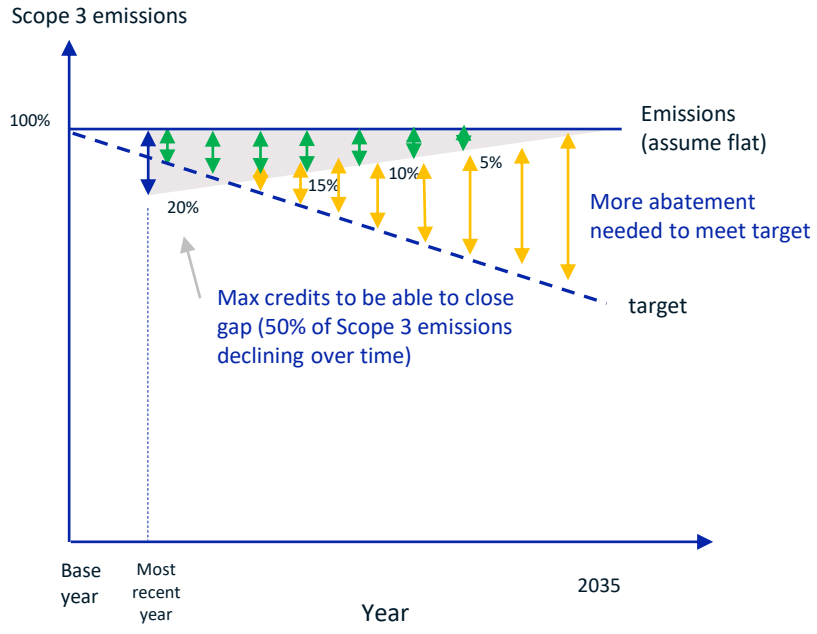
Limit - 50% of Scope 3 emissions in initial year



Limit - 30% of Scope 3 emissions in initial year



Limit - 20% of Scope 3 emissions in initial year



4.5 Limiting the use of carbon credits to bridge Scope 3 emissions gap for SBTi targets (cont'd)

The analysis below shows sensitivities for different thresholds for the use of carbon credits to meet Scope 3 emissions targets (for firms that are on-track for Scope 1 & 2 emissions). The left-hand table shows outcomes for most recent year's emissions, the right-hand table for outcomes in 2030. Thresholds are lower in 2030 because of the principle of declining credit use cap over time.

For most recent emissions, reducing the threshold from 50% to, say, 30% of Scope 3 emissions would reduce the number of companies that could make use of credits by around 20%, but reduce the emissions gap covered by credits and the additional finance created by around 75%. In 2030, starting at a threshold of 25%, only 106 out of 150 companies would be able to bridge their total projected emissions performance gap of 29 MtCO2e (out of 2.2 GtCO2e) and deploy $3.2bn (out of $65bn) in additional finance. Reducing the threshold to, say, 15% would reduce the number of companies that could make use of credits by 55% to 13, and the volume of emissions that could make of credits and additional finance by 70% to just under $1bn.

Effect of credit use threshold on outcomes – recent year's emissions

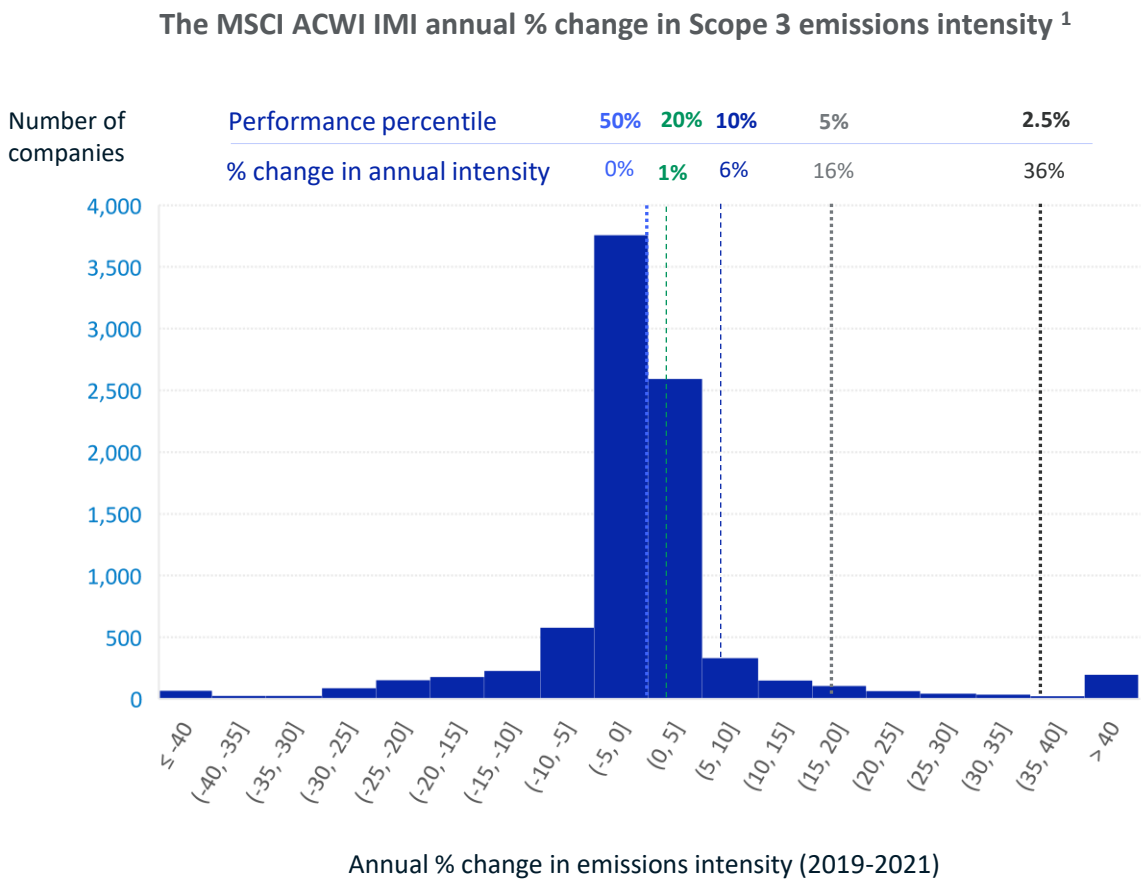
Credit use threshold - % of Scope 3 emissions	Emissions Gap		Number of Companies		Additional Finance USD Million (1)
	MtCO2e	% of emissions gap	Number	% of all companies	
50%	644	100%	295	100%	19,333
40%	602	93%	277	94%	18,055
30%	181	28%	242	82%	5,431
20%	155	24%	194	66%	4,645
10%	52	8%	112	38%	1,555

Effect of credit use threshold on outcomes - 2030

Credit use threshold - % of Scope 3 emissions	Emissions Gap		Number of Companies		Additional Finance USD Million (1)
	MtCO2e	% of emissions gap	Number	% of all companies	
25%	106	100%	29	100%	3,193
20%	32	30%	15	52%	963
15%	32	30%	13	45%	957
10%	32	30%	11	38%	957
5%	1	1%	4	14%	27

1. *Assumes $30/tCO2 carbon credit price*

4.6 Effect on worst performers



The tables on the previous page show the effect of excluding the worst performing companies as measured by the gap between emissions and the target, today and in 2030. Using MSCI data we are also able to show the emissions performance of companies in terms of emissions intensity – i.e. tonnes of emissions per $1m revenue.

The chart left shows the distribution of the annual change in Scope 3 emissions intensity for all companies in the MSCI ACWI IMI.

Excluding the worst 10% of performers (which would be achieved by a carbon credit use threshold of 40% of Scope 3 emissions) would exclude all firms with an increase in emissions intensity of over 6% per year. Put another way, this threshold would still include all firms with an increase in emissions intensity of under 6% per year.

If the threshold was set at the worst 20% of performers (equivalent to a carbon credit use threshold of around 30% Scope 3 emissions), this would exclude firms with increases in emissions intensity of greater than around 1% per year.

Note these figures are for all companies in the ACWI-IMI database, irrespective of whether they are on- or off-track for Scope 1 & 2 emission targets.

1. Scope 3 emissions intensity is calculated per $1m revenue

5. Impact of lowering the minimum threshold of carbon credit use to make an enterprise-wide VCMI claim

Information Classification: GENERAL

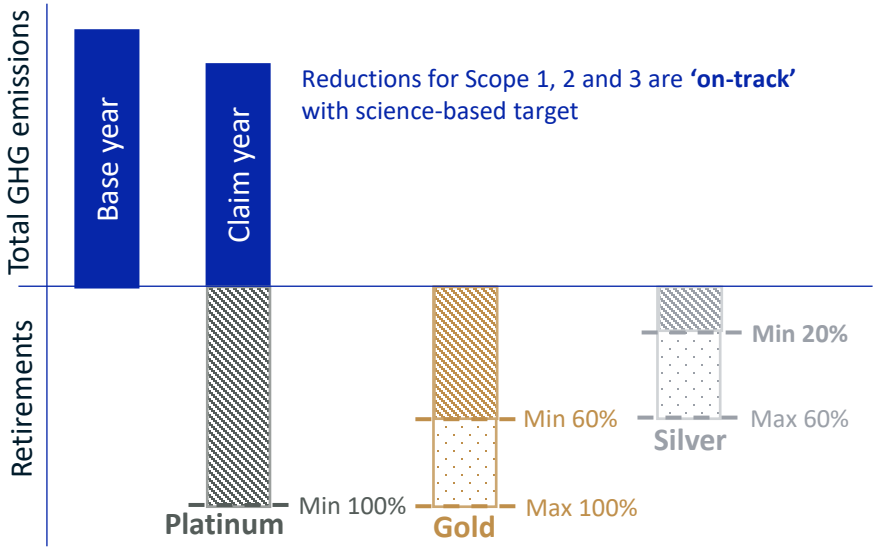
5.1 VCMI's current claims code tiers

The preceding sections have looked at how carbon credits could be used as part of company mitigation actions for Scope 3 emissions, under the provisional VCMI "Bronze" claim category. This section assesses the implications of lowering the threshold for firms to claim the main tiers under the draft VCMI claims guidance.

The VCMI Silver, Gold and Platinum claims relate to the proportion of Scope 1, 2 and 3 emissions that are offset/compensated by the use of carbon credits. To achieve these claims firms must first achieve the "Foundational Criteria" (summarised below). For all claim tiers companies can only use credits aligned with the ICVCM's CCPs [1] and those that are eligible for CORSIA [2] - although these can only be used until the ICVCM completes project type assessments.

Assuming Foundational Criteria are met, the Platinum tier assumes 100% of residual emissions are covered by high-quality carbon credits, Gold between 60 and 100%, and Silver between 20 and 60%. Additional guidance from the VCMI is expected to be published later in November which will include among other updates, details on more flexible and accessible tiers levels. This is may reduce the threshold for Silver claim from a minimum of 20% to 10%. The rest of this section looks at the impact of such a change.

Current "Claims Code of Practice"



Current "Claims Code of Practice"

1. Must meet 'foundational criteria':
   a) Disclose emissions, including Scope 3
   b) Set science-based emission reduction target, and long-term net zero target of ≤2050
   c) Demonstrate 'on-track' to hit targets
   d) Demonstrate public advocacy supports Paris
2. Select a claim – either Silver, Gold or Platinum
3. Retire an annually increasing proportion (for Silver and Gold) of CCP-eligible reduction or removal credits (CORSIA-eligible credits can be used in lieu of CCP credits in the period until a credit category has been reviewed by the ICVCM).
4. Report credit use and get third-party verification

1. The Integrity Council for the Voluntary Carbon Market. CCP = ICVCM's Core Carbon Principles. 2. The Carbon Offsetting and Reduction Scheme for International Aviation

5.2 Effect of lowering the credit use threshold for VCMI "silver" tier

We have assessed the effect of lowering the tier for VCMI silver claims from 20% to 10% by looking at how many firms are making use of carbon credits and what proportion of their Scope 1, 2 and 3 these credits cover.

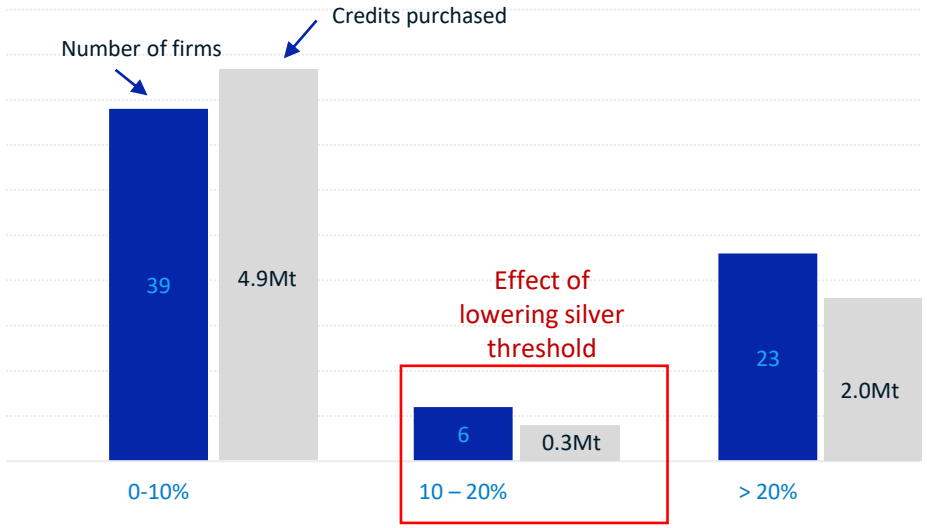
Currently there are some 1,286 firms with SBTi 1.5°C targets. Of these some 293 (23%), representing total GHG emissions of 3.2 $GtCO_2e$ are on-track for both Scope 1, 2 and 3. Of these, 68 firms have bought carbon credits. Around a third of these firms have covered more than 20% of the emissions, on average covering 77% of their emissions. If the threshold for a silver claim was reduced to 10% this would have a relatively modest effect on the number of firms that would be included, covering six firms and credit purchases of 0.3Mt. The majority of firms that are on-track for Scope 1, 2 and 3 1.5°C targets use carbon credits to cover less than 10% of their total carbon footprint with an average of 0.4%. Their total carbon footprint is over 1 $GtCO_2e$. A much more significant opportunity would arise if these firms used more carbon credits, or firms not using carbon credits did so under a silver claim (see following page).

Carbon credit use for firms on-track for SBTi Scope 1, 2 and 3 targets

	Proportion of Scope 1, 2 & 3 emissions covered with carbon credit purchases in 2021			
	0 -10%	**10 – 20%**	> 20%	Total
Number of companies	39	**6**	23	68
Scope 1, 2 & 3 emissions (MtCO2e)	1,109	**1.9**	2.6	1,113
Credits purchased (MtCO2e) [1] (% of Scope 1, 2 & 3 emissions)	4.9 (0.4%)	**0.3 (15%)**	2.0 (77%)	7.2 (0.6%)
Value ($m) (@ $30/tCO2e)	147	**9**	60	216

Effect of lowering silver threshold from 20% to 10%

Carbon credit use for firms on-track for SBTi Scope 1, 2 and 3 targets



1. Trove Research combines credit activity information from multiple sources in order to build an accurate credit activity database. Trove Research's carbon credits database tracks 11 registries (ACR, CAR, Gold Standard, Verra, Biocarbon, Ecoregistry, CDM (both NDC eligible and not), Plan Vivo, PuroEarth, UK Woodland Carbon Code, Pacific Carbon Standard), CDP questionnaires and corporates' annual and sustainability reports.

5.2 Effect of lowering the credit use threshold for VCMI "silver" tier (cont'd)

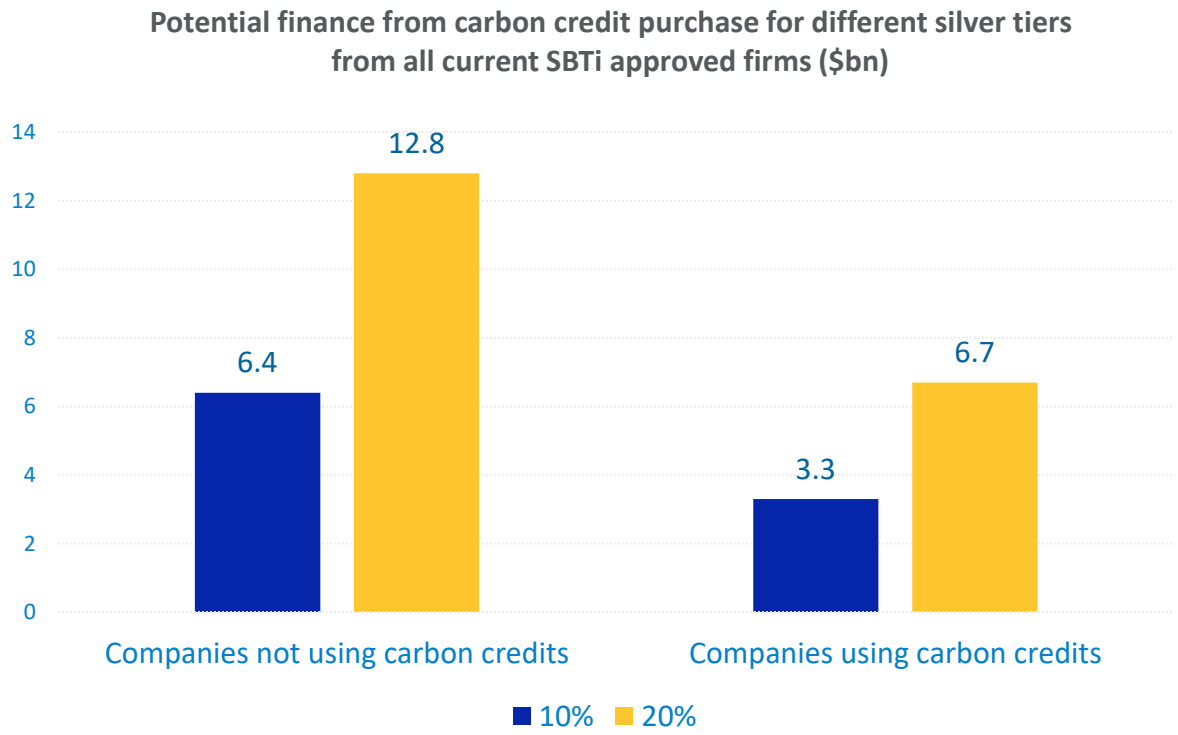
A change in threshold for the silver tier would allow more firms to claim silver status based on their current use of carbon credits. More importantly these firms could also use more credits or more firms could use carbon credits to make a new claim.

Currently some 225 firms are on-track with Scope 1, 2 and 3 but not using any carbon credits. These firms have a total emissions footprint of around 2.1GtCO_2e. If they purchased credits to cover 10% of these emissions at $30/t this would generate $6.4bn of additional finance. If these used up to 20% of credits this could generate some $12-13bn of additional finance.

Firms on-track with Scope 1, 2 and 3 emissions and currently using carbon credits have an emissions footprint of around 1.1GtCO_2e. If these firms purchased credits to cover 10% of these emissions at $30/t this would generate $3.3bn of additional finance. If these used up to 20% of credits this could generate some $6-7bn of additional finance.

Together, all firms that are on-track for Scope 1, 2 and 3 emissions - those using carbon credits and those not using credits – have an emissions footprint of 3.2GtCO_2e. If all firms purchased credits to cover 10% of these emissions at $30/t the total finance required would be around $10bn and mitigate some 320MtCO_2 of emissions.

Note – these estimates do not take into account the ability of companies to pay for these credits. Mechanisms would need to be in place to encourage firms to take on these targets and secure the finance required.



6. Conclusions and Recommendations

Information Classification: GENERAL

6. Conclusions and recommendations

Conclusions

This report presents a detailed analysis of how the use of carbon credits could close the emissions gaps for companies with science-based targets, deploy additional finance in mitigating beyond value chain emissions and how this could affect the number of companies setting climate commitments and the strength of those targets.

Emissions gap

Across all firms with climate targets the gap between current emissions and targets is **c.400 $MtCO_2e$** for Scope 1 & 2. This increases to **c.2 $GtCO_2e$** in 2030. The gap in Scope 3 emissions targets is even larger, at around **1.4 $GtCO_2e$** today and over **7 $GtCO_2e$** by 2030.

Closing the Scope 3 gap with carbon credits

Assuming only firms that are on-track to achieve SBTi approved Scope 1 & 2 emissions targets are eligible to use carbon credits to close the gap in Scope 3 emissions, this could create a demand for carbon credits of **640 Mt** today and **2.2 $GtCO_2e$** in 2030, if no limitations were put in place with regards to the maximum amount of carbon credits used. On the assumption that carbon credits cost $30/tCO2e, this demand could generate an additional expenditure on carbon credits of **$19bn** today and **$65bn** in 2030. If the use of carbon credits is limited to 50% of Scope 3 emissions today, and 25% in 2030, the finance required would be **$19bn** and **$3bn** respectively.

Reducing the minimum threshold for the lower VCMI claim tier ("Silver")

Reducing the minimum threshold for the lower VCMI tier "Silver" from 20% to 10% would increase the number of companies eligible for "Silver" by around 30% (6 firms with 2Mt of emissions), based on the firms currently on-track for Scope 1, 2 and 3 under SBTi targets and using carbon credits. Currently, SBTi firms that are on-track for Scope 1, 2 and 3 targets cover only 0.6% of their emissions with carbon credits – equivalent to an expenditure of **$0.2bn** at $30/t. If, however, all on-track firms used carbon credits up to a maximum of 10% of their total emissions footprint, this would require **$10bn** in finance (at $30/t) and mitigate some **320 MtCO2e** of beyond value chain emissions.

Incentivising more climate action

The above figures are based solely on the number of companies that have declared emissions targets today. Allowing companies to use carbon credits to meet their emissions targets should encourage more companies to set ambitious climate targets as it will lower the costs of reducing emissions.

If companies are allowed to use carbon credits to meet 50% of their total emissions gap (Scope 1, 2 and 3) we could expect to see around **1,000** more companies setting ambitious climate targets representing some **$10 trillion** in market capital. 400 of these new firms would be expected to set SBTi approved targets. If these new targets are achieved the average Implied Temperature Rise of companies with climate targets would reduce by **0.5°C** from 2.5°C to 2.0°C.

Recommendations

Thousands of companies have made public declarations to dramatically reduce their carbon emissions. Many of these are significantly behind in meeting their near-term targets, and many other companies are reluctant to set science-based targets because of the difficulty in achieving them.

The use of carbon credits could significantly support the climate ambition and impact of corporates. High-quality carbon credits with strong benefits for the climate, society and nature, are often several times cheaper than the cost of reducing corporate emissions, especially in hard to abate sectors. Allowing companies to use these high-quality credits against their targets would encourage more firms to adopt ambitious climate targets and deliver better outcomes for the climate, broader environment and society.

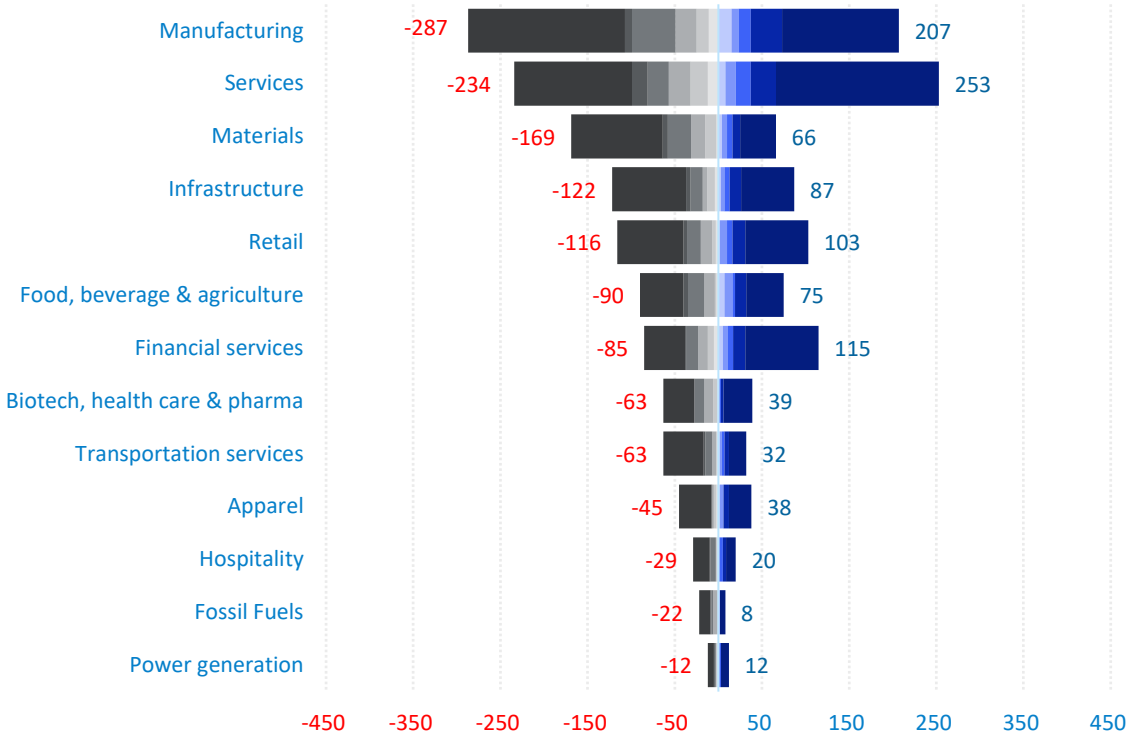
Appendices

Information Classification: GENERAL

Appendix A.1 Number of companies - Current Performance: Scope 1 & 2 only

Charts below show the current emissions performance, against achieving companies' own near-term targets vs. 1.5°C aligned targets for Scope 1 & 2 at different levels of being off-and on-track **by number of companies**.

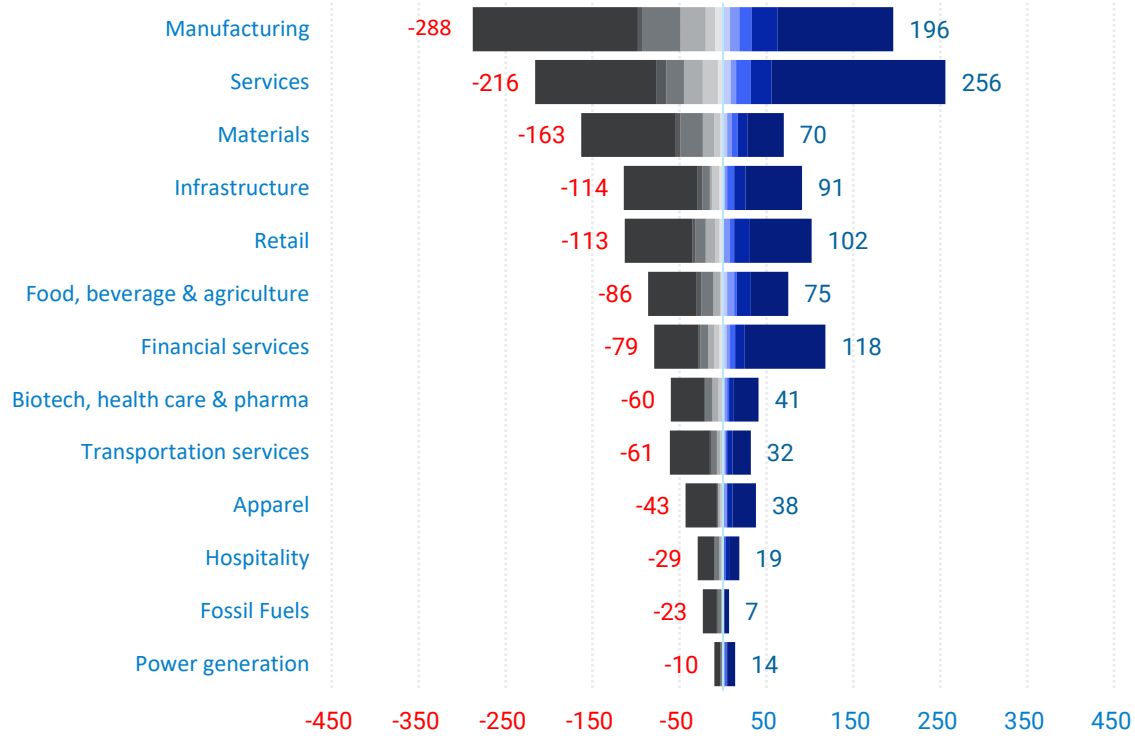
Current Performance against own targets for Scope 1 & 2



Total Off-track: 1,337

Total On-track: 1,055

Current Performance against 1.5°C aligned targets for Scope 1 & 2



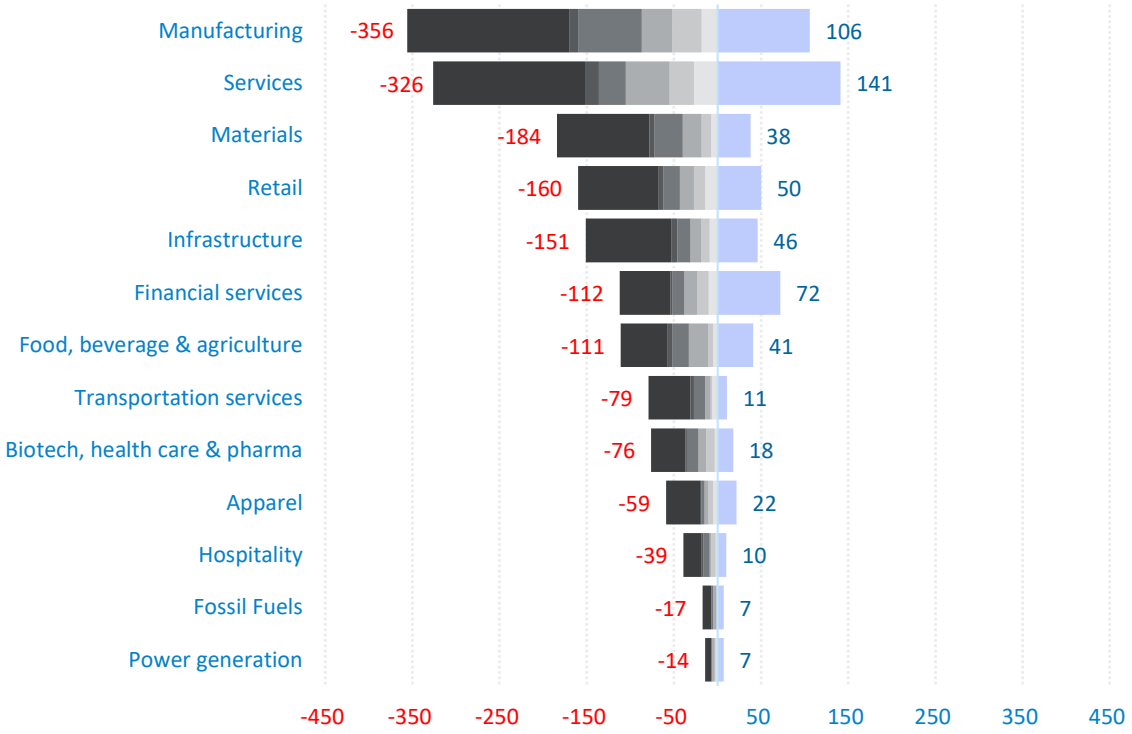
Total Off-track: 1,285

Total On-track: 1,059

Appendix A.2 Number of companies - Projected performance in 2030: Scope 1 & 2 only

Charts below show the projected emissions performance in 2030, against achieving companies' own near-term targets vs. 1.5°C aligned targets for Scope 1 & 2 at different levels of being off-and on-track **by number of companies.**

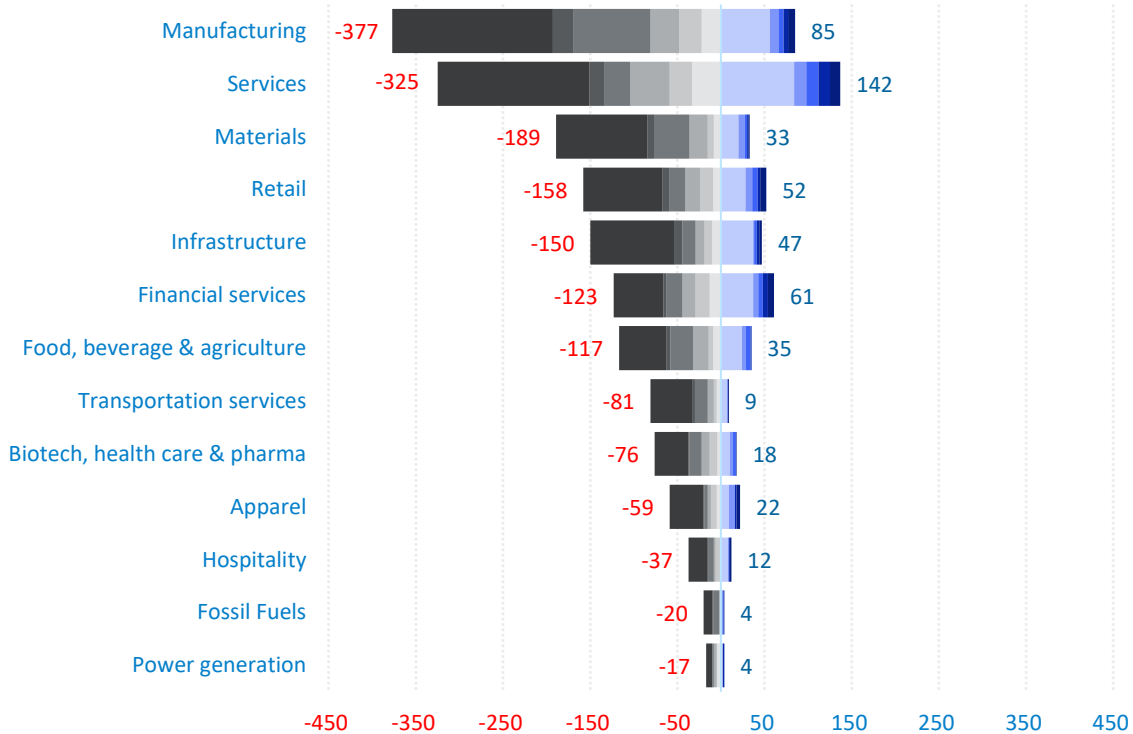
Projected performance in 2030 against own targets for Scope 1 & 2



Total Off-track: 1,684

Total On-track: 569

Projected performance in 2030 against 1.5°C aligned targets for Scope 1 & 2



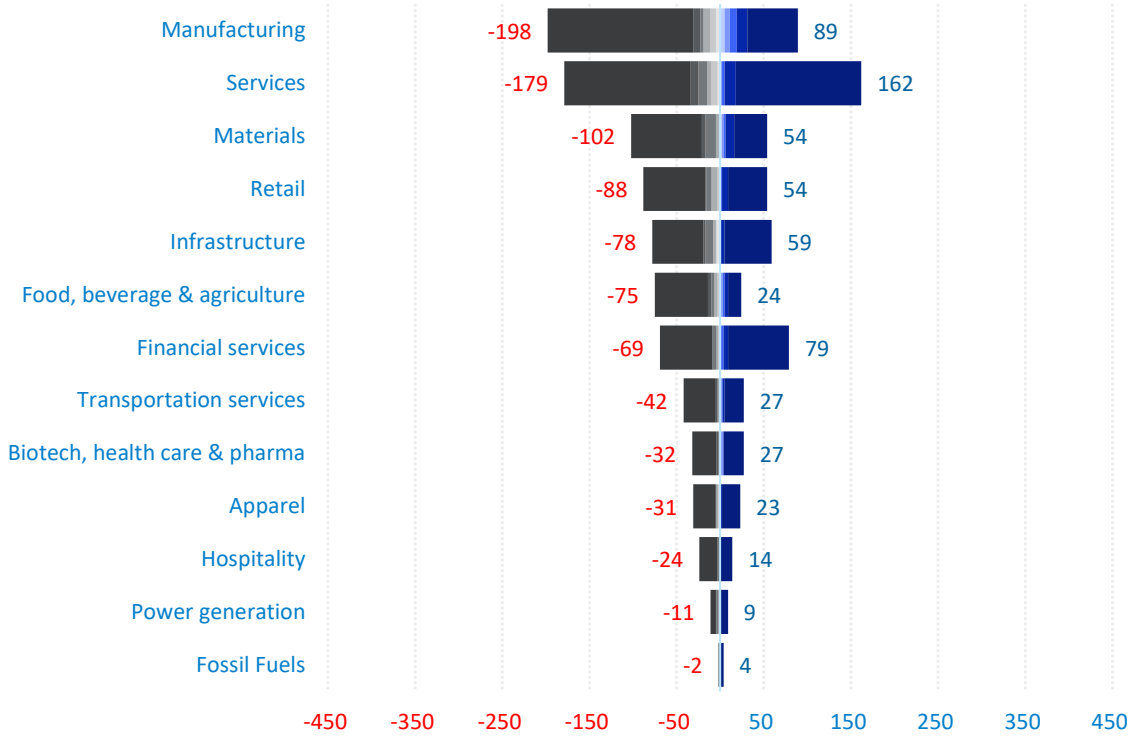
Total Off-track: 1,729

Total On-track: 524

Appendix A.3 Number of companies - Current Performance: Scope 3 only

Charts below show the current emissions performance, against achieving companies' own near-term targets vs. 1.5°C aligned targets for Scope 3 only at different levels of being off- and on-track **by number of companies.**

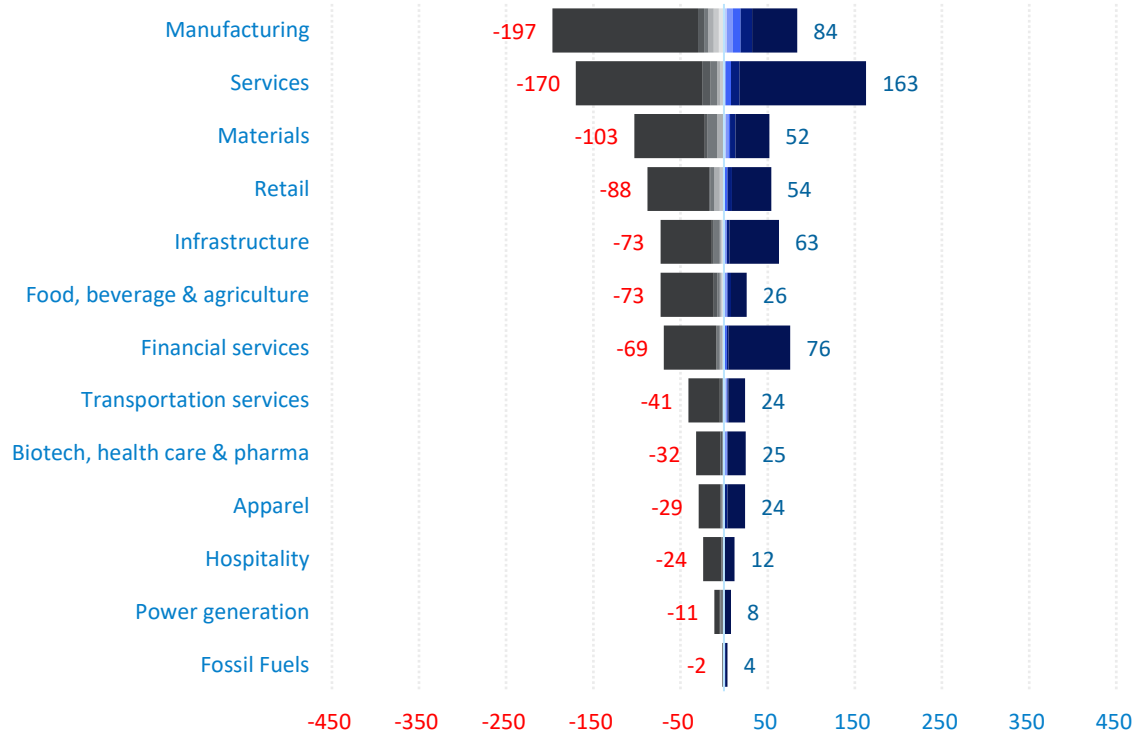
Current Performance against own targets for Scope 3



Total Off-track: 931

Total On-track: 625

Current Performance against 1.5°C aligned targets for Scope 3



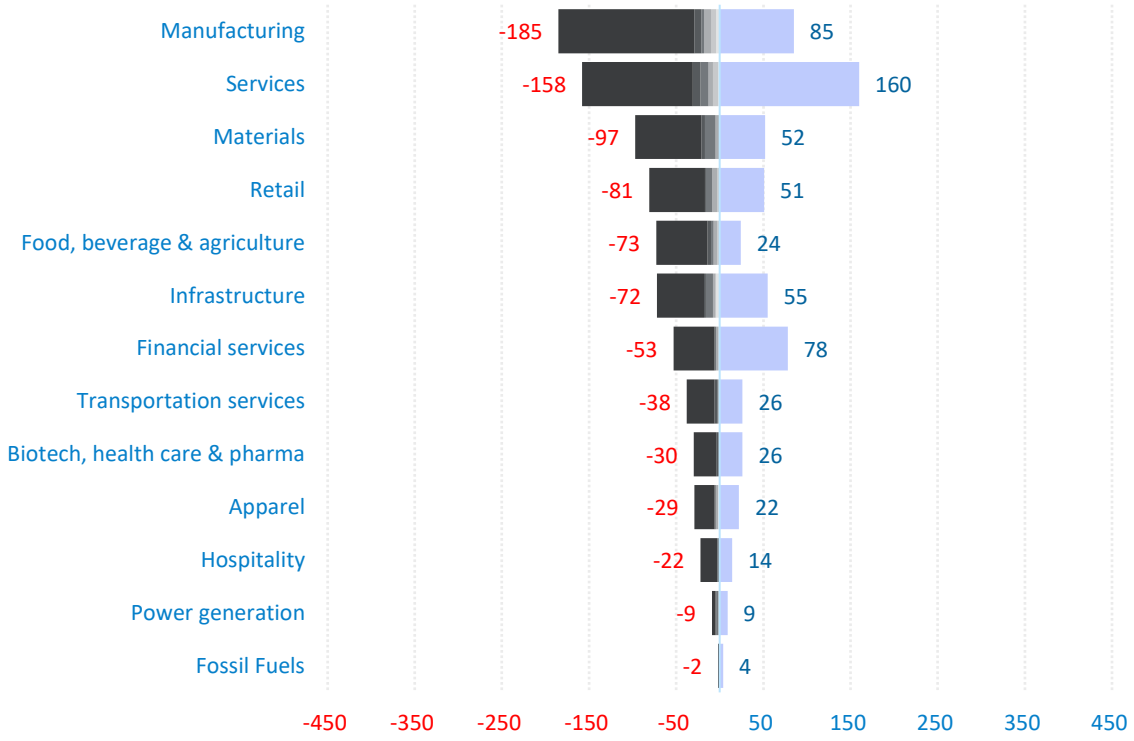
Total Off-track: 912

Total On-track: 615

Appendix A.4 Number of companies – Projected performance in 2030: Scope 3 only

Charts below show the projected emissions performance in 2030, against achieving companies' own near-term targets vs. 1.5°C aligned targets for Scope 3 at different levels of being off-and on-track **by number of companies.**

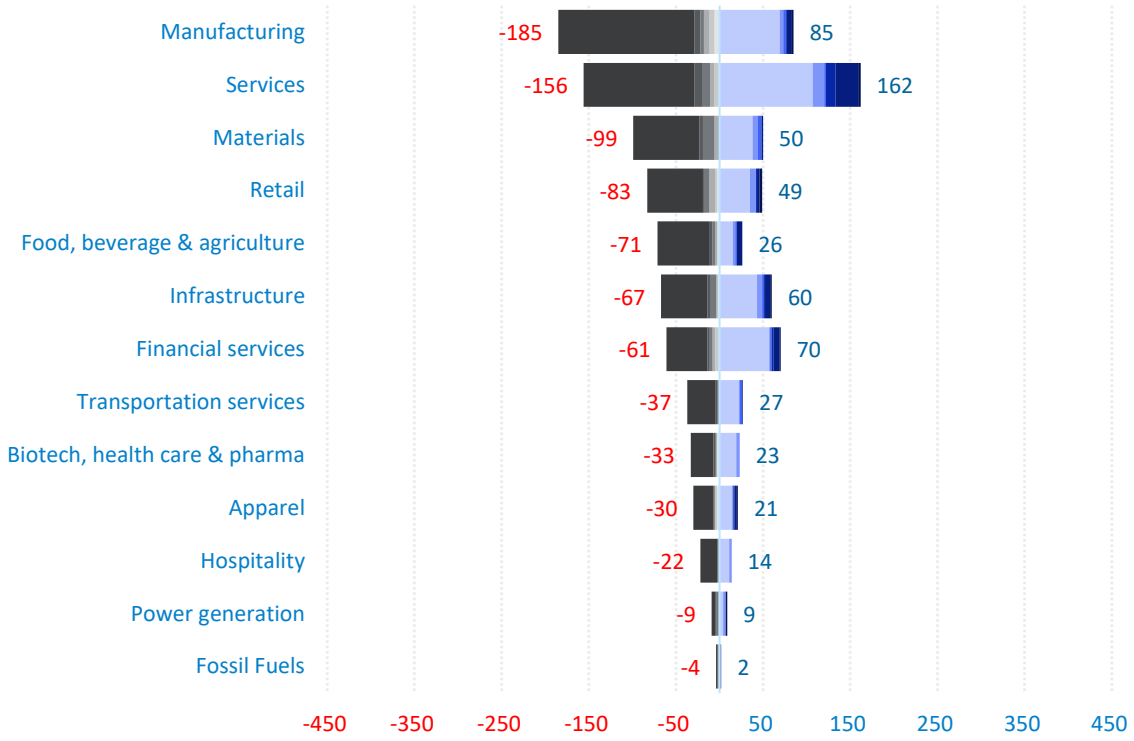
Projected performance in 2030 against own targets for Scope 3



Total Off-track: 849

Total On-track: 606

Projected performance in 2030 against 1.5°C aligned targets for Scope 3



Total Off-track: 857

Total On-track: 598

Appendix A.5 Corporate climate commitment definitions

Corporate climate commitments are grouped into the categories described in the table below. Where a company has multiple targets, which qualify for several of the categories, they are included in the higher of the possible category.

Trove Research's climate commitment groupings and their definitions

Commitment type	Description	No of companies[1]
1. SBTi net zero target	Includes all companies that have had: (i) an emissions reduction target validated by the SBTi, and (ii) are committed to SBTi's net zero standard.	913
Of which Validated	Companies from the above group who have had their commitment to SBTi's net zero standard validated by the SBTi.	434
2. Self-declared net zero target	Includes companies who have made a net zero commitment but have not committed to SBTi's net zero standard.	2,390
Of which Oil & Gas majors	Companies from the above group who are classified by Trove Research as Oil & Gas majors.	30
3. SBTi validated emission reduction target	Includes all companies that had their emission reduction target validated by the SBTi as consistent with a 1.5°C, Well-below 2°C or a 2°C warming scenario, but which have not (yet) committed to SBTi's net zero standard.	2,252
4. Self-declared emission reduction target	Includes all companies known to Trove Research who have announced an emission reduction target, where this reduction target is neither part of a net zero target nor been validated by the SBTi.	2,714
5. Announced an intention to set a target in the next 2 years.	Companies that have not yet made a public climate target but have publicly stated their intention to set one in future. This includes companies who have 'committed' to having the SBTi verify their target in the next 2 years and have not set any other target.	1,396
	Total	9,665

1. Number of companies with climate commitments as of Trove Research's latest Corporate Climate Commitment monthly report.

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Information Classification: GENERAL

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