Corporate Climate Responsibility Monitor 2023

ASSESSING THE TRANSPARENCY AND INTEGRITY OF COMPANIES' EMISSION REDUCTION AND NET-ZERO TARGETS

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Summary

About the Corporate Climate Responsibility Monitor

The *Corporate Climate Responsibility Monitor* evaluates the transparency and integrity of companies' climate pledges.

Companies around the world are increasingly alert to the climate emergency. They face calls from a growing range of stakeholders to take responsibility for the impact of their activities. Most large companies now have public climate strategies and targets, many of which include pledges that appear to significantly reduce, or even eliminate, their contributions to global warming. The rapid acceleration of corporate climate pledges, combined with the fragmentation of approaches, means that it is more difficult than ever to distinguish between real climate leadership and unsubstantiated greenwashing. This is compounded by a general lack of regulatory oversight at international, national and sectoral levels. Identifying and promoting real climate leadership, and sorting it from greenwashing, is a key challenge that, where addressed, has the potential to unlock greater global climate change mitigation ambition.

The *2023 Corporate Climate Responsibility Monitor* assesses the climate strategies of 24 major global companies, critically analysing the extent to which they demonstrate corporate climate leadership (Section A, summarised in Table S.1). We evaluate the integrity of climate pledges against good practice criteria to identify examples for replication, and highlight areas where improvement is needed (Section B, summarised in Table S.2). This is the second iteration of the *Corporate Climate Responsibility Monitor*, whereby the 2022 analysis revealed a number of issues with corporate climate strategies.

We assess and draw insights on transparency and integrity in four main areas of corporate climate action:

Tracking and disclosure of emissions (section A1)

Setting emission reduction targets (section A2)

Reducing own emissions (section A3)

Climate contributions and offsetting claims (section A4).

The 24 companies assessed in this report are major multinational companies. They comprise of the largest three global companies with bold climate pledges from eight consumer-facing and industrial sectors (see section B for further details on selection criteria). They reported combined revenues of USD 3.16 trillion in 2021, approximately 10% of the total revenue from the world's largest 500 companies. Their total self-reported GHG emission footprint in 2019, including upstream and downstream emissions (scope 3) that may include a marginal degree of overlap, amount to approximately 2.2 $GtCO_2e$. This is equivalent to roughly 4% of global GHG emissions in 2019. Ten of the 24 companies (selected through the process described in Section B) were also assessed in the *2022 Corporate Climate Responsibility Monitor*. The repeat analysis of this small sub-set of companies offers insights into what progress has been made over the past year.

Key insights

Most companies' climate strategies are mired by ambiguous commitments, offsetting plans that lack credibility and emission scope exclusions, but replicable good practice can be identified from a minority.

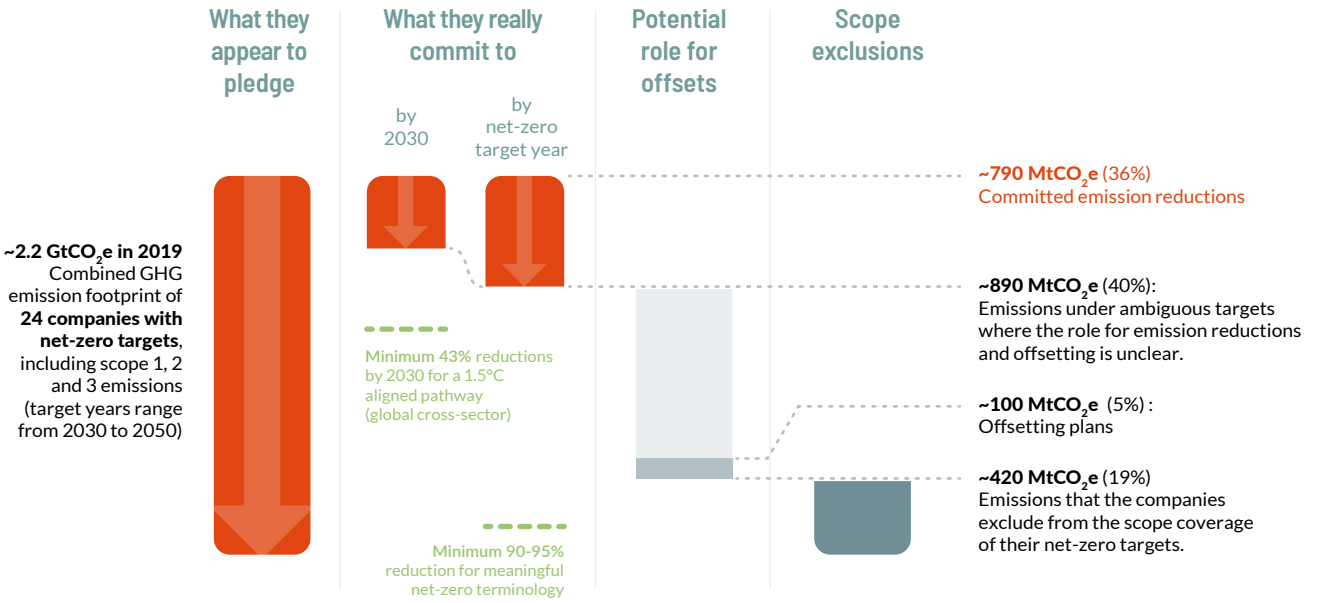
The companies analysed in the *2023 Corporate Climate Responsibility Monitor* have put themselves forward as climate leaders. Of eight major-emitting sectors, we assessed the largest three global companies that are members of an initiative affiliated with the Race to Zero campaign, creating a sample of 24 companies. Through this affiliation, these companies have committed themselves to preparing and implementing decarbonisation plans that align with the objective to limit warming to 1.5°C. These companies serve as role models for other large, medium, and small companies around the world. The analysis of these companies should provide the best prospects for the identification of replicable good practice. Scrutiny of their plans is also necessary to identify whether these are truly influential leaders that set the right examples.

Overall, we find the climate strategies of 15 of the 24 companies to be of low or very low integrity. We found that most of the companies' strategies do not represent examples of good practice climate leadership. Companies' climate change commitments do not add up to what their pledges might suggest (Figure S1). Their combined emission reduction commitments are wholly insufficient to align with 1.5°C-compatible decarbonisation trajectories; targets and potential offsetting plans remain ambiguous; and the exclusion of emission scopes severely undermines the targets of several companies. The integrity of emissions disclosure practices is more encouraging. We found most companies' disclosure to have at least a moderate level of transparency. We also found examples of companies with credible decarbonisation commitments, and companies taking proactive and innovative action to reduce GHG emissions, but these good practice examples represent a minority.

We identify limited progress in the transparency or integrity of companies' climate strategies over the past year. Since the publication of the *2022 Corporate Climate Responsibility Monitor*, there have been a number of important developments in the guidelines and governance of corporate climate strategies: the Science Based Targets initiative's (SBTi) Net Zero Standard entered a new phase of implementation, a UN-convened high-level expert group (HLEG) published recommendations for credible corporate climate targets, while the International Standards Organisation (ISO) published guidelines for net-zero targets. Yet, for the ten companies that we also analysed in the previous iteration of the *Corporate Climate Responsibility Monitor*, we have identified only limited signs of improvement in the transparency or integrity of some companies' strategies, while many of the key issues previously highlighted persist.

The following pages provide a summary of our key insights.

Figure S1: Net-zero pledges break down to only moderate emission reductions alongside offseting and scope exclusions



The 24 companies assessed in this report are not necessarily a representative sample of all corporate actors with net-zero targets. They represent 24 of the largest companies in the world, accounting for approximately 4% of global GHG emissions and revenues of USD 3.16 trillion in 2021. We anticipate that any overlap in the scope 1, scope 2 and scope 3 emissions of these companies is marginal and of limited significance to the key insights derived from this report.

There is a critical need to shift attention to the 2030 blind spot. Companies' climate pledges for 2030 fall well short of the required ambition and are inappropriately verified.

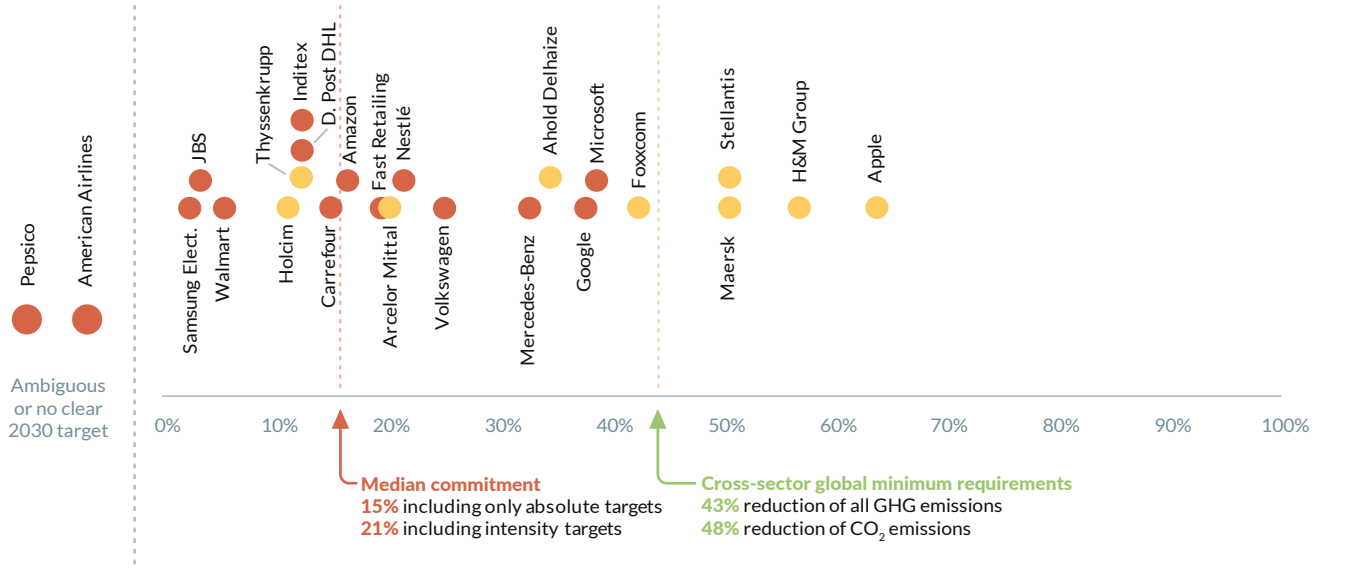
Companies' 2030 targets cannot be taken at face value. Nearly all the 24 companies that we assessed have pledged 2030 targets, but we find that these targets can rarely be taken at face value. For many companies, 2030 targets address only a limited scope of emission sources, such as only direct emissions (scope 1) or emissions from procured energy (scope 2) and only selected other indirect emission categories (scope 3). Scope 3 emissions account for over 90% of the GHG emission footprints for most of the companies we have assessed. For others, 2030 targets are misleading due to reliance on offsetting.

Climate pledges for 2030 fall well short of the economy-wide emission reductions required to stay below the 1.5°C temperature limit. For the 22 companies with targets for 2030, we find that these targets translate to a median absolute emission reduction commitment of just 15% of the full value chain emissions between 2019 and 2030. This may increase to 21% under the most optimistic scenario that emission intensity targets translate to equivalent absolute emission reductions (Figure S2). This compares to the need to cut global GHG and CO_2 emissions by 43% and 48% between 2019 and 2030 respectively, to be in line with the goal to limit the global temperature increase to 1.5°C (IPCC, 2022).

Third-party certifications lend credibility to companies whose targets are highly insufficient. The SBTi has certified the 2030 targets of 16 of the 24 companies included in this analysis as aligned with a pathway to limit global temperature increase to 1.5°C, 'well-below 2°C', or 2°C. Another five companies are listed on SBTi's website as 'committed' to science-based targets for 2030. Most of these companies highlight their SBTi certifications prominently in their climate-related communications as well as in litigation processes, to defend targets that are highly insufficient and sometimes misleading. We find the majority of these companies' 2030 targets to be of poor integrity, due to them not meeting the 1.5°C compatible benchmarks that scientific and grey literature provide, such as from SBTi's own methodologies (see Table 9 in section 2.3 and Table 19 in the Annex for company-specific comparisons).

Figure S2: The median commitment to emission reductions between 2019 and 2030 is just 15-21%

*This chart shows the **proportion of full value chain GHG emissions that companies commit to reduce between 2019 and 2030.***
Data includes 22 companies. 2 companies without clear commitments for 2030 are not included.



LEGEND Poor integrity | Moderate integrity | High integrity

The colour of the data points represents our assessment of the integrity of company's 2030 targets, based on their sufficiency compared to sector-specific 1.5 °C aligned benchmarks, and the appropriateness of the terminology used in the pledge communication.
Data presented on a single x-axis. Placement on y-axis has no significance.

The data points in this graphic represent the authors' most optimistic interpretations of companies' absolute emission reduction commitments, including emission intensity targets, based on publicly available information. The median is provided for scenarios with and without the optimistic assumption that intensity targets result in equivalent absolute emission reductions. Targets that are reliant on offsets to an undefined extent are marked as ambiguous. Further details and explanation on the authors' interpretation of companies' targets can be found in the individual company cases in Section B and in Annex II.

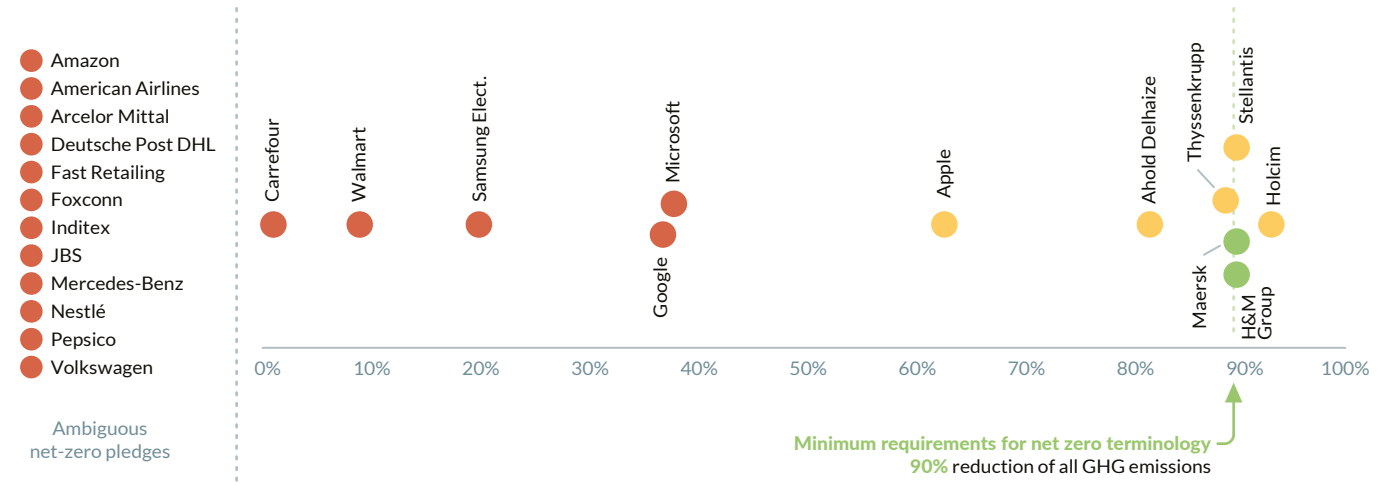
Only a minority of net-zero pledges represent credible commitments to deep decarbonisation, while many remain highly ambiguous.

Only five of 24 companies' net-zero pledges represent a commitment to deep decarbonisation. All the 24 companies that we assessed have pledged to reach net-zero emissions, carbon neutrality or other pledges of equivalent terminology, but the general quality of those pledges remains poor. Just five out of the 24 companies – H&M Group, Holcim, Stellantis, Maersk, and Thyssenkrupp – commit to decarbonise their emissions by at least around 90% by their respective net-zero target years. We find the long-term targets of 17 companies to be of poor integrity, due to the inadequacy or complete lack of explicit emission reduction commitments alongside ambiguous net-zero pledges (Figure S3). Overall, the net-zero pledges of the 24 companies translate to a commitment to reduce just 36% of the companies' combined GHG emission footprint, by the respective net-zero target years (Figure S1).

SBTi's Net Zero Standard may provide a framework for credible long-term targets, but compliance must be checked thoroughly and monitored in the future. Two of the companies we assessed – H&M Group and Holcim – have had their net-zero pledges certified by SBTi under its Net Zero Standard. We found the net-zero pledges of these companies to be of high and moderate integrity, respectively. The SBTi's Net Zero Standard requires that net-zero pledges should equate to at least 90% emission reductions across the full value chain. This directly addresses the key issue that we identify for most companies' net-zero pledges, which are either ambiguous or do not translate to commitments for deep decarbonisation. However, the SBTi's Net Zero Standard is not watertight and depends on companies' willingness to comply with the framework fully and transparently: the *2022 Corporate Climate Responsibility Monitor* (Day *et al.*, 2022) found that the SBTi-certified net-zero pledge of CVS Health was undermined by highly contentious baseline setting. The credibility and real ambition of H&M Group's and Holcim's targets could be undermined by the companies' plans to use bioenergy and RECs, and CCS technologies, respectively. Finally, rigorous verified targets are only one part of the overall integrity assessments, as these need to be backed by credible and detailed plans to achieve them and accompanied by a satisfactory level of transparency. This is why some companies can score well at the 'target setting' level, while still performing moderately or poorly in the overall assessment.

Figure S3: Just 5 of 24 companies commit to deep decarbonisation with their net-zero pledges

*This chart shows the **proportion of full value chain GHG emissions that companies commit to reduce with their net-zero pledges.***
Data includes 12 companies. For 12 other companies the meaning of the net-zero target is ambiguous.



LEGEND Poor integrity | Moderate integrity | High integrity

The colour of the data points represents our assessment of the integrity of company's long-term targets, based on their sufficiency compared to sector-specific 1.5 °C aligned benchmarks, and the appropriateness of the terminology used in the pledge communication. Data presented on a single x-axis. Placement on y-axis has no significance.

The data points in this graphic represent the authors' most optimistic interpretations of companies' emission reduction commitments, including emission intensity targets, based on publicly available information. The chart includes emission reduction commitments under net-zero targets, carbon neutrality pledges and other pledges with equivalent terminology, for the respective target year, which ranges between 2030 and 2050. Targets that are reliant on offsets to an undefined extent are marked as ambiguous. Further details and explanation on the authors' interpretation of companies' targets can be found in the individual company cases in Section B and in Annex II.

Offsetting plans – under various guises – still remain a major stumbling block for the credibility of corporate climate strategies, but the stage is set for a transition to the climate contribution approach.

Developments in 2022 charted a clearer path for a transition from offsetting to a climate contribution claim approach, but companies' climate strategies appear to be behind the curve of these developments. Misleading offsetting claims are increasingly recognised as a legal liability. The climate contribution approach has traction towards wider implementation through the COP 27 decision to create a 'mitigation contribution' unit under Article 6.4 (UNFCCC, 2022), as well as the first-mover announcement from myclimate that it will discontinue its climate neutrality label and transition to a climate contribution model (myclimate, 2022). Companies' climate strategies are not yet in step with these developments; just four of the 24 companies we assessed reported activities or donations that could be interpreted as climate contributions without a neutralisation claim. Meaningful developments in guidelines and frameworks for the climate contribution model may facilitate progress in 2023.

Transparency and integrity of carbon neutrality claims remain critically low. Half of the 24 companies assessed – including most consumer-facing brands – made some form of carbon neutrality claim in 2021 and 2022. These are supposed to be reflections of a company's current impact, as opposed to a distant net-zero target. We found the integrity of every one of those claims to be poor. The integrity of carbon neutrality claims is compromised by various issues, including the scope coverage, and the quality of the carbon credits procured. From the companies assessed, the average company's carbon neutrality claim covered just 3% of their emission footprint, although consumers could be misled into understanding the claims apply to a company's entire business. We find that the offsetting projects that companies select are highly contentious as they are neither additional nor likely to result in permanent emission removals.

The 24 sampled companies plan to offset 23–45% of their combined 2019 emission footprint to claim achievement of their long-term net-zero pledges. Twenty-three of the 24 companies will rely on some form of offsetting towards their targets in the future. The potential role for offsets is left uncertain by many companies, but we estimate from the available information that companies jointly plan to offset at least 23% and up to 45% of their combined emissions footprint. This is far in excess of the maximum role for offsetting (albeit under different terminologies) indicated by SBTi's Net Zero Standard (10%, SBTi, 2021c) and the ISO Net Zero Guidelines (case specific, but less than 5% in most cases, ISO, 2022a, 2022b).

Planned reliance on forestry- and land-related offsets outstrips the technical potential of the world's natural resources and is fundamentally flawed due to the non-permanence of biological carbon sinks. We find that at least three quarters of the 24 sampled companies rely on forestry and land-use related offsets. The demand for such carbon dioxide removals would exceed the potential of the world's natural resource base by around 2–4 times (see section A 4.3), if these practices would be replicated by other companies. Moreover, these plans demonstrate the widespread lack of awareness that the biological storage of carbon is fundamentally unsuitable for offsetting claims due to the non-permanence of the climate impact. Companies are increasingly proposing plans to overcome the issue of non-permanence, but we find that these plans are implausible (see ***Spotlight 4.4.2***: *'Can the non-permanence of climate impacts from nature-based solutions be mitigated?'*).

Offsetting under the guise of 'insetting' is gaining traction and legitimacy, although this practice leads to low credibility offsetting claims and the double counting of emission reductions. 'Insetting' is a business-driven concept with no universally accepted definition. Several companies are advocating for 'insetting' as an alternative to offsetting, but the insetting measures that we have identified amount de facto to the unregulated offsetting of emissions, usually through biological carbon dioxide removals within the value chain (see ***Spotlight 4.4.4***: *'What does insetting really mean?'*). This illegitimate concept has gained considerable traction over the past year, and its potential to significantly undermine corporate strategies is already being realised. Nestlé, PepsiCo, JBS and Deutsche Post DHL already employ 'insetting' today or plan for it to be a significant component of future pledges to illegitimately claim that their emissions have been or will be offset. Some of these companies actively distance themselves from 'offsetting' while planning to offset their emissions through non-permanent biological carbon dioxide removals under the guise of 'insetting' and lobbying for the recognition of that approach. The new SBTi FLAG guidance allows companies to claim the achievement of their emission reduction targets through 'insetting', breaking from the long-held SBTi position that emission reduction targets should only be achieved through emission reductions. SBTi explicitly acknowledges that the definition of insetting and its suitability towards emission reduction targets remains uncertain, while still allowing its use (SBTi, 2021c, p. 30 Box 3). This may have grave consequences for the credibility of climate targets from companies with significant land use emissions, including not only agri-businesses but also retailers and the fashion industry.

Companies' proposed measures are insufficient to catalyse the transformational change that is necessary to limit global warming to 1.5°C.

The majority of companies in this report present measures targeting emissions across the value chain, but their plans usually lack substance. Of the 24 companies assessed, 18 present reduction plans for upstream and downstream scope 3 emissions. Another four companies present measures to reduce upstream emissions only, while two companies (JBS and ArcelorMittal) present no measures at all for scope 3. These findings indicate that companies recognise their responsibility for emissions upstream and downstream the value chain. However, in almost all cases, it remains unclear at what scale measures are implemented and what share of current GHG emissions they address.

While most companies state to work on developing nascent zero-carbon technologies, these generally do not address company's key emission sources. Although 20 of 24 companies state that they invest in new solutions for zero-carbon technologies, we identified only a handful of companies that are working on technologies that address key emission sources. These include, for instance, Maersk, which invests in alternative fuels and vessels, Google, which is pioneering 24/7 monitoring and matching renewable energy generation with consumption, and Deutsche Post, which invests in electrifying its fleet and scaling up the production of low-carbon fuels for road transport.

Companies currently use bioenergy to reduce their emissions footprint, but large-scale reliance on bioenergy is very likely to have negative sustainability implications. Bioenergy use is associated with a range of sustainability issues, including deforestation, biodiversity loss, GHG emissions, and food insecurity. Despite those drawbacks, at least 11 companies plan on using bioenergy to decrease their emissions, including all companies in the transport and heavy industry sectors. Most of them claim that they use 'sustainable' bioenergy, but even the best available options for bioenergy can still exacerbate sustainability problems. The potential for sustainable bioenergy is limited and outweighed by demand, so companies buying sustainable bioenergy, push other companies to use non-sustainable biomass.

A few companies demonstrate leadership with innovative and higher-quality approaches for sourcing renewable electricity, but overall, the integrity of companies' procurement constructs remains low.

Some of the tech companies in this report are pioneering new approaches to securing 100% renewable electricity consumption on an hourly basis. On-site installation and PPAs on the local grid are generally the most impactful procurement constructs that companies can pursue. However, there is a mismatch between renewable electricity generation and consumption. For instance, a company that has signed a PPA for a wind park cannot claim to use renewable energy on windless days. Matching renewable energy generation with production around the clock addresses this problem. Google and Microsoft have both pledged that 100% of their energy consumption will be matched 24/7 with renewable energy generation by local installations by 2030.

Despite these positive examples, we find that most companies' approaches to securing renewable energy are shallow and unlikely to result in significant additional renewable energy capacity. At least 14 of the 24 companies in the report rely on Renewable Electricity Certificates (RECs) to make bold claims about how they reduce electricity-related emissions. RECs are, however, unlikely to send a signal to the market that there is demand for renewable electricity; they will most likely not result in the installation of new renewable electricity capacity.

We see some traction for taking responsibility for energy-related emissions in the value chain. Apple, Walmart, Foxconn and H&M Group support their suppliers in purchasing renewable electricity – financially, through guidance, or by facilitating arrangements. This is an important component of decarbonising the supply chain, although the real impact of this support depends on the procurement constructs that suppliers end up using. Support for suppliers is critical not only because many suppliers may be too small to set up PPAs or on-site installation themselves, but also because renewable energy policies are underdeveloped in some countries, which hinders suppliers in procuring renewable electricity. This problem is particularly relevant in many Asian countries with large manufacturing industries.

On a more positive note, companies' emission disclosure in 2022 indicates a solidifying consensus and level of understanding on good practice.

Companies exhibit a moderate degree of transparency in their emission disclosure. Of the 24 companies we assessed, we found that 16 companies disclosed emissions data with at least a moderate level of transparency and integrity, for all emission scopes. These trends indicate that it is now common practice for companies we have assessed to acknowledge full responsibility for upstream and downstream scope 3 emissions, and emissions from subsidiaries. This reflects the increasing level of alignment and clarity on these issues among existing and newly published guidelines. Moreover, we see signs that this moderate level of transparency continues to improve.

Companies exhibiting bad practice for emission disclosure are in the minority, but these bad practices remain significant. A minority of companies still publish highly misleading emissions data, usually by excluding major emission sources from their public documentation. Even if fully disclosing all relevant emission scopes, some companies' estimates could remain contentious since they may significantly *underreport* certain emission scopes. For example, recent analysis suggests that automobile manufactures Volkswagen, Mercedes-Benz and Stellantis all underreport their disclosed life-cycle emissions of sold vehicles by more than 50% due to unrealistic assumptions on vehicle lifetimes (Bonaccorsi *et al.*, 2022). We did not identify any significant improvements over the past year from the minority of companies with poor emission disclosure practices.

2023 must be the year for regulators, companies and voluntary initiatives to align with the solidifying consensus on what constitutes good practice for corporate climate responsibility.

Companies must play a central role in finding and scaling up solutions for deep decarbonisation, but their efforts need urgent acceleration and appropriate regulatory frameworks. The findings of this report indicate that regulators cannot rely on consumer and shareholder pressure to drive corporate action, nor can they rely on existing voluntary initiatives to ensure compliance with the necessary standards for credible and transparent corporate climate action. In particular, companies' plans for the period up to 2030 fall far short of the efforts needed in this crucial decade for climate action to stand a reasonable chance of limiting global warming to 1.5°C. Forthcoming regulation, for example the EU's Corporate Sustainability Reporting Directive entering into force in 2023 (EU, 2022), will introduce tighter requirements for corporate climate strategies, but their final implementation will need to be closely monitored to ensure a high standard of compliance. The publication of the UN HLEG recommendations and the ISO Net Zero Guidelines at COP 27 demonstrated the solidifying consensus on what constitutes good practice for corporate climate responsibility. Although these publications largely took stock of the existing consensus on good practice, rather than proposing new and more ambitious benchmarks, most companies' strategies fall far short of the established recommendations.

Urgent action is needed to unlock the potential of corporate climate leadership in this crucial decade of climate action towards 2030. 2023 is an important year for regulators, companies, and the standard-setting initiatives to step up and align with the requirements set out in the scientific literature for immediate action towards deep decarbonisation. Having focused largely on the integrity of net-zero pledges in recent years, regulators and voluntary initiatives must place a renewed and urgent focus on the integrity of companies' emission reduction plans up to 2030, ensuring that the discourse on longer-term net zero does not distract from this most immediate and unfulfilled objective.

Table S1: Overview of corporate climate responsibility good practice assessment for 24 companies in 2023

1 TRACKING AND DISCLOSING EMISSIONS	GOOD PRACTICE	TRANSPARENCY & INTEGRITY
Comprehensiveness of disclosure	✓ Disclose full details on their GHG emissions on an annual basis, with a breakdown of the data to specific emission sources (including scope 1, 2, 3 and non-GHG climate forcers) and the presentation of historical data for each emission source.	Moderate ▲

2 SETTING SPECIFIC AND SUBSTANTIATED TARGETS	GOOD PRACTICE	AVERAGE PERFORMANCE+ & CHANGE SINCE 2022	
		TRANSPARENCY+	INTEGRITY+
Short- & medium-term targets towards 2030	✓ Set short- and medium-term emission reduction targets *towards* 2030 within five-year intervals that reflect a commitment to immediate action and accountability. Targets should be independent from offsetting and aligned with 1.5°C-compatible trajectories in the sector, across all emission scopes.	Moderate ▲	Very low —
Long-term targets beyond 2030	✓ Set specific long-term emission reduction targets *beyond 2030* that are independent from offsetting and aligned with 1.5°C-compatible trajectories in the sector, across all emission scopes, as a *vision* for deep decarbonisation.	Low —	Very low —

3 REDUCING EMISSIONS	GOOD PRACTICE	AVERAGE PERFORMANCE+ & CHANGE SINCE 2022	
		TRANSPARENCY+	INTEGRITY+
Emission reduction measures	✓ Implement encompassing and deep decarbonisation measures and disclose details of those measures to support replication. ✓ Refrain from using bioenergy where alternatives to combustion exist, and ensure that any bioenergy they use does not have negative sustainability implications.	Moderate ▲	Low —
Renewable energy procurement	✓ Procure the highest quality renewable electricity available and disclose the details of that procurement.	Low —	Very low —

4 CLIMATE CONTRIBUTIONS AND OFFSETTING	GOOD PRACTICE	AVERAGE PERFORMANCE+ & CHANGE SINCE 2022	
		TRANSPARENCY+	INTEGRITY+
Responsibility for unabated emissions	✓ Pursue high transparency and integrity on climate contributions and any neutralisation claims made today (see criteria below).	Low —	Very low —
Climate contributions	✓ Provide an ambitious volume of financial support to climate change mitigation activities beyond the value chain, without claiming to neutralise the company's own emissions.	Low ▲	Very low —
Offsetting claims today	✓ Clearly disclose offsetting claims and plans; avoid misleading pledges and claims; avoid risk of distraction by also committing to measures for deep emission reductions; commit to procure only high-quality credits from ambitious projects with a permanent climate impact; and commit to preventing any form of double-counting of climate impacts.	Low —	Very low —
Offsetting plans for the future		Low —	Very low —

+ Transparency and integrity columns: the bar indicates the distribution of our rating of the 24 companies (Poor Moderate High n.a.); the text above the shaded bars represents the average rating across all the companies we assessed, calculated excluding non-applicable cases, on a 5-point scale (Very low, Low, Moderate, Reasonable, High); and an indication of progress since the last analysis in 2022 (▲ — ▼), based on the authors' interpretation of progress from the companies that were analysed also in 2022, against the current methodology version. Good practices were derived from the principles elaborated in the following subsections, and from a compilation of the practices identified from existing company strategies. Full details on the assessment methodology can be found in the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0* (NewClimate Institute, 2023b).

Table S2: Overview of companies assessed in the Corporate Climate Responsibility Monitor 2023

HIGH INTEGRITY	HEADLINE PLEDGE	TRANSPARENCY	INTEGRITY	PAGE
No companies achieved a high integrity rating				
REASONABLE INTEGRITY	**HEADLINE PLEDGE**	**TRANSPARENCY**	**INTEGRITY**	**PAGE**
Maersk	Net zero by 2040	Reasonable	Reasonable	p. 100
MODERATE INTEGRITY	**HEADLINE PLEDGE**	**TRANSPARENCY**	**INTEGRITY**	**PAGE**
Apple	Carbon neutral by 2030	Reasonable	Moderate	p. 78
Arcelor Mittal	Net zero by 2050	Moderate	Moderate	p. 80
Google	Net zero by 2030	Moderate	Moderate	p. 90
H&M Group	Net zero by 2040	Moderate	Moderate	p. 92
Holcim	Net zero by 2050	Reasonable	Moderate	p. 94
Microsoft	Carbon negative by 2030	Reasonable	Moderate	p. 104
Stellantis	Net-zero carbon by 2038	Moderate	Moderate	p. 112
Thyssenkrupp	Climate neutral by 2050	Moderate	Moderate	p. 114
LOW INTEGRITY	**HEADLINE PLEDGE**	**TRANSPARENCY**	**INTEGRITY**	**PAGE**
Ahold Delhaize	Net zero by 2050	Moderate	Low	p. 72
Amazon	Net-zero carbon by 2040	Low	Low	p. 74
Deutsche Post DHL	Net zero by 2050	Moderate	Low	p. 84
Fast Retailing	2030 emission reduction targets	Moderate	Low	p. 86
Foxconn	Net zero by 2050	Low	Low	p. 88
Inditex	Net zero by 2040	Moderate	Low	p. 96
Mercedes-Benz	Carbon neutral vehicles by 2039	Low	Low	p. 102
Nestlé	Net zero by 2050	Low	Low	p. 106
PepsiCo	Net zero by 2040	Low	Low	p. 108
Volkswagen	Carbon neutral by 2050	Moderate	Low	p. 116
Walmart	Zero emissions by 2040	Moderate	Low	p. 118
VERY LOW INTEGRITY	**HEADLINE PLEDGE**	**TRANSPARENCY**	**INTEGRITY**	**PAGE**
American Airlines	Net zero by 2050	Moderate	Very low	p. 76
Carrefour	Carbon neutral by 2040	Very low	Very low	p. 82
JBS	Net zero by 2040	Very low	Very low	p. 98
Samsung Electronics	Net-zero carbon by 2050	Low	Very low	p. 110

RATINGS **5-point scale** High Reasonable Moderate Low Very low. **See individual company analyses.**
Assessments were made based on public information identified by the authors. A poor rating may not necessarily be an indication that a company's climate strategy is weak, but could also indicate that the information was insufficient to confirm good practice. Ambitious companies can improve their ratings by ensuring that all aspects of their climate responsibility strategies are transparently and accurately disclosed, and in the public domain.

About the corporate climate responsibility monitor

The need for scrutiny on corporate climate action

Many companies are putting themselves at the forefront of climate action. The rate of corporate climate pledge setting is accelerating exponentially: by January 2023, nearly 9,000 companies had joined the UNFCCC's Race to Zero campaign (UNFCCC, 2023), up from just over 3,000 one year earlier (Day *et al.*, 2022).

Civil society's increasing concern with the urgency of the climate crisis is resulting in more pressure from consumers, shareholders and regulators for companies to decarbonise. In parallel, companies realise that the direction of travel is set for the decarbonisation of the global economy, and it is increasingly attractive for them to assume a leading role in that new paradigm. Many companies are scrambling for new approaches and narratives to demonstrate their climate leadership, recognising that historical approaches face limitations in today's context.

The rapid acceleration of corporate climate pledge setting, combined with the fragmentation of approaches and the general lack of regulation or oversight, means that it is more difficult than ever to distinguish between real climate leadership and unsubstantiated greenwashing.

The goalpost of what constitutes good practice climate action for companies has shifted in the era of the Paris Agreement and the increasingly clear scientific evidence that underpins its urgency. With the objectives of the Paris Agreement, greenhouse gas emissions need to be reduced at speed, in all countries and in all sectors. The 1.5°C limit requires a reduction in global greenhouse gases and CO_2 emissions by 43% and 48% respectively from 2019 levels by 2030, to reach a state of net-zero global CO_2 emissions by around 2050, net-zero emissions of all greenhouse gases by around 2070, and net-negative emissions thereafter (IPCC, 2022). Company actions that were considered viable in the era of the Kyoto Protocol only ten years ago are no longer sufficient.

For example, it is no longer sufficient for companies to only address their own direct emissions; rather, companies now need to address upstream and downstream emissions as well. It is no longer good practice for a company to compensate for emissions by reducing or removing emissions elsewhere; rather, emission reductions and removals 'elsewhere' need to be enhanced in parallel to the company's emission reductions, to reach global net zero.

A new mindset and evaluation standard for companies is emerging. While in the Kyoto era only some countries were required to act, companies now need to ask themselves: 'Would we reach global net-zero emissions if all would do what we are doing?'

The difficulty of distinguishing real climate leadership from greenwashing is a key challenge that, where addressed, has the potential to unlock more substantial global climate change mitigation. Corporate climate action is key to closing the emissions gap to a 1.5°C-aligned emissions pathway. In a short space of time, and in the absence of sufficient top-down regulation, consumers' and shareholders' expectations have become a major driver for enhanced corporate climate action. Companies appear to be responding. To facilitate this important bottom-up pressure mechanism, it is essential that the credibility of companies' strategies is transparent and can be understood by their target audiences.

The Corporate climate responsibility monitor

The *Corporate Climate Responsibility Monitor* evaluates the transparency and integrity of companies' climate pledges. The objectives of the *Corporate Climate Responsibility Monitor* are:

- **Identify and highlight good practice approaches** that can be replicated by other companies, recognising that companies are experimenting to work out what is constructive and credible practice.
- **Reveal the transparency and integrity of major companies' climate leadership claims** and provide a structured methodology for others to replicate such an evaluation. **Transparency** refers to the extent to which a company publicly discloses the information necessary to fully understand the integrity of that company's approaches towards the various elements of corporate climate responsibility. **Integrity**, in this context, is a measure of the quality, credibility and comprehensiveness of those approaches.
- **Scrutinise the credibility of companies' plans for offsetting their emissions** through carbon dioxide removals or emission reduction credits, recognising that voluntary carbon markets are highly fragmented and there remains a lot of uncertainty on credible good practice.

The *Corporate Climate Responsibility Monitor* focuses on four main areas of corporate climate action: tracking and disclosure of emissions (section A1), setting emission reduction targets (section A2), reducing own emissions (section A3) and taking responsibility for unabated emissions through climate contributions or offsetting (section A4). Evaluations for 24 major global companies are set out in Section B.

The *Corporate Climate Responsibility Monitor* is prepared by **NewClimate Institute** and **Carbon Market Watch**. The consortium partners combine years of experience with the independent critical analysis of corporate climate action and carbon market mechanisms. NewClimate Institute and Carbon Market Watch are both not-for-profit organisations. Neither of the institutions hold private commercial interests in voluntary carbon credit markets.

Development of the Corporate Climate Responsibility Monitor

The *Corporate Climate Responsibility Monitor* is based on the guiding principles for good practice corporate climate responsibility set out in the accompanying methodology document: *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0* (NewClimate Institute, 2023b). We have drawn these guiding principles from a combination of scientific literature review, previous work by the authors, and the identification of existing good practices from company case studies.

The guiding principles identified in this document and the accompanying methodology document relate to issues where the state of scientific knowledge and debate is rapidly evolving. The contents of this document represent the views of the authors, based on our interpretation of existing research and current developments. Our assessments of specific companies are based upon these perspectives and interpretations, which may not be universally held views.

The *Corporate Climate Responsibility Monitor* promotes transparency with the philosophy that consumers, shareholders, regulators and wider observers should be able to follow and assess the integrity of companies' claims. Accordingly, the company assessments in section B are based only on publicly available information that the authors were able to identify (see Annex-Data Sources in the Methodology document). Each rating represents the authors' understanding of the publicly available information. In some cases, company information was scattered across different sources (e.g., annual reports, press releases and statements, webpages, or other marketing materials); it is possible in this process that information may have been misinterpreted, or that relevant information was overlooked. Companies should consider how to present information as transparently as possible, to ensure that observers are able to identify all the relevant information necessary to understand their climate strategies.

We assess the transparency and integrity of companies' strategies based on the information that is self-reported by the companies. We do not assess or certify the accuracy or truth of the information provided by companies, including their GHG emission reporting. In specific cases, we supplement self-reported information from the companies with information that we have identified from other sources, but we cannot guarantee the accuracy of that information.

→ See also the assessment methodology for the *Corporate Climate Responsibility Monitor*. *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0* (NewClimate Institute, 2023b).

SECTION A

Key elements of corporate climate responsibility

This section provides an overview of the good practice criteria and assessment methodology for the *Corporate Climate Responsibility Monitor*, based on the specific principles for credibility in four focus areas: tracking and disclosure of emissions; setting specific and credible targets; reducing own emissions; and responsibility for unabated emissions. For each of these four focus areas, we discuss trends, good practices and challenges identified from the companies we assessed.

Good practice overview

Corporates looking to take a position of climate leadership can learn from each other to replicate good practice approaches that are transparent, constructive and robust. The *Corporate Climate Responsibility Monitor 2023* assesses 24 major global companies to draw out good practice in four key areas:

1. Tracking and disclosure of emissions (section 1)

To develop a comprehensive and robust climate strategy, it is key that companies understand and are transparent about their GHG emission footprints and their trajectories. Section 1 presents good practice principles and trends for tracking and disclosure of emissions.

2. Setting specific and substantiated targets (section 2)

Companies' headline climate change pledges encompass a broad range of target setting approaches. Regardless of the type of target and the terminology used, the commitments should send a clear signal for immediate action to decarbonise the value chain, and should avoid misleading consumers, shareholders, observers and regulators. Section 2 presents good practice principles and trends for setting specific and substantiated targets, considering the coverage of emission sources, the explicit specification of an emission reduction target as part of the headline pledge, and the substantiation of long-term visions through interim targets.

3. Reducing emissions (section 3)

Encompassing measures for deep emission reductions are the backbone of ambitious corporate climate targets. Section 3 presents good practice principles and trends for reducing emissions, including a special focus on good practice for sourcing renewable electricity.

4. Climate contributions and offsetting (section 4)

Corporate climate leadership includes not only ambitious target setting, but also taking responsibility for unabated emissions. Section 4 explores good practice and trends related to two distinct approaches for assuming responsibility for unabated emissions: climate contributions and offsetting claims.

The specific assessments include a rating of the transparency and integrity of companies' approaches. **Transparency** refers to the extent to which a company publicly discloses the information necessary to fully understand the integrity of that company's approaches towards the various elements of corporate climate responsibility. **Integrity**, in this context, is a measure of the quality, credibility and comprehensiveness of those approaches.

Table 1 provides an overview of good practice corporate climate responsibility and the rating methodology for the *Corporate Climate Responsibility Monitor 2023* for transparency and integrity in each of these four areas. Full details on the methodology can be found in the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0* (NewClimate Institute, 2023b).

Table 1: Overview of corporate climate responsibility good practice assessment for 24 companies in 2023

1 TRACKING AND DISCLOSING EMISSIONS	GOOD PRACTICE	TRANSPARENCY & INTEGRITY
Comprehensiveness of disclosure	✓ Disclose full details on their GHG emissions on an annual basis, with a breakdown of the data to specific emission sources (including scope 1, 2, 3 and non-GHG climate forcers) and the presentation of historical data for each emission source.	Moderate ▲

2 SETTING SPECIFIC AND SUBSTANTIATED TARGETS	GOOD PRACTICE	AVERAGE PERFORMANCE+ & CHANGE SINCE 2022	
		TRANSPARENCY+	INTEGRITY+
Short- & medium-term targets towards 2030	✓ Set short- and medium-term emission reduction targets *towards* 2030 within five-year intervals that reflect a commitment to immediate action and accountability. Targets should be independent from offsetting and aligned with 1.5°C-compatible trajectories in the sector, across all emission scopes.	Moderate ▲	Very low —
Long-term targets beyond 2030	✓ Set specific long-term emission reduction targets *beyond 2030* that are independent from offsetting and aligned with 1.5°C-compatible trajectories in the sector, across all emission scopes, as a *vision* for deep decarbonisation.	Low —	Very low —

3 REDUCING EMISSIONS	GOOD PRACTICE	AVERAGE PERFORMANCE+ & CHANGE SINCE 2022	
		TRANSPARENCY+	INTEGRITY+
Emission reduction measures	✓ Implement encompassing and deep decarbonisation measures and disclose details of those measures to support replication. ✓ Refrain from using bioenergy where alternatives to combustion exist, and ensure that any bioenergy they use does not have negative sustainability implications.	Moderate ▲	Low —
Renewable energy procurement	✓ Procure the highest quality renewable electricity available and disclose the details of that procurement.	Low —	Very low —

4 CLIMATE CONTRIBUTIONS AND OFFSETTING	GOOD PRACTICE	AVERAGE PERFORMANCE+ & CHANGE SINCE 2022	
		TRANSPARENCY+	INTEGRITY+
Responsibility for unabated emissions	✓ Pursue high transparency and integrity on climate contributions and any neutralisation claims made today (see criteria below).	Low —	Very low —
Climate contributions	✓ Provide an ambitious volume of financial support to climate change mitigation activities beyond the value chain, without claiming to neutralise the company's own emissions.	Low ▲	Very low —
Offsetting claims today	✓ Clearly disclose offsetting claims and plans; avoid misleading pledges and claims; avoid risk of distraction by also committing to measures for deep emission reductions; commit to procure only high-quality credits from ambitious projects with a permanent climate impact; and commit to preventing any form of double-counting of climate impacts.	Low —	Very low —
Offsetting plans for the future	✓	Low —	Very low —

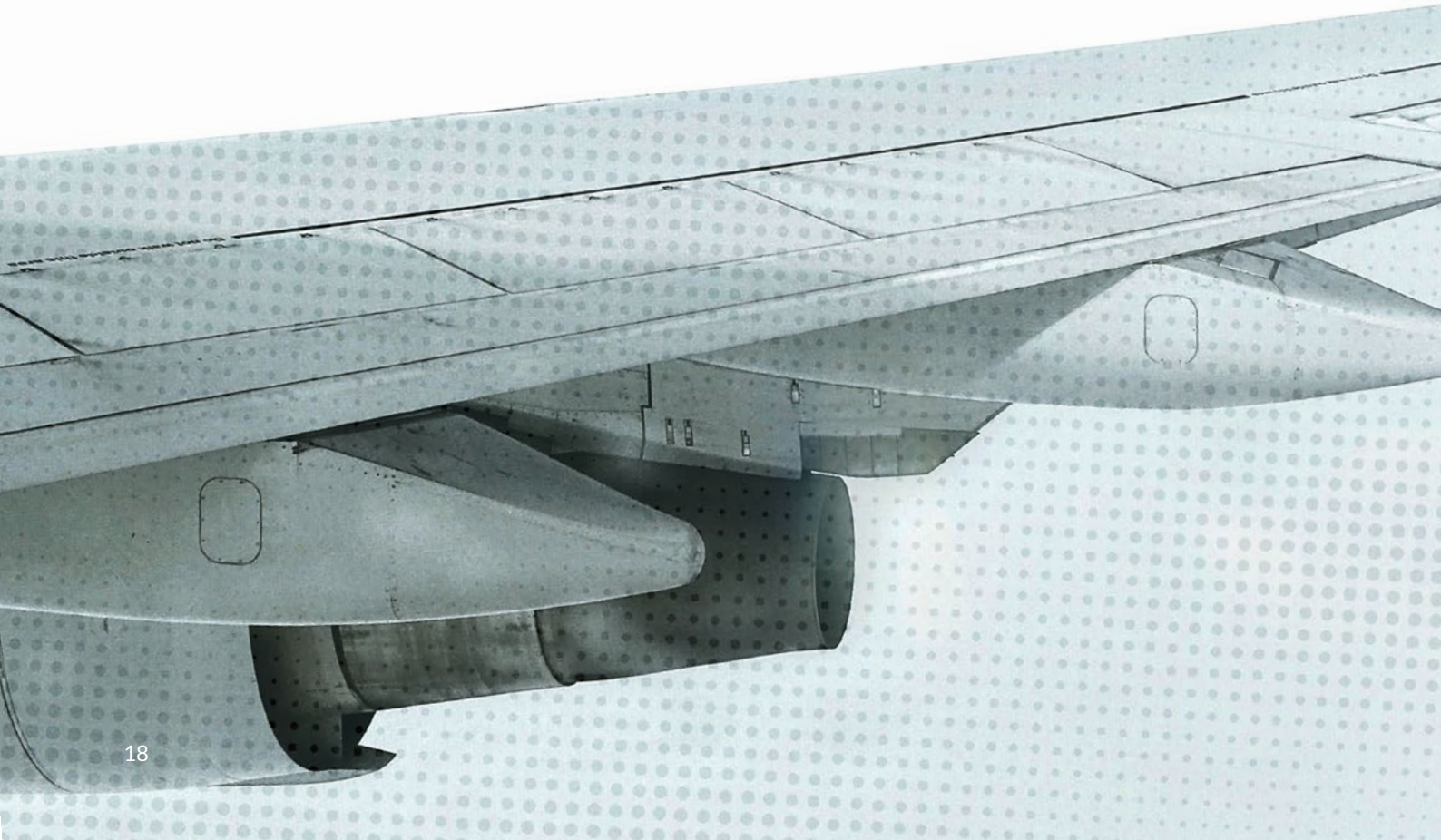
+ Transparency and integrity columns: the bar indicates the distribution of our rating of the 24 companies (Poor Moderate High n.a.); the text above the shaded bars represents the average rating across all the companies we assessed, calculated excluding non-applicable cases, on a 5-point scale (Very low, Low, Moderate, Reasonable, High); and an indication of progress since the last analysis in 2022 (▲ — ▼), based on the authors' interpretation of progress from the companies that were analysed also in 2022, against the current methodology version. Good practices were derived from the principles elaborated in the following subsections, and from a compilation of the practices identified from existing company strategies. Full details on the assessment methodology can be found in the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0* (NewClimate Institute, 2023b).

1 Tracking and disclosure of emissions

To develop a comprehensive and robust climate strategy, it is key that companies understand and are transparent about their GHG emission footprints and their trends over time. A complete and transparent overview of a company's emissions footprint is crucial to understand a company's scope of influence, to grasp the relevance of its climate-related targets, and to determine whether emission reduction measures are appropriate and comprehensive.

This section assesses the comprehensiveness of companies' GHG emission tracking and disclosure for specific emission scopes and for subsidiary companies. This report does not assess the rigorousness and accuracy of companies' calculations when quantifying emissions from each emissions scope; quantified GHG emissions throughout this document are self-reported by the companies and not verified by the authors. Rather, we assess how comprehensive the companies' own disclosure is in terms of the coverage of emission sources.

Table 2 presents a summary overview of principles for good practice (section 1.2) as well as a summary trends, promising examples and bad practice identified from the company assessments (section 1.3).



1.1 Snapshot summary

Table 2: Summary of good practice and trends for GHG emission tracking and disclosure

SUMMARY OF GOOD PRACTICE AND TRENDS FOR GHG EMISSION TRACKING AND DISCLOSURE

GOOD PRACTICE FOR EMISSION DISCLOSURE

- ✓ Disclose full details on their GHG emissions on an annual basis in public documents.
- ✓ Include a breakdown of the data to specific emission sources (including scope 1, 2, 3 and non-GHG climate forcers)
- ✓ Present of historical data for each emission source.
- ✓ Ensure consistency of emission disclosure across documents.

(See section 1.2.2 for further detail)

AVERAGE PERFORMANCE+ TRANSPARENCY & INTEGRITY+

Scope 1	Reasonable —
Scope 2	Moderate ▲
Scope 3 upstream	Moderate —
Scope 3 downstream	Moderate —
Inclusion of subsidiaries	High —

+ Transparency and integrity columns: the bar indicates the distribution of our rating of the 24 companies (Poor Moderate High n.a.); the text above the shaded bars represents the average rating across all the companies we assessed, calculated excluding non-applicable cases, on a 5-point scale (Very low, Low, Moderate, Reasonable, High); and an indication of progress since the last analysis in 2022 (▲ — ▼), based on the authors' interpretation of progress from the companies that were analysed also in 2022, against the current methodology version.

SUMMARY OF TRENDS, ROLE MODELS AND BAD PRACTICE (SECTION 1.3)

Moderate transparency in emission disclosure: Companies' emission disclosure in 2022 indicates a solidifying consensus and level of understanding on good practice. Most companies disclose emissions with at least a moderate degree of transparency.

Disclosure of indirect (scope 3) emissions and emissions from subsidiaries: Reflecting a consensus across existing and new guidance, it is now established common practice for companies to take responsibility for scope 3 emissions, and emissions from subsidiaries.

Companies exhibiting bad practice for emission disclosure are in the minority, but misleading scope 3 emission disclosure remains a critical issue.

PROMISING EXAMPLES

Emissions breakdown: **Apple, Microsoft, Holcim, Maersk** and **Inditex** provide a breakdown of emissions for each emissions scope, which allows for an understanding of emission sources. **Microsoft** provides a transparent breakdown of scope 3 emissions into the 15 categories of the GHG Protocol and shows whenever a category is not relevant.

Scope 2 emissions reporting: **Holcim, Foxconn, Fast Retailing** and **Mercedes-Benz** use the highest estimate for scope 2 emissions as part of their emissions aggregates, providing incentives for improvements in both renewable energy procurement and energy efficiency.

BAD PRACTICE

Inconsistent reporting: Some companies misuse CDP certifications to claim the legitimacy of inconsistent and incomplete public disclosure.

Hidden scope exclusions: **Carrefour** use footnoted scope clarifications to exclude the majority of their emissions from their public emissions disclosure.

SUPPORTING COMPANIES TO IMPROVE THEIR EMISSION DISCLOSURE

Sector-specific reporting boundaries: There remains a lack of guidance on the appropriate boundaries of downstream scope 3 emission reporting for some sectors, including the steelmaking sector.

Indirect product use phase emissions: There is no clear consensus on the extent to which it is constructive and appropriate for companies to disclose indirect product use phase emissions (e.g. emissions from operating washing machines as downstream emissions for clothing), which are labelled as optional by the GHG Protocol. In some cases 'over-reporting' emissions can undermine targets (see section 1.2.1).

Table 3: Summary of developments in 2022 related to disclosure of GHG emissions

DEVELOPMENTS IN 2022 FOR CORPORATE EMISSION DISCLOSURE

PROGRESS IN COMPANIES' CLIMATE STRATEGIES (INCLUDING THE 10 COMPANIES ASSESSED IN BOTH THE 2022 AND 2023 CCRM)

2023 RATINGS & PROGRESS+ SINCE 2022		
Amazon	Moderate	—
Apple	Reasonable	—
Carrefour	Very low	—
Deutsche Post DHL	Moderate	▲
Google	Moderate	—
JBS	Very low	—
Maersk	Reasonable	▲
Nestlé	Moderate	—
Volkswagen	Moderate	—
Walmart	Low	—

ALL (AVERAGE): Moderate —

The overall transparency of companies' disclosure remains moderate; some companies improved aspects of their disclosure but the minority of companies with the lowest performance on emissions disclosure did not make significant improvements to address identified issues.

+ Authors' interpretation of companies' progress against the current methodology version since the last analysis in 2022 (▲ — ▼).

NEW GUIDELINES AND FRAMEWORKS RELATED TO CORPORATE GHG EMISSION DISCLOSURE IN 2022

ISO Net Zero guidelines (ISO, 2022b)	Scope 1, 2, and 3 emissions should be reported in full detail, including a breakdown of the emission scopes by GHG or activity, including and differentiating between all specific scope 3 categories (ISO, 2022b, p. 30). Focus on the higher scope 2 emission accounting method: Companies should use both the location- and market-based methods to derive a scope 2 emissions estimate, but use the highest of the two for aggregate emission reporting and target setting (ISO, 2022b, p. 18), in order to adequately prioritise energy efficiency as well as renewable energy procurement.
UN High-Level Expert Group (UN HLEG, 2022) Race to Zero Criteria 3.0 (Race to Zero, 2022)	Full inclusion of all emission sources and business activities in climate strategies: The **HLEG recommendations** and the **Race to Zero** criteria are both specific to target setting rather than emission disclosure (see section 2). Nevertheless, the HLEG recommendation and Race to Zero criteria both state that net-zero targets must include all emission scopes, including all company divisions and subsidiaries, is a clear signal that companies should be reporting emissions in this way as well.
Other developments	Regulation on emission disclosure: The European Parliament and Council approved a *Corporate Sustainability Reporting Directive* in November 2022 (Directive 2022/2464 (EU, 2022)), which requires companies to report emissions related both to their own operations and their supply chain, and to prioritise disclosing emission estimates for significant scope 3 emission categories. In the United States, the *Climate Risk Disclosure Act*, which would require all issuers of securities to disclose direct and indirect GHG emissions, has stalled in Congress (Congress.gov, 2021). Nevertheless, since November 2022 the US Federal Government requires its major suppliers and contractors to publicly disclose scope 1, 2 and 3 emissions (The White House, 2022).

Note: The summaries in this table represent the authors' interpretations of the guidelines and developments presented.

1.2 Principles for good practice

This section includes a summary of guiding principles and assessment criteria for tracking and disclosure of emissions from section 1 of the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0*.

1.2.1 Tracking and disclosure of emissions

Companies should annually disclose information on the GHG emissions from their full value chain and provide details that allow for a complete understanding of key emission sources and trends. Meaningful planning for complete decarbonisation depends on a thorough and granular understanding of a company's emission sources. Complete and transparent disclosure covers all direct emissions (scope 1), indirect energy-use emissions (scope 2), and other upstream and downstream indirect emissions (scope 3). Companies should report these emission scopes separately and break them down into GHG, activity or emissions source, while providing historical data. Where relevant, companies should also include non-GHG climate forcers in their disclosure. Companies' disclosure should be accompanied by the methodologies used to derive the emission estimates, especially for emission sources where there remains uncertainty in estimation approaches.

Companies should report scope 2 emissions using both the location-based and market-based method, taking the highest of the two values for their calculation of their total emissions footprint. According to the GHG Protocol and the ISO's Net Zero Guidelines, companies should report on scope 2 emissions using both the location-based and market-based accounting methods (GHG Protocol, 2015; ISO, 2022b, p. 18). The location-based method reflects the average emissions intensity of grids on which energy consumption occurs. The market-based method reflects emissions from electricity procurement constructs that companies have purposefully chosen, deriving emission factors from contractual renewable electricity procurement instruments. Both accounting approaches have the potential to misrepresent the emission footprint of electricity consumption in different circumstances. To create a clear incentive to both maximise energy efficiency improvements and to procure renewable electricity, companies should report on both market-based and location-based scope 2 emissions, and use the larger of the two values towards their aggregated total emission estimates (ISO, 2022b, p. 18).

Companies should report on all upstream and downstream indirect emissions, including emission sources deemed minor or irrelevant. The ISO's Net Zero Guidelines require companies to provide separate data for the different scope 3 categories (ISO, 2022b, p. 30), such as emissions from procured products and services, investments, waste, upstream and downstream transport and distribution, and emissions from product use. The GHG Protocol's Scope 3 Standard identifies 15 distinct reporting categories for scope 3 emission sources and requires companies to quantify and report scope 3 emissions from each (WRI and WBCSD, 2013). For transparency, companies should disclose data or at least explanatory information for all 15 of these mandatory scope 3 emission categories, even those deemed minor or irrelevant. Different interpretations of what constitutes a 'minor' or 'irrelevant' emission source could lead to inconsistencies between companies' reporting. Reporting on scope 3 emissions outside of the 15 mandatory categories, such as indirect use-phase emissions and emissions from products that are not sold to end users, is in some cases crucial to represent a company's complete climate impact, while in other cases it may distract from a company's mandatory emissions scope and make its targets disingenuous (see section 1.1 of the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0).*

Companies' disclosure should include the emissions associated with subsidiary companies. Companies may depend on emission-intensive assets and infrastructure that are held in subsidiary companies. Transparent and complete reporting includes these emissions, which should be integrated into the company's scope 1, 2 and 3 emissions. If companies report transparently on the emissions of all subsidiaries, they have a stronger incentive to make a real shift away from emission-intensive activities and assets, rather than continuing those activities through subsidiaries.

1.2.2 Good practice assessment criteria

The criteria for good practice in Table 4 forms the basis for the company assessments in section B. Full details on the methodology for rating companies' tracking and disclosure can be found in the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0*, section 1.

Table 4: Good practice for tracking and disclosing emissions.

DISCLOSING EMISSIONS CORPORATE CLIMATE LEADERS EXHIBITING GOOD PRACTICE...
Provide in their public-facing documents: ✓ An annual disclosure of their full value chain emissions (scopes 1, 2, and 3), including emissions from subsidiaries. ✓ A breakdown of data for each scope to specific emission sources, including for scope 3 the 15 mandatory categories from the GHG protocol. ✓ For scope 3, emission estimates for other 'optional' sources, such as indirect use-phase emissions, only if they are crucial to represent a company's complete climate impact. ✓ Historical data for the same emission sources. ✓ Explanations on why omitted emission sources are not tracked. ✓ A disclosure of non-GHG climate forcers, if relevant. ✓ For scope 2, both market- and location-based emission estimates, while using the highest estimate for emission aggregates.

1.3 Trends, role models, and bad practice

Summary of trends in 2022

Companies' emission disclosure in 2022 indicates a solidifying consensus and level of understanding on good practice. Of the 24 companies we assessed in this report, we found that 16 disclosed emissions data with at least a moderate level of transparency and integrity, for all emission scopes. These trends indicate that it is now common practice for the companies we assessed to acknowledge full responsibility for upstream and downstream scope 3 emissions, and emissions from subsidiaries. This finding reflects an increasing level of alignment and clarity on these issues among existing and newly published guidelines.

Companies exhibiting bad practice for emission disclosure are in the minority, but these bad practices remain significant. A minority of companies still publish highly misleading emissions data, usually by excluding major emission sources from their public documentation. Of the companies that we assessed in the previous iteration of the *Corporate Climate Responsibility Monitor*, we did not identify any significant improvements from those with poor emission disclosure practices.

Companies' emission disclosure in 2022 indicates a solidifying consensus and level of understanding on good practice.

Most of the 24 companies disclose emissions data with at least a moderate level of transparency and integrity, for all emission scopes. Although we identified room for improvement in the emission disclosure practices of all companies, we find that the disclosure of most companies is of at least moderate transparency, and we see signs of further improvement. Three companies, **Apple**, **Maersk** and **Microsoft**, were found to report and disclose with high transparency and integrity for at least three of the four emission scopes we assessed (scope 1, 2, upstream scope 3 and downstream scope 3).

It is now established common practice for companies to take full responsibility for scope 3 emissions, and emissions from subsidiaries. The majority of companies report on scope 3 emissions with at least a moderate level of transparency and integrity, demonstrating that it is now common practice for the companies that we assessed to do so. Likewise, almost all companies report on their subsidiaries' emissions and make the inclusion explicit. These positive findings reflect the improving degree of consensus across guidelines and standards on the issue of scope 3 emissions. In addition to the existing guidelines of initiatives like the Race to Zero campaign, the Science Based Targets Initiative and the GHG Protocol, the requirement for companies to include full scope 3 emissions and subsidiaries in their climate strategies was underlined by the new ISO Net Zero Guidelines (ISO, 2022b), the recommendations of the high-level expert group (UN HLEG, 2022), the European Corporate Sustainability Reporting Directive (Directive 2022/2464 (EU, 2022)), and the procurement conditions of the U.S. Federal Government (The White House, 2022). Despite these developments and positive trends, poor scope 3 disclosure remains a critical issue for a minority of companies (see below).

There are signs of improvement in the disclosure of emissions associated with procured energy (scope 2). Ten out of the 24 companies studied provided a breakdown of scope 2 emissions. Most companies assessed (14 out of 24) report both the location- and the market-based scope 2 emission estimates (see section 1.2.1), although some do not clarify the method used. Of the companies that report both estimates, four – **American Airlines**, **Fast Retailing**, **Foxconn** and **Holcim** – used the highest estimate towards their emission aggregates. Although it remains only a minority of companies that pursue this most transparent approach, this handful of positive examples, alongside the release of the ISO guidelines, may provide an encouraging sign and inspiration for other companies to replicate this transparent practice, for an emission scope that has been rather untransparent in the past.

Companies exhibiting bad practice for emission disclosure are in the minority, but misleading scope 3 emission disclosure remains a critical issue.

A minority of companies are still not transparent about their scope 3 emissions. We found that 8 of the 24 companies disclose emissions with a low, or very low, level of transparency and integrity. The most critical issues identified from these companies often relate to the untransparent disclosure of indirect upstream and downstream scope 3 emissions, which account for over 90% of most companies' emission footprints. **Carrefour**, **Foxconn**, **Samsung**, **Stellantis** and **Walmart** do not clearly disclose most of their scope 3 emissions in their public-facing sustainability reports, giving the impression that their emission footprint is just a small fraction of the reality, and depriving consumers and investors of key information on the emissions profile associated with specific products and business models.

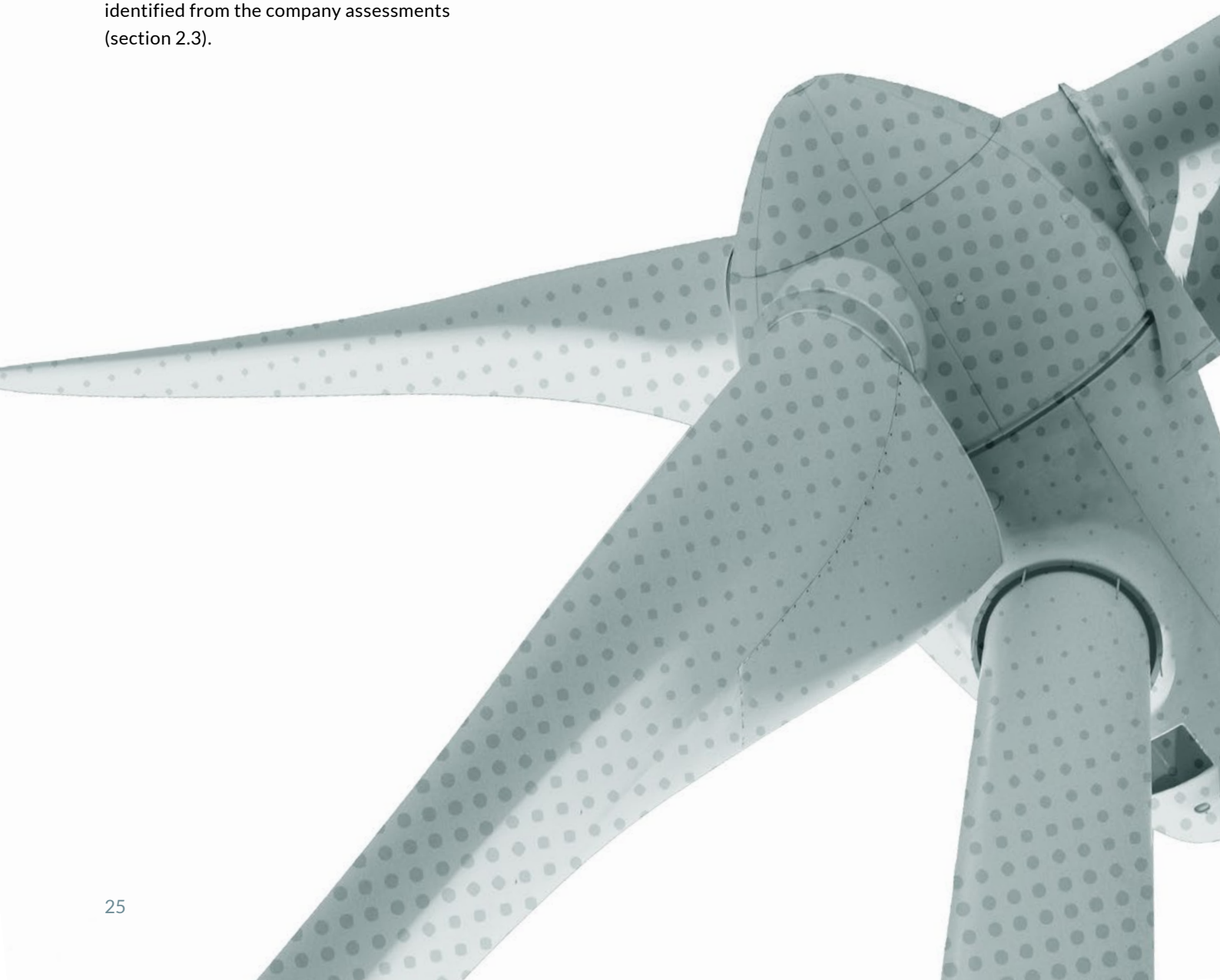
Some companies misuse CDP certifications to claim the legitimacy of inconsistent and incomplete disclosure. We found that some companies report more comprehensive data in non-public CDP responses, while presenting a much smaller scope of emissions data in public-facing sustainability reports, alongside the statement that the transparency of disclosure has been verified by CDP. This highly misleading practice calls into question the value of climate transparency certifications for non-public information. It may be more effective for assessments and certifications of transparency to be restricted to public information contained in or attached to companies' annual reports.

Guidance for scope 3 disclosure remains lacking in some sectors, including steelmaking. The disclosure of downstream scope 3 emissions from **ArcelorMittal** and **Thyssenkrupp** appears inconsistent and untransparent. ArcelorMittal does not provide a clear breakdown of scope 3 emissions upstream and downstream; Thyssenkrupp reported no scope 3 emissions from the use phase of sold products in 2021, compared to around 780 $MtCO_2e$ in 2017. These issues appear to be owing partly to the poor availability of guidance on the appropriate boundaries of downstream scope 3 emissions for steel companies. There remains no clear consensus on the extent to which steelmaking companies should be required to take responsibility for indirect product use phase emissions.

2 Setting specific and substantiated targets

Corporate climate targets must provide a clear signal for immediate action to reduce emissions across the value chain paired with a longer-term vision for deep decarbonisation. Corporates ought to set both short- and medium-term climate targets towards 2030 *and* long-term climate targets beyond 2030 in line with sector-specific 1.5°C Paris Agreement-aligned emission pathways.

This section assesses the transparency and integrity of corporate climate targets towards 2030 and beyond. Table 5 presents a summary overview of principles for good practice (section 2.2) as well as a summary trends, promising examples and bad practice identified from the company assessments (section 2.3).



2.1 Snapshot summary

Table 5: Summary of good practice and trends for corporate target setting

SUMMARY OF GOOD PRACTICE PRINCIPLES (SECTION 2.2) AND PERFORMANCE FROM THE 24 COMPANIES ASSESSED

GOOD PRACTICE FOR TARGET SETTING		AVERAGE PERFORMANCE+	
		TRANSPARENCY+	INTEGRITY+
Short- & medium-term targets towards 2030	Companies should set both ✓ short- and medium-term emission reduction targets towards 2030 within 5-year intervals, ✓ and specific long-term emission reduction targets beyond 2030 as a long-term vision for deep decarbonisation.	Moderate ▲	Very low —
Long-term targets beyond 2030	All short-, medium-, and long-term targets should ✓ be independent from offsetting claims, ✓ align with 1.5°C-compatible trajectories and benchmarks for the sector, and ✓ cover all scope 1, 2 & 3 emissions & non-GHG climate forcers, where relevant.	Low —	Very low —

+ Transparency and integrity columns: the bar indicates the distribution of our rating of the 24 companies (Poor Moderate High n.a.); the text above the shaded bars represents the average rating across all the companies we assessed, calculated excluding non-applicable cases, on a 5-point scale (Very low, Low, Moderate, Reasonable, High); and an indication of progress since the last analysis in 2022 (▲ — ▼), based on the authors' interpretation of progress from the companies that were analysed also in 2022, against the current methodology version.

SUMMARY OF TRENDS, ROLE MODELS AND BAD PRACTICE (SECTION 2.3)

2030 climate targets fall well short of the required ambition: The emission reduction commitment across all value chain emissions is estimated to be 15–21% between 2019 and 2030. This compares to the need to cut global GHG and CO_2 emissions by 43% and 48% between 2019 and 2030 respectively, to stand a reasonable chance of limiting global warming to 1.5°C.

Only a minority of net-zero pledges represent credible commitments to deep decarbonisation: Only half of the companies' net-zero or carbon neutrality pledges commit to an explicit emission reduction target alongside these pledges. Collectively, these pledges translate to a commitment to reduce only 36% of the companies' combined GHG emission footprint by the respective net-zero target years.

Third-party certifications lend credibility to highly insufficient targets: SBTi has certified most of the assessed companies' 2030 climate targets ('1.5°C', 'well-below 2°C', '2°C') despite most companies falling way short of the required ambition across the entire value chain according to latest science.

PROMISING EXAMPLES

Deep decarbonisation commitments: **Holcim, H&M Group, Maersk, Stellantis**, and **ThyssenKrupp** explicitly commit to reduce emissions by at least around 90% across the entire value chain next to their net-zero pledges.

Meeting 1.5°C-aligned decarbonisation milestones for 2030: **Apple, H&M Group,** and **Maersk** meet 1.5°C-aligned decarbonisation milestones for their respective sectors, while **ArcelorMittal, Foxconn, Holcim, Stellantis,** and **ThyssenKrupp** come close to meeting them.

Voluntary compliance to net-zero guidelines: **Holcim**'s and **H&M Group**'s net-zero targets have been verified under the SBTi's Net Zero Standard; we find them to be of moderate and high integrity, respectively. **Ahold Delhaize** and **Maersk** have committed to the Net Zero Standard (without yet being verified by SBTi); we find these pledges to be of moderate and high integrity, respectively.

BAD PRACTICE

Unsubstantiated net-zero pledges: Half of the 24 companies make no specific emission reduction commitment for the net-zero target year. Five other companies commit to less than 40% emission reductions across the entire value chain. **Carrefour** and **Walmart** commit to only 1% and 9% emission reductions respectively by 2050 below 2019 levels, due to scope exclusions.

Insufficient 2030 targets: Fifteen out of 24 companies clearly fall short of meeting 1.5°C-aligned decarbonisation milestones for their respective sectors despite being verified by the SBTi in most cases. **Mercedes-Benz** and **Volkswagen**, for example, both do not set 1.5°C-aligned phase-out dates for internal combustion engines in line with latest scientific findings.

SUPPORTING COMPANIES TO IMPROVE THEIR CORPORATE TARGET SETTING

A renewed focus on ratcheting-up 2030 targets through improved guidance and mandatory regulation that cover the full value chain, align with the 1.5°C temperature limit, and are independent of offsets is of most critical importance.

A more transparent presentation and summary of the increasing body of literature defining sector-specific 1.5°C-aligned decarbonisation milestones can support companies, regulators and the wider public to set and evaluate corporate climate targets.

Table 6: Summary of developments in 2022 related to corporate target setting

DEVELOPMENTS IN 2022 FOR CORPORATE TARGET SETTING

PROGRESS IN COMPANIES' CLIMATE STRATEGIES (INCLUDING THE 10 COMPANIES ASSESSED IN BOTH THE 2022 AND 2023 CCRM)

	2023 RATINGS & PROGRESS+ SINCE 2022				ALL (AVERAGE)			
	TRANSPARENCY		INTEGRITY		TRANSPARENCY		INTEGRITY	
Amazon	Low	—	Very low	—	Moderate	—	Low	—
Apple	Moderate	—	Moderate	—				
Carrefour	Very low	▼	Very low	—				
Deutsche Post DHL	Moderate	▲	Very low	—				
Google	Moderate	▲	Very low	—				
JBS	Very low	—	Very low	—				
Maersk	High	—	Reasonable	—				
Nestlé	Very low	—	Very low	—				
Volkswagen	Low	—	Very low	—				
Walmart	High	—	Very low	—				

We did not identify significant progress on the low level of transparency and integrity of corporate climate targets.

+ Authors' interpretation of companies' progress against the current methodology version since the last analysis in 2022 (▲ — ▼).

NEW GUIDELINES AND FRAMEWORKS RELATED TO CORPORATE TARGET SETTING IN 2022

UN High-Level Expert Group (UN HLEG, 2022)

The emission coverage of emission reduction targets should include all emissions along a company's entire value chain (scope 1, 2 and 3) and transparently explain any missing emission sources.

Companies should set 1.5-compatible absolute emission reduction targets for the short-, medium- and long-term informed by modelled 1.5°C emission pathways with no or limited overshoot, and where global emissions decline at least 50% below 2020 levels by 2030, reaching net-zero by 2050 or sooner.

A target should be set for 2025 with subsequent targets following in five-year intervals for 2030 and 2035.

ISO Net Zero guidelines (ISO, 2022b)

The emission coverage of emission reduction targets should include all emissions along the value chain (scope 1, 2 and 3), and set emission reduction targets for each emission scope separately using the same base year.

Companies should set 1.5-compatible absolute emission reduction targets informed by sector-specific modelled emission pathways with a high likelihood of limiting warming to 1.5°C (e.g., 2021 IEA *Net Zero by 2050* report).

Companies should restrict the use of carbon dioxide removal offsets—both inside and outside the value chain—to only counterbalance residual emissions towards net-zero claims. The guidance shows that its definition of *residual* emissions likely accounts for 0-5% of emission levels today for most sectors.

The use of a net-zero terminology for companies operating in sectors with significant technological challenges might lead to *false* claims whereas companies operating in such sectors should rather set *achievable* targets.

Corporates should set interim emission reduction targets within two-year to five-year intervals.

Other developments

An increasing body of literature defines sector-specific 1.5°C-aligned decarbonisation milestones. Over the course of 2022, the Science-Based Targets Initiative has published new guidance for the cement, maritime, and FLAG sectors (SBTi, 2022a, 2022b, 2022e), the Transition Pathways Initiative has published new and updated guidance for several sectors including food producers and cement (Dietz, Gardiner, *et al.*, 2022; Dietz, Harvey, *et al.*, 2022), and both Teske (2022) and Boehm *et al.* (2022) provide 1.5°C-aligned decarbonisation milestones for multiple sectors. This literature facilitates an improved understanding of 1.5°C-aligned sectoral climate action by corporates.

Companies increasingly face risks of litigation over the sufficiency of their climate action. The appeal procedure against the Hague District Court's landmark ruling for Shell's emission reduction targets is ongoing, with a final verdict expected in 2024 (Setzer and Higham, 2022). Oil and gas companies remain the most frequent defendants in climate litigation cases against corporates (Higham and Kerry, 2022; Setzer and Higham, 2022). German NGOs brought forward court cases against German automobile manufacturers Mercedes-Benz, BMW, and Volkswagen to mandate them to phase out internal combustion engines by 2030 latest in line with latest available science (Setzer and Higham, 2022).

Note: The summaries in this table represent the authors' interpretations of the guidelines and developments presented.

2.2 Principles for good practice

2.2.1 Corporate target setting for the short-, medium-, and long-term

Corporate climate targets must provide a clear signal for immediate action to reduce emissions along the entire value chain paired with a longer-term vision for deep decarbonisation. For this reason, corporates should set both short- and medium-term climate targets towards 2030 *and* long-term climate targets beyond 2030.

Credible short- and medium-term targets towards 2030 ensure that corporate emissions decrease in line with what limiting global temperature increase to 1.5°C requires by 2030. The pathway to net-zero is crucial: a 1.5°C limit requires immediate action to achieve a reduction in global GHG and CO_2 emissions of about 43% and 48% respectively from 2019 levels by 2030 (IPCC, 2022). Further delay in emission reductions put the Paris Agreement objectives beyond reach. Well-defined short- and medium-term targets set within five-year intervals ensure such immediate action and provide accountability. The HLEG recommendations and ISO Net Zero Guidelines mandate companies to set short-term targets within the next two to five years and align their medium-term 2030 targets with the latest science using 1.5°C-aligned pathways with no or limited overshoot (ISO, 2022b, p. 11; UN HLEG, 2022, p. 17).

Long-term targets beyond 2030 set out a vision towards deep decarbonisation. Such targets must provide a clear indication of what the company aims to achieve in the long-term, to inform today's management and investment decisions. Limiting global temperature increase to 1.5°C requires the rapid decarbonisation of all sectors to reach a state of global net-zero CO_2 emissions by around 2050, net-zero GHG emissions by around 2070, and net-negative emissions thereafter (IPCC, 2022). Long-term targets beyond 2030 ought to be presented in five-year intervals over time and align with sector-specific emission pathways towards full decarbonisation.

2.2.2 Coverage of emission sources in targets

Short-, medium- and long-term targets should be explicit in their coverage of the complete spectrum of emission sources and greenhouse gases, to maximise impact and avoid misleading communication. The most comprehensive targets cover the full GHG emission footprint of a company across its entire value chain, including upstream and downstream scope 3 emissions, and non-GHG climate forcers where relevant. When setting multiple short- and medium-term targets, for example targeting specific emission scopes, the company ought to transparently explain how much of its emissions across the entire value chain these targets cover.

Companies should explicitly set out the coverage of their headline climate pledges to avoid misinterpretation and to ensure accountability. For net-zero targets, as well as for short- and medium-term targets, the United Nations' High-Level Expert Group (HLEG) recommendations and ISO Net Zero Guidelines both mandate the coverage of all emission scopes (ISO, 2022b, pp. 16–19; UN HLEG, 2022, pp. 17–18). Targets with partial scope coverage have the potential to mislead: disclaimers are easily overlooked or may not be well understood by the audiences of climate pledge communications.

Coverage of all mandatory scope 3 emission categories is highly relevant, despite uncertainties and indirect influence. Scope 3 emissions can entail a degree of uncertainty, particularly for complex emission sources related to land-use such as upstream food processing, and downstream emissions associated with consumer behaviour and product use. The decarbonisation of these emissions may also depend partially on actions taken by others. Despite these uncertainties, the inclusion of all mandatory scope 3 emission sources from the GHG Protocol's Scope 3 Standard in companies' targets is crucial (WRI and WBCSD, 2013). This provides a clear incentive for all actors with a potential influence on the decarbonisation of emission sources to take measures to do so. For manufacturers of cars, electric appliances, or electronic devices, scope 3 emissions often account for the major share of those companies' emissions, and the companies are the actors with the greatest influence to decarbonise those emission sources, by manufacturing products with alternative or more efficient technologies. Even in the cases where companies have a lower degree of influence in the reduction of scope 3 emissions, this does not justify their exclusion from targets; the full inclusion of scope 3 emissions in targets can incentivise companies to cooperate with suppliers and consumers to mutually support each other to reduce emissions, including to seek out new solutions where needed. Targets that omit scope 3 emissions carry a significant potential to mislead, since scope 3 emissions account for a large portion of most companies' climate impact.

2.2.3 Emission reduction commitments

Headline pledges only send a meaningful signal for decarbonisation if they explicitly include deep emission reduction commitments that are independent of offsetting and carbon dioxide removals. Some companies' headline pledges are directly specified in the form of emission reduction targets, some are *accompanied* by such targets, while others do not specify any emission reduction targets at all. Headline pledges only contribute to the Paris Agreement objectives in a meaningful way if they put emission reductions across the entire value chain in the spotlight. Such pledges are also more constructive if they avoid ambiguous terminology that can distract from this focus, for example by remaining unspecific on emissions reductions to be achieved without relying on offsets or carbon dioxide removal. Both the SBTi's Net Zero Standard and the ISO Net Zero Guidelines require companies with net-zero targets from any sector—except the forestry, land-use, and agriculture sectors—to explicitly commit to emission reductions of at least 90% below 2019 levels across all emission scopes (SBTi, 2021c; ISO, 2022b, pp. 16–17). The commitment to such deep emission reductions ensures that the net-zero terminology is not misleading, regardless of the target year, but it is not alone a measurement of sufficiency in terms of 1.5°C compatibility.

Short, medium, and long-term targets must be ambitious enough to align with 1.5°C compatible emission pathways with no or limited overshoot. To stand a reasonable chance of limiting global warming to 1.5°C, global GHG and CO_2 emissions must decrease by around 43% and 48% respectively between 2019 and 2030 under modelled pathways with no or limited overshoot (IPCC, 2022). Global CO_2 and GHG emissions must further reach net-zero by around 2050 and around 2070 respectively. Both the HLEG recommendations and ISO Net Zero Guidelines emphasise the need for companies to align their targets with those findings (ISO, 2022b, pp. 19–20; UN HLEG, 2022, p. 17).

Sector-specific decarbonisation milestones compatible with the Paris Agreement's 1.5°C temperature limit provide relevant benchmarks to inform and evaluate corporate target setting. These benchmarks informed by latest science help to determine ambition levels of corporate climate action across different sectors in line with global efforts. For automobile manufacturers, for example, several studies identify 1.5°C-aligned decarbonisation milestones for the phase out of internal combustion engines (ICEs) replaced by electric and low-emission vehicles at the global and regional level (CAT, 2020a; IEA, 2021; UNFCCC, 2021; Boehm *et al.*, 2022; Teske *et al.*, 2022; WBA, 2022). Table 3 in the report's accompanying methodology provides an overview of sector-specific decarbonisation benchmarks available in existing literature as of February 2022 for all eight sectors covered in the report.

2.2.4 Good practice assessment criteria

The criteria for good practice in Table 7 form the basis for the company assessments in section B. Full details on the methodology for rating companies' corporate target setting can be found in the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0, section 2*.

Table 7: Good practice for setting specific and substantiated targets

SETTING SPECIFIC AND SUBSTANTIATED TARGETS CORPORATE CLIMATE LEADERS EXHIBITING GOOD PRACTICE...	
A. Short- & medium-term targets towards 2030	✓ Set short- and medium-term emission reduction targets towards 2030 within five-year intervals that reflect a commitment to immediate action and accountability. ✓ Set all short- and medium-term targets towards 2030 independent from direct offsetting or offsetting under the guise of 'insetting' (sometimes also referred to as within value chain removals). ✓ Align their short- and medium-term targets with sector-specific 1.5°C-compatible decarbonisation milestones in the literature. ✓ Cover all emission scopes along the entire value chain and—if setting multiple short- and medium-term targets —transparently explain how much of its emissions across the entire value chain these targets cover.
B. Long-term targets beyond 2030	✓ Set specific long-term emission reduction targets beyond 2030 to provide a vision for deep decarbonisation towards mid-century with five-year intervals. ✓ Set all long-term targets independent from offsetting or offsetting under the guise of 'insetting' (sometimes also referred to as within value chain removals). ✓ Align their long-term targets with sector-specific 1.5°C-compatible decarbonisation milestones in the literature. ✓ Cover all emission scopes along the entire value chain.

2.3 Trends, role models, and bad practice

Summary of trends in 2022

Several new net-zero guidelines and target setting methodologies have been released for corporates over the course of 2022. These recent developments point to the emerging consensus on the need for robust, credible, and transparent emissions reduction targets in the short-, medium-, and long-term. Despite these recent developments, we find that the 24 companies' 2030 targets jointly fall well short of the required ambition to cut global GHG and CO_2 emissions by 43% and 48% between 2019 and 2030 respectively, to stand a reasonable chance of limiting global warming to 1.5°C. Companies' 2030 targets translate to a median commitment of only 15–21% emission reductions across their full value chain emissions between 2019 and 2030. In this context, SBTi certifications for short- and medium-term targets towards 2030 lend credibility to companies whose targets are highly insufficient.
Net-zero targets of most of the 24 companies remain highly ambiguous. Only a small minority of companies follow recent recommendations and commit to at least around 90% emission reduction by their respective net-zero target years and meet 1.5°C-aligned decarbonisation milestones for their respective sectors. None of the ten companies analysed in the previous iteration of the *Corporate Climate Responsibility Monitor* improved on the integrity of their target setting over the course of 2022.

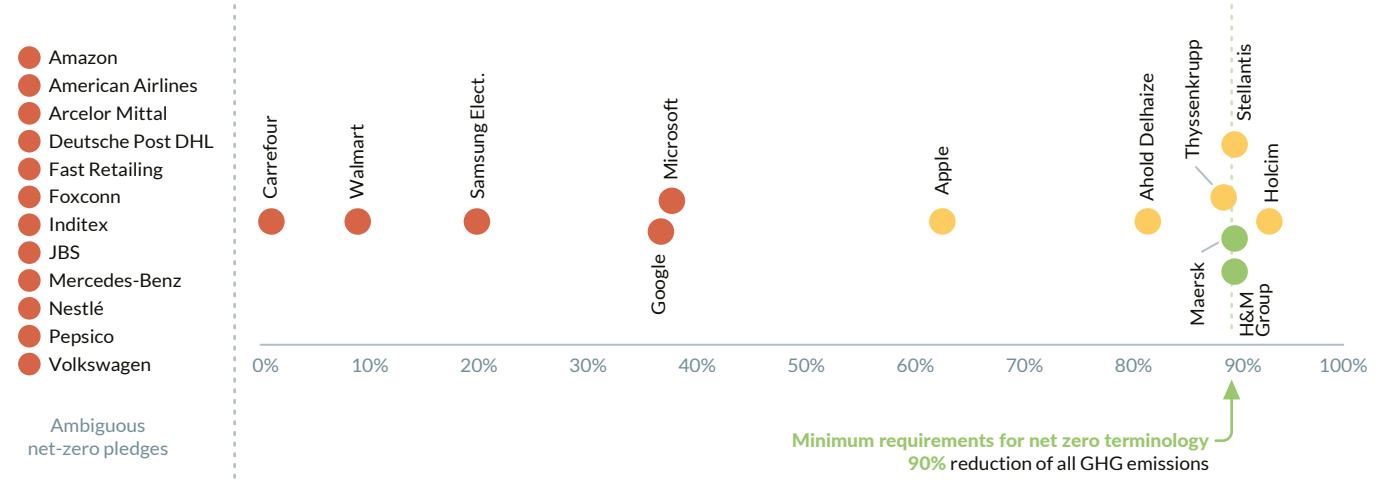
Only a minority of net-zero pledges represent credible commitments to deep decarbonisation, while most others remain highly ambiguous due to the lack of credible emission reduction targets.

Just five of 24 companies' net-zero pledges represent a commitment to deep decarbonisation. Only a small minority of companies—covering a diverse range of sectors—comply with latest recommendations by standard setters to substantiate corporate net-zero targets with deep decarbonisation targets aligned with sector-specific 1.5°C milestones (SBTi, 2021c; ISO, 2022b; UN HLEG, 2022). **Holcim**, **H&M Group**, **Maersk**, **Stellantis** and **Thyssenkrupp** commit to reducing their emissions by at least around 90% by their respective net-zero target years (Figure 1). Among these five companies, we evaluate **H&M Group**'s and **Maersk**'s net-zero targets of high integrity, as these targets fully align with available 1.5°C-aligned decarbonisation milestones in the literature. **Stellantis** only meets some of the 1.5°C-aligned milestones for automobile manufacturers; **Thyssenkrupp** likely aligns with 1.5°C-compatible milestones for steelmaking but uncertainty remains regarding the coverage and relevance of downstream scope 3 emissions in its climate strategy; while **Holcim's** net-zero target hinges on intensity targets and the extensive use of CCUS, which makes the appropriateness of the net-zero terminology contentious. For this reason, we evaluate the latter companies' net-zero targets to have moderate integrity.

Overall, we evaluate the large majority of net-zero targets to be of poor integrity due to the inadequacy or complete lack of explicit emission reduction commitments. Despite all 24 companies committing to net zero or carbon neutrality, only half of them set an explicit emission reduction target next to these pledges. For the other half, net-zero pledges represent ambiguous commitments, as they do not explicitly specify the extent to which companies intend to reduce emissions by the respective target years. Five out of 24 companies only set emission reduction targets of less than 40% across the value chain; none of these comply with sector-specific 1.5°C milestones. Three companies (**Apple, Google, Microsoft**) commit to net-zero targets by 2030 already, but these entail only about 63%, 37% and 38% emission reductions across the entire value chain below 2019 emission levels, respectively. Those three companies do not commit to any further emission reductions beyond 2030.

Figure 1: Just 5 of 24 companies commit to deep decarbonisation with their net-zero pledges

*This chart shows the **proportion of full value chain GHG emissions that companies commit to reduce with their net-zero pledges.** Data includes 12 companies. For 12 other companies the meaning of the net-zero target is ambiguous.*



LEGEND Poor integrity | Moderate integrity | High integrity

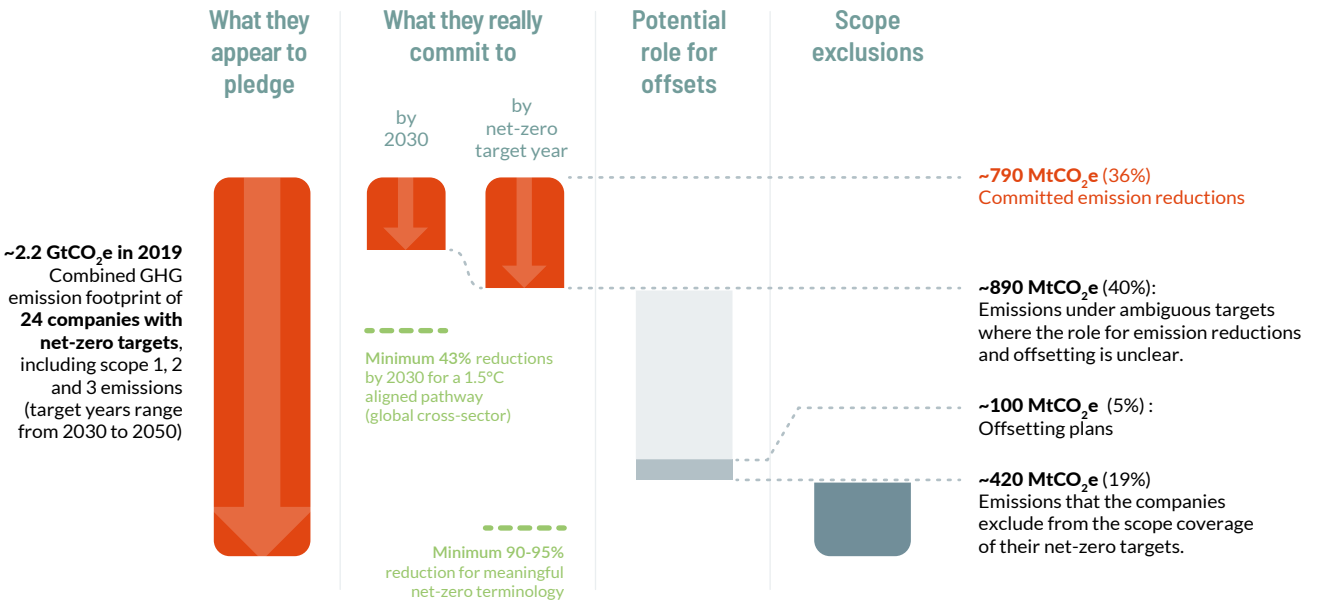
The colour of the data points represents our assessment of the integrity of company's long-term targets, based on their sufficiency compared to sector-specific 1.5 °C aligned benchmarks, and the appropriateness of the terminology used in the pledge communication. Data presented on a single x-axis. Placement on y-axis has no significance.

The data points in this graphic represent the authors' most optimistic interpretations of companies' emission reduction commitments, including emission intensity targets, based on publicly available information. The chart includes emission reduction commitments under net-zero targets, carbon neutrality pledges and other pledges with equivalent terminology, for the respective target year, which ranges between 2030 and 2050. Targets that are reliant on offsets to an undefined extent are marked as ambiguous. Further details and explanation on the authors' interpretation of companies' targets can be found in the individual company cases in Section B and in Annex II.

Collectively the net-zero pledges of the 24 companies translate to a commitment to reduce just 36% of the companies' combined GHG emission footprint at a maximum, by the respective net-zero target years. Net-zero targets thus on average fall way short of a commitment to deep decarbonisation towards near-zero emissions, as suggested by the term 'net-zero' (Figure 2).

Half of the net-zero targets cover emissions across all scopes, but 2030 targets often do not align with this emission source coverage. Eleven companies explicitly cover 100% of their emissions footprint in their net-zero targets. While three companies (**Carrefour**, **Samsung**, **Walmart**) exclude more than 80% of their emissions across the value chain from their net-zero targets, eight companies do not disclose their emission coverage at all. Limited emissions coverage is often not presented transparently and has significant potential to mislead. Companies active in the aviation sector (**American Airlines** and **Deutsche Post DHL**) focus on reporting CO_2 emissions but miss to transparently cover all non-GHG climate forcers, the impacts of which are larger than the CO_2 impact for aviation (Lee *et al.*, 2021). Short- and medium-term targets towards 2030 often explicitly leave out certain emission scopes covered by net-zero targets. Only five companies (**Ahold Delhaize**, **Foxconn**, **H&M Group, PepsiCo**, and **Stellantis**) cover 100% of their emissions both under their 2030 emission reduction targets and their net-zero targets.

Figure 2: Net-zero pledges break down to only moderate emission reductions



The 24 companies assessed in this report are not necessarily a representative sample of all corporate actors with net-zero targets. They represent 24 of the largest companies in the world, accounting for approximately 4% of global GHG emissions and revenues of USD 3.16 trillion in 2021. We anticipate that any overlap in the scope 1, scope 2 and scope 3 emissions of these companies is marginal and of limited significance to the key insights derived from this report.

Inadequate and ambiguous net-zero target setting distracts from the most important issue at hand: immediate and economy-wide emission reductions towards 2030. Companies' climate pledges for 2030 fall well short of the required ambition according to latest science.

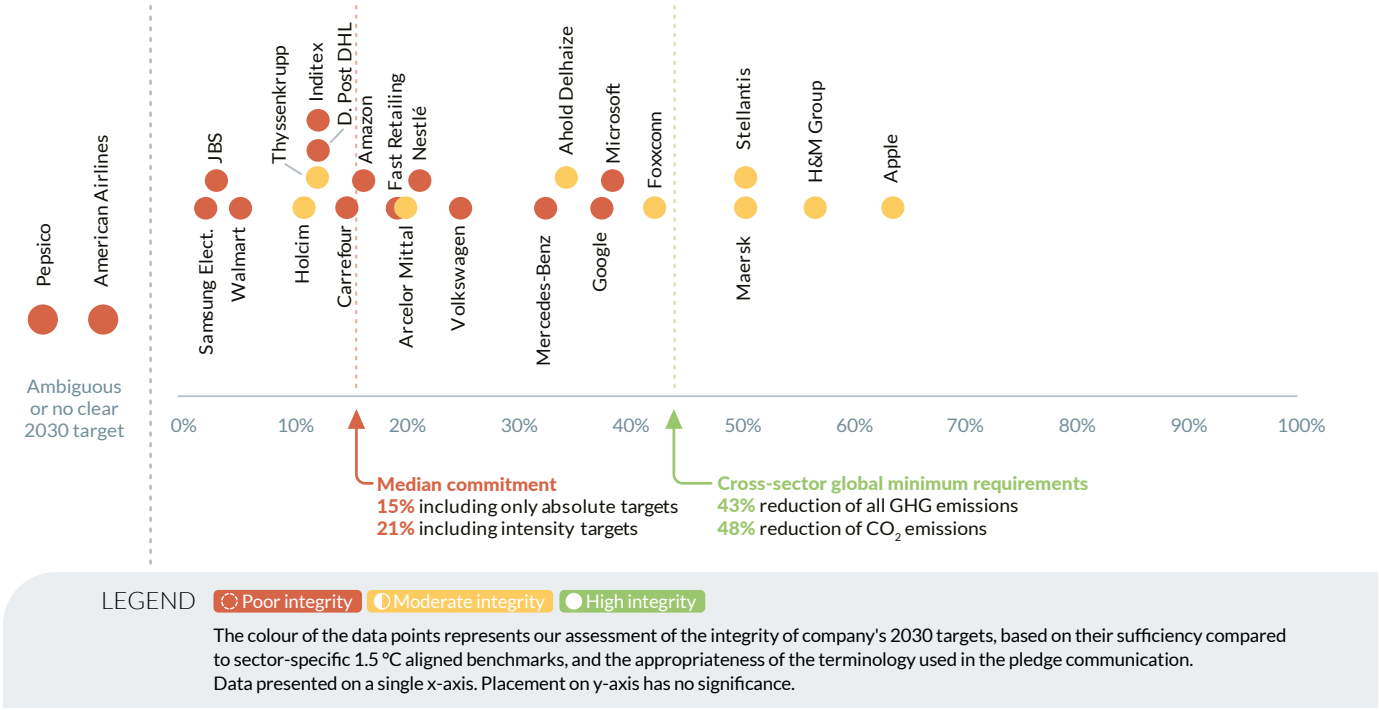
Nearly all the 24 companies that we assessed have pledged 2030 targets, but we find that these targets can rarely be taken at face value. For many companies, 2030 targets address only a limited scope of emission sources, such as scope 1 and 2 emissions, or selected scope 3 emission categories. For others, 2030 targets are misleading due to reliance on direct offsetting or offsetting under the guise of 'insetting'.

Climate pledges for 2030 fall well short of the economy-wide emission reductions required to stay below the 1.5°C temperature limit. For the 22 companies with targets for 2030, we find that these targets translate to a median absolute emission reduction commitment of just 15% of the of full value chain emissions between 2019 and 2030, or 21% under the most optimistic scenario that emission intensity targets translate to equivalent absolute emission reductions (Figure 3). This compares to the IPCC Sixth Assessment Report's findings that global CO_2 and GHG emissions must decrease by 48% and 43% between 2019 and 2030 respectively to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022). Emission reduction targets for the crucial decade towards 2030 thus fall way short of the ambition required to align with the internationally agreed goals of the Paris Agreement, as emphasised by recent recommendations by the UN High-Level Expert Group and the ISO Net Zero Guidelines (ISO, 2022b; UN HLEG, 2022).

We find only three companies (**Apple**, **H&M Group**, and **Maersk**) to meet 1.5°C-aligned decarbonisation milestones for 2030 in the literature. We evaluate these companies' targets towards 2030 to have moderate integrity, as none of them have set a similar short-term target within a five-year interval substantiating their 2030 medium-term commitments. Six other companies (**Ahold Delhaize**, **ArcelorMittal**, **Foxconn**, **Holcim**, **Stellantis**, and **Thyssenkrupp**) come close to meet 1.5°C-aligned decarbonisation milestones in the literature but do not fully meet them. Fifteen out of 24 companies fall way short of meeting such benchmarks. These findings point to the urgent need for companies to better inform and align their corporate targets to sector-specific 1.5°C-aligned decarbonisation milestones identified in the literature. Apart from mostly inadequate targets towards 2030, only 11 of the 24 companies commit to emission reduction targets within a five-year interval; another key recommendation by the UN High-Level Expert Group and the ISO Net Zero Principles (ISO, 2022b; UN HLEG, 2022).

Figure 3: The median commitment to emission reductions between 2019 and 2030 is just 15-21%

*This chart shows the **proportion of full value chain GHG emissions that companies commit to reduce between 2019 and 2030**.*
Data includes 22 companies. 2 companies without clear commitments for 2030 are not included.



The data points in this graphic represent the authors' most optimistic interpretations of companies' absolute emission reduction commitments, including emission intensity targets, based on publicly available information. The median is provided for scenarios with and without the optimistic assumption that intensity targets result in equivalent absolute emission reductions. Targets that are reliant on offsets to an undefined extent are marked as ambiguous. Further details and explanation on the authors' interpretation of companies' targets can be found in the individual company cases in Section B and in Annex II.

Voluntary initiatives and recently published guidelines in principle set high criteria for net-zero pledges to meet, but the lack of mandatory compliance, missing independent scrutiny, and methodological shortcomings to inform 'science-based' target setting requires urgent attention by regulators and civil society.

Several net-zero guidelines and target setting methodologies have been released for corporates over the course of 2022, among others by the UN High-Level Expert Group, the International Standard Organisation (ISO) and the Race to Zero Campaign (ISO, 2022b; Race to Zero, 2022; UN HLEG, 2022). These recent developments point to an emerging consensus on the need for robust, credible, and transparent emissions reduction targets in the short-, medium-, and long-term. After the SBTi released its Net Zero Standard in November 2021, it has verified the net-zero targets of around 140 companies' net zero targets as 1.5°C-aligned as of February 2023 (SBTi, 2023). More than 1,600 companies have officially committed to set net-zero targets in line with the SBTi Net Zero Standard, but SBTi has not yet verified their targets.

Our analysis shows that the SBTi's Net Zero Standard may provide a framework for credible long-term targets, but compliance must be checked thoroughly and be continuously monitored in the future. As of February 2023, two of the companies we assessed – **H&M Group** and **Holcim** – have had their net-zero pledges certified by SBTi under its Net Zero Standard (see Table 8). We found the net-zero pledges of these companies to be of high and moderate integrity, respectively. The requirement of SBTi's Net Zero Standard that net-zero pledges should equate to at least 90% emission reductions across the full value chain, directly addresses the key issue that we identify for most companies' net-zero pledges, which are either ambiguous or do not translate to commitments for deep decarbonisation.

However, the Net Zero Standard is not watertight and depends on honest compliance with the framework: the *2022 Corporate Climate Responsibility Monitor* (Day *et al.*, 2022) found that the SBTi-certified net-zero pledge of CVS Health was undermined by highly contentious baseline setting. The credibility and real ambition of **H&M Group** and **Holcim**'s targets contain uncertainties with regards to the companies' potential use of bioenergy and RECs, and CCS technologies, respectively. Another 11 of the 24 companies assessed in this report have officially committed to the Net Zero Standard through SBTi's webpage but SBTi has not yet verified their targets (see Table 8 for company-specific comparisons). We evaluate the net-zero targets of nine of those eleven companies to have low integrity.

Table 8: Comparison between target verifications by the Science Based Targets initiative (SBTi) as of February 2023 and the integrity assessment as part of the Corporate Climate Responsibility Monitor (CCRM) 2023 for net-zero pledges. Companies listed in alphabetical order.

COMPANY NAME	SBTI VERIFICATION (FOR NET-ZERO TARGETS)	CCRM TARGET INTEGRITY (FOR LONG-TERM TARGETS BEYOND 2030)
Ahold Delhaize	Officially committed (no verification)	Moderate integrity
American Airlines	Officially committed (no verification)	Low integrity
Carrefour	Officially committed (no verification)	Low integrity
Deutsche Post DHL	Officially committed (no verification)	Low integrity
H&M Group	1.5°C	High integrity
Holcim	1.5°C	Moderate integrity
	Explanation on difference in assessments: Holcim's net-zero target meets 1.5°C-aligned sectoral benchmarks, but the underlying intensity targets for scope 1 and 2 and the heavy reliance on CCUS makes the appropriateness of net-zero terminology contentious.	
Inditex	Officially committed (no verification)	Low integrity
JBS	Officially committed (no verification)	Low integrity
Maersk	Officially committed (no verification)	High integrity
Microsoft	Officially committed (no verification)	Low integrity
Nestlé	Officially committed (no verification)	Low integrity
PepsiCo	Officially committed (no verification)	Low integrity
Walmart	Officially committed (no verification)	Low integrity

SBTi certifications for short- and medium-term targets lend credibility to companies whose targets are highly insufficient. SBTi has certified the 2030 targets of 16 of the 24 companies included in this analysis as aligned with a pathway to limit global temperature increase to 1.5°C, 'well-below 2°C', or 2°C. Another five companies are listed on SBTi's website as 'committed' to science-based targets for 2030. Most of these companies highlight their SBTi certifications prominently in their climate-related communications to defend targets that are highly insufficient in the context of latest available science, and sometimes misleading. The SBTi's verifications of 2030 targets often neglect relevant details leading to the undifferentiated certification of corporate targets, regardless of whether a company is lagging in climate action or can truly be considered a climate leader. Full compliance with existing guidelines and appropriate communication around verified targets appears to be rather an optional avenue for a clear minority of willing companies, rather than a mandatory practice. The comparison between SBTi's verifications of 2030 targets for 16 of 24 companies and the CCRM's integrity assessments identifies the following four key common problems (see Table 9 below and Table 19 in the Annex for company-specific comparisons).

- **Use of offsetting under the guise of 'insetting' (within value chain removals) by companies operating in the FLAG sector:** The SBTi FLAG guidance and the SBTi Net Zero Standard allow companies operating in the FLAG sector to use 'insetting' to meet their 2030 and net-zero targets (SBTi, 2021c, p. 30, 2022b, pp. 27–28). 'Insetting' refers to approaches under which emissions are offset rather than reduced; moreover, 'insetting' through biological carbon dioxide removals is not an appropriate approach to claim that emissions have been offset, among other reasons, due to high uncertainties regarding the permanence of outcomes (see ***Spotlight 4.4.4*** *What does insetting and climate positive really mean?*). **Nestlé** and **PepsiCo** are examples of companies that rely on offsetting to achieve 2030 pledges under the guise of 'insetting'.

- **Continued use of verifications based on methods discontinued by SBTi ('legacy issue'):** SBTi does not sufficiently clarify that certain verifications that continue to be used by companies in their day-to-day communication build on methodologies indefinitely paused by SBTi. Automobile manufacturers such as **Mercedes-Benz** and **Volkswagen** continue to promote their 'well-below 2°C' verification of their scope 3 emissions intensity targets in their annual sustainability reports (Mercedes-Benz Group, 2022e, p. 130, 2022a, p. 23; Volkswagen, 2022c, p. 46), although SBTi has indefinitely paused the use of its methodology for automakers, as the initiative states that the methodology does not reflect a 1.5°C-compatible definition (SBTi, 2022f).

- **Target verification not contextualised to emission share covered across a company's entire value chain:** SBTi's temperature ratings for short- and medium-term targets are only provided for targets for scope 1 and 2 emissions (SBTi, 2023b). Those temperature ratings do not – in most cases – apply to scope 3 targets, although companies' scope 3 targets are also listed on SBTi's website alongside the temperature rating, in a way that is very likely to lead to misunderstandings on this issue. For this reason, a 1.5°C verification for a given scope 1 and 2 target might in some cases only cover less than 5% of a company's total footprint. SBTi does not directly put a single verification into context of whether and to which ambition level a company intends to reduce all other emissions. For example, **Microsoft**'s 2030 1.5°C verified renewables target only covers 3% of the company's entire value chain emissions. Certain sector-specific verification methods further leave out specific operational emissions. Our assessments include the significant climate impacts of non-GHG climate forcers associated with aviation – for example in the case of **American Airlines** – while SBTi's aviation guidance exclusively covers GHG emissions from jet fuel (SBTi, 2021d).

- **No disclosure of method and underlying data used for specific certification:** SBTi neither provides information on verification methods used nor on underlying data inputs such as base year emissions. On the former, it remains unclear for an external audience whether SBTi uses sector-specific or cross-sectoral methods for specific verifications. Cross-sectoral methods do not generally consider any sector-specific requirements to reduce emissions in line with 1.5°C. For example, we cannot identify whether **Deutsche Post DHL**'s verification uses cross-sectoral methods or sector-specific methods for the aviation, shipping, and road transport sectors. On the latter, SBTi discloses no further information on relevant data inputs used for its verification and whether these have been independently scrutinised. For the 'well-below 2°C' verification for **Carrefour**'s 2030 targets, for example, it remains unclear whether SBTi explicitly allows Carrefour to exclude the vast majority of its stores and global activities from its target coverage, or if such exclusions have been overlooked. An open letter by several scientists called upon SBTi, among others, to strengthen independent scrutiny of baseline emissions data (Carton *et al.*, 2022).

The overlapping issues on undifferentiated verification give cause to increasing concern that these targets do not reflect the urgency to accelerate climate action towards 2030 in line with latest science and require urgent attention by SBTi and regulators.

Table 9: Comparison between target verifications by the Science Based Targets initiative (SBTi) as of February 2023 and the integrity assessment as part of the Corporate Climate Responsibility Monitor (CCRM) 2023 for short- and medium-term targets towards 2030. Companies listed in alphabetical order.

COMPANY NAME	SBTI TEMPERATURE RATINGS[+] (NEAR-TERM TARGETS)	CCRM INTEGRITY ASSESSMENT (SHORT- & MEDIUM-TERM TARGETS TOWARDS 2030)	KEY ISSUES EXPLAINING THE DIFFERENCE BETWEEN SBTI TEMPERATURE RATINGS AND CCRM ASSESSMENTS FOR CORPORATE TARGETS TOWARDS 2030				
			Use of insetting	Use of discontinued verifications	Exclusion of significant emission share	Lack of disclosure on method and underlying data disclosure	Other reasons (see Annex for further details)
Ahold Delhaize	1.5°C	Moderate integrity			X	X	X
American Airlines	Well-below 2°C [++]	Poor integrity [+++]			X		X
Apple	1.5°C	Moderate integrity			X	X	X
Carrefour	Well-below 2°C	Poor integrity			X	X	
Deutsche Post DHL	1.5°C	Poor integrity			X	X	
Fast Retailing	1.5°C	Poor integrity			X		
Holcim	1.5°C	Moderate integrity					X
H&M Group	1.5°C	Moderate integrity			X		X
Inditex	1.5°C	Poor integrity			X		X
PepsiCo	1.5°C	Unclear integrity	X		X	X	
Mercedes-Benz	1.5°C/ Well-below 2°C	Poor integrity		X	X		
Microsoft	1.5°C	Poor integrity			X		
Nestlé	1.5°C	Poor integrity	X		X	X	
Thyssenkrupp	Well-below 2°C	Moderate integrity			X		X
Volkswagen	1.5°C/2°C	Poor integrity		X	X		
Walmart	1.5°C	Poor integrity			X		

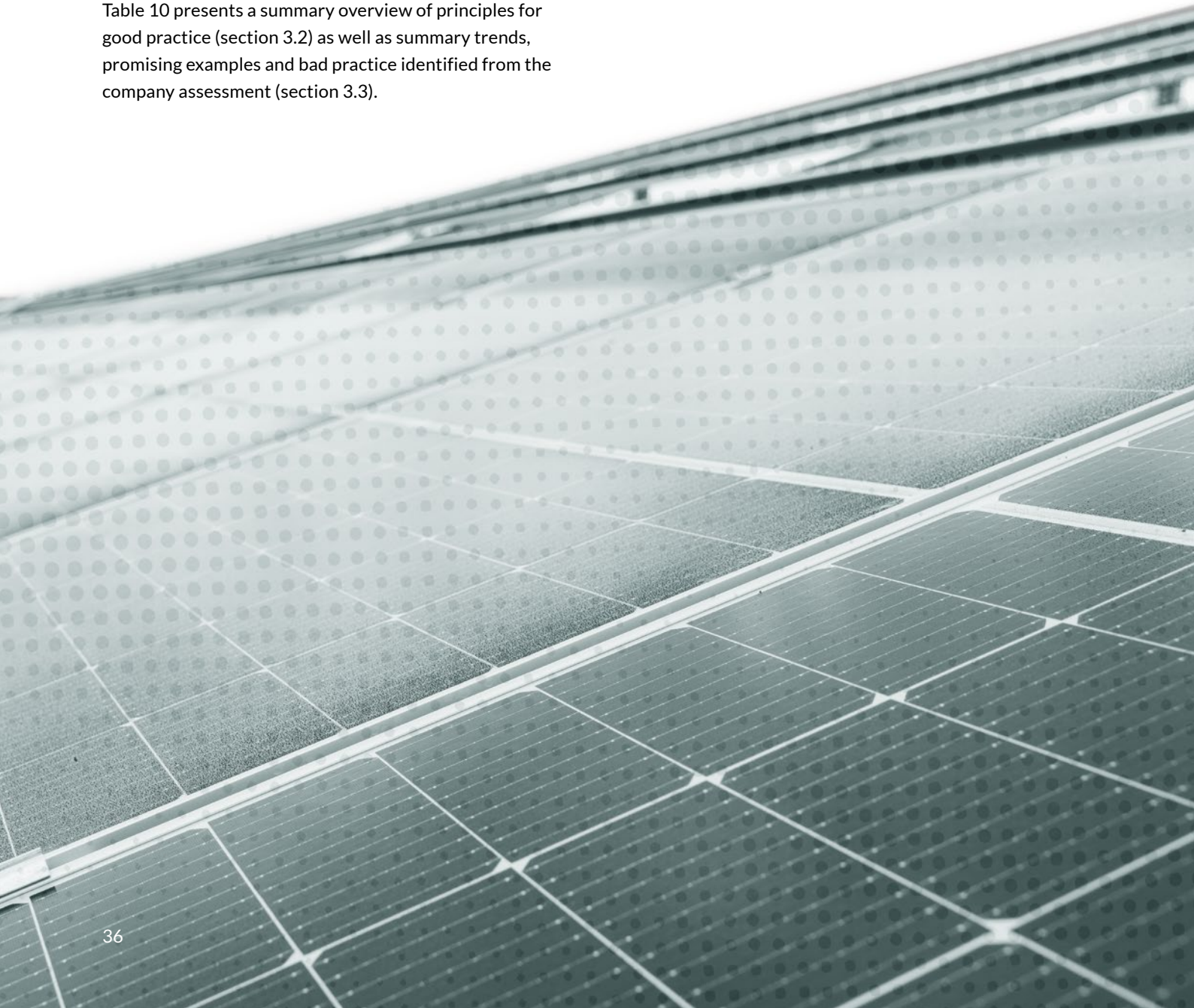
[+] The SBTi temperature ratings for short- and medium-term targets do not cover certain emission scopes, which is not directly obvious from SBTi's presentation and companies' communications. Table 19 in the Annex III provides further information on the verifications' emission coverage.
[++] SBTi verifies American Airlines 2035 target as a near-term target.
[+++] Integrity evaluation for 'long-term targets' beyond 2030 given SBTI's 2035 target verification.

3 Reducing emissions

Encompassing measures for deep emission reductions are the backbone of ambitious corporate climate targets. As companies' emission profiles vary widely, there is not a standardised set of measures that all can implement. The integrity and robustness of companies' decarbonisation efforts must be considered against each company's circumstances and emission profile (section 3.2.1).

Electricity-related emissions are relevant for all companies to address and are often a central feature of companies' plans and claims. For this reason, we single out renewable electricity generation and procurement for deeper assessment (section 3.2.2).

Table 10 presents a summary overview of principles for good practice (section 3.2) as well as summary trends, promising examples and bad practice identified from the company assessment (section 3.3).



3.1 Snapshot summary

Table 10: Summary of good practice and trends for emission reduction measures and renewable electricity.

SUMMARY OF GOOD PRACTICE PRINCIPLES (SECTION 3.2) AND PERFORMANCE FROM THE 24 COMPANIES ASSESSED

GOOD PRACTICE FOR REDUCING EMISSIONS		AVERAGE PERFORMANCE+	
		TRANSPARENCY+	INTEGRITY+
Emission reduction measures	✓ Implement encompassing and deep decarbonisation measures and disclose details of those measures to support replication and the identification of new solutions. ✓ Refrain from using bioenergy where alternatives to combustion exist, and ensure that any bioenergy used does not have negative sustainability implications.	Moderate ▲	Low —
Renewable electricity generation and procurement	✓ Procure the highest quality renewable electricity available and disclose the full details of that procurement.	Low —	Very low —

+ Transparency and integrity columns: the bar indicates the distribution of our rating of the 24 companies (Poor Moderate High n.a.); the text above the shaded bars represents the average rating across all the companies we assessed, calculated excluding non-applicable cases, on a 5-point scale (Very low, Low, Moderate, Reasonable, High); and an indication of progress since the last analysis in 2022 (▲ — ▼), based on the authors' interpretation of progress from the companies that were analysed also in 2022, against the current methodology version.

SUMMARY OF TRENDS, ROLE MODELS AND BAD PRACTICE (SECTION 3.3)

Reduction plans are lengthy but without much substance: Most companies describe their reduction plans in length, but most plans lack detailed information and concrete commitments.

Bioenergy currently plays an important role in the decarbonisation plans of companies in sectors that are more difficult to transition: At least 11 of 24 companies plan to rely on bioenergy, which may have negative sustainability implications.

More companies are taking responsibility for reducing energy-related emissions in their supply chain: At least 4 of 24 companies present plans to reduce energy-related emissions in their supply chain, for instance through collective PPAs.

No significant progress on renewable electricity procurement: We identified limited information on renewable electricity procurement, a relatively accessible measure for most companies. RECs remain in widespread use although they are largely ineffective.

PROMISING EXAMPLES

Investing in new solutions: **Maersk** invests in the development of low-carbon fuels.

24/7 matching of renewable electricity generation and consumption: **Google** and **Microsoft** are monitoring (a share of) their electricity consumption and RE generation on the local grid 24/7.

Supporting suppliers in reducing their electricity-related emissions: **Walmart** sets up collective PPAs for suppliers. **Apple** connects suppliers with RE project developers and engages with policymakers on supportive regulatory frameworks for RE.

BAD PRACTICE

Lack of transparency: Only three companies outline detailed information on their reduction measures and just two on their renewable electricity procurement.

Description of reduction measures is lengthy but lacks clear commitments: For instance, **Fast Retailing**, the **H&M Group** and **Inditex** commit to using 'more sustainable' materials, without explaining what 'more' or 'sustainable' means.

Focus on marginal changes: Most companies focus on efficiency improvements or present innovations that address just a small share of their emissions. Only one company – **Apple** – outlines plans that could transform its business and place it on a 1.5°C-compatible trajectory.

Limited ambition for renewable electricity: On-site installations and high-quality PPAs represent a minor share of RE consumption. 14-20 companies use RECs.

SUPPORTING COMPANIES TO IMPROVE THEIR EMISSION REDUCTION MEASURES AND RENEWABLE ELECTRICITY PROCUREMENT

Sector-specific regulations and carbon pricing can support ambitious first-movers without putting them at an economic disadvantage compared to their less ambitious competitors.

Better guidance on bioenergy use at the national and regional level to help ensure that the limited availability of sustainable bioenergy and biomass is not claimed by a select set of companies, which would push others to use non-sustainable bioenergy resources.

Policies that incentivise, rather than hinder, more renewable energy capacity is key to ensuring that companies can decarbonise their entire supply chain.

Table 11: Summary of developments in 2022 related to emission reduction measures and renewable electricity

DEVELOPMENTS IN 2022 FOR EMISSION REDUCTION MEASURES AND RENEWABLE ELECTRICITY

PROGRESS IN COMPANIES' CLIMATE STRATEGIES (INCLUDING THE 10 COMPANIES ASSESSED IN BOTH THE 2022 AND 2023 CCRM)

	2023 RATINGS & PROGRESS+ SINCE 2022				ALL (AVERAGE)			
	TRANSPARENCY		INTEGRITY		TRANSPARENCY		INTEGRITY	
Amazon	Low	—	Low	—	Moderate	—	Moderate	—
Apple	High	▲	High	▲				
Carrefour	Low	—	Very low	—				
Deutsche Post DHL	Moderate	—	Moderate	—				
Google	Reasonable	—	Reasonable	—				
JBS	Very low	—	Very low	—				
Maersk	Moderate	—	Moderate	—				
Nestlé	Low	—	Low	—				
Volkswagen	Moderate	—	Moderate	—				
Walmart	Moderate	—	Low	—				

We did not identify significant progress on the level of transparency and integrity of emission reduction measures and renewable electricity generation and procurement

+ Authors' interpretation of companies' progress against the current methodology version since the last analysis in 2022 (▲ — ▼).

NEW GUIDELINES AND FRAMEWORKS RELATED TO EMISSION REDUCTION MEASURES AND RENEWABLE ELECTRICITY PROCUREMENT IN 2022

UN High-Level Expert Group (UN HLEG, 2022)	Companies must publicly disclose transition plans, specifying what action will be undertaken to achieve targets, including supplier engagement efforts and disclosing how plans and investments are aligned with the targets. Companies must update their transition plans every five years and annually report on progress. Corporate net-zero pledges must be accompanied by targets for ending the use or support for fossil fuels in line with IPCC and IEA net-zero emissions pathways that limit global warming to 1.5°C with no or limited overshoot. Renewable energy procurement targets must be part of corporate net-zero transition plans. Companies must avoid the conversion of natural ecosystems in their own operations and supply chain. They must eliminate deforestation and peatland loss by 2025 at the latest, and the conversion of other remaining natural ecosystems by 2030 at the latest.
ISO Net Zero guidelines (ISO, 2022b)	Corporates should not delay any mitigation action to achieve their interim or long-term reduction targets. Measures must address scope 1, scope 2 and scope 3 emissions and companies should focus on the full range of emission reduction measures available. Companies should aim to use 100% renewable energy and the purchase of renewable energy should lead to the development of further renewable energy capacity. This implies that companies should avoid relying on RECs that 'allocate the renewable portion of a supply that contains a mix of other sources, including fossil fuels', but instead should prioritise renewable energy through power purchase agreements or on-site installations. Companies should adjust their consumption in line with the availability of renewable energy. This means they need to minimise consumption when the grid is reliant on high-emission energy. Corporates should commit to achieve and maintain operations and supply chains free of deforestation by 2025.
EU Corporate Sustainability Reporting Directive (CSRD) (EU, 2022)	Companies shall report on their plans to ensure that their business model is compatible with the transition to a sustainable economy and with the limiting of global warming to 1.5°C in line with the Paris Agreement (Article 19). In June 2023, the Council of the EU will adopt a set of standards outlining in more detail what information companies need to report on.

Note: The summaries in this table represent the authors' interpretations of the guidelines and developments presented.

3.2 Principles for good practice

3.2.1 Emission reduction measures

Corporate actors must implement encompassing and deep decarbonisation measures. Decarbonisation efforts should focus on all relevant emission sources across all three scopes. Adopting readily available measures should be the first priority for companies that claim to be on a decarbonisation pathway, followed by the scaling up of proven flagship projects and—if necessary—investments in research and development to find new decarbonisation solutions. Demonstrated emission reduction measures vary per sector, although electrification and renewable energy are relevant for many sectors. For instance, a switch from combustion engines to electric vehicles in the automobile sector, and e-fuels instead of fossil-based fuels in the shipping sector. In addition, technological and operational efficiency improvements are necessary steps for every company.

Further, companies should have a clear plan to phase out all carbon-intensive infrastructure and products. Net-zero is disingenuous vision for companies that continue to invest in and rely on fossil fuels. Ambitious companies should plan for and implement a set of measures that leads to complete or near decarbonisation of their activities, depending on the sector they are active in.

Transparent disclosure and information sharing can support replication and the identification of new solutions. Companies can show real climate leadership by prioritising transparent exchange on climate change mitigation over industry competition, to support replication of effective measures and to collaborate for the identification of new solutions. Reports that refer to individual flagship projects may potentially inspire readers, but further details are required to support replication and facilitate an assessment of the company's ambition. Companies' planned measures can only be fully appraised if their plans contain details on the scale of planned measures using indicators that demonstrate what proportion of a company's activities will be addressed by the measures, and what the anticipated impacts are for reductions in GHG emissions.

Several companies present bioenergy as a measure to decarbonising their businesses. We have looked at more detail into the issue of bioenergy for this iteration of the Corporate Climate Responsibility Monitor. *Full details on the issues around bioenergy can be found section 3 of the methodology document.*

Companies demonstrating climate leadership plan and take decarbonisation measures that do not rely on bioenergy when possible; and ensure that any bioenergy they use does not have negative sustainability implications. Some sectors that are difficult to electrify and have limited alternatives to decarbonise might rely on bioenergy to some extent (Calvin *et al.*, 2020; Clarke *et al.*, 2022). However, increasing demand for bioenergy in hard-to-abate industries will lead to competition for limited biomass resources (Pavlenko and Kharina, 2018; ETC, 2021), which is likely to further exacerbate sustainability issues. These include, but are not limited to, deforestation, biodiversity loss and food insecurity (Kline *et al.*, 2015; Hof *et al.*, 2018; Searchinger *et al.*, 2018; Calvin *et al.*, 2020; Ahmed *et al.*, 2021; Clarke *et al.*, 2022; Hanssen *et al.*, 2022) . Further, bioenergy is not an emissions-free energy source: cutting down trees or other plants and burning them to generate energy, leads to the release of sequestered carbon. It can take several to hundreds of years to balance out this release of CO_2, depending on the type of trees used (Holsmark, 2012; Mitchell *et al.*, 2012; Ter-Mikaelian *et al.*, 2015; Searchinger *et al.*, 2018). Also, land that is used to grow bioenergy crops cannot be used for other purposes, such as sequestering carbon directly (Searchinger *et al.*, 2022). This carbon opportunity cost of land should be factored in when calculating the net impact of bioenergy.

The potential for sustainable biomass is very limited and outweighed by demand (ETC, 2021). Biomass is not only used to generate energy, but also to produce materials (e.g. timber, paper and bio-feedstocks for the chemicals industry). It is estimated that the potential for sustainable biomass may amount to 40-60EJ by 2050, similar to today's usage of biomass (ETC, 2021). However, demand for biomass to generate energy and produce materials in just four sectors is likely to exceed this supply potential. Companies should therefore use alternative technologies that do not depend on combustion where those exist. If such alternative technologies are likely to emerge in the future, companies should consider using bioenergy only as a temporary solution, ensure it does not have negative sustainability implications, and invest the development of alternative technologies at the same time. Full details on the issues around bioenergy can be found section 3 of the methodology document.

3.2.2 Renewable electricity generation and procurement

Companies reduce electricity-related emissions in different ways. How a company goes about sourcing renewable electricity makes a big difference in the actual emission impact and the credibility of renewable electricity consumption claims. Importantly, in most cases, pursuing high-quality procurement constructs does not imply that a company consumes 100% renewable electricity.

Electricity-related emissions are a relevant emissions source for all companies to address and represent a key component of many companies' climate change strategies and pledges. For some companies, those emissions account for the lion's share of their emissions. Other companies may have relatively fewer emissions from electricity consumption today, for instance those in the heavy industry, aviation, and shipping sectors. However, electricity is likely to become increasingly important for those companies, as they move away from fossil fuels to alternatives such as hydrogen and ammonia, for the production of which electricity is needed. As alternative fuels are not yet produced at scale, some companies are investing in new facilities that will produce, for instance, e-methanol or e-hydrogen. Those fuels are only zero carbon if they are based on green electricity.

It is best practice for companies to combine high-quality renewable electricity procurement with the most accurate and transparent emission reporting. Companies have a variety of options for sourcing renewable electricity (see Table 12). Of all the options, own renewable electricity installations are most likely to result in truly additional renewable energy capacity and are therefore usually the highest quality approach that companies can follow. Power Purchase Agreements (PPAs) might result in the development of additional capacity, but the causal link between a certain PPA and additional capacity is often very hard to prove (see Box 1). Renewable Electricity Certificates (RECs) are least likely to result in additional capacity and often have no impact on grid decarbonisation.

As the impact of projects vary and is often unclear, companies should report their electricity-related emissions using the location-based accounting method alongside the market-based accounting method (see section 3 in the methodology document and the Glossary).

BOX 1

RECs and PPAs explained

(adapted from Day et al. (2022))

Renewable Electricity Certificates

Renewable Electricity Certificates (RECs) are used in many countries around the world, sometimes under different names, such as Guarantees of Origin (GOs) or Energy Attribute Certificates (EACs). RECs are certificates that represent the generation of 1 MWh of renewable electricity. Companies – or other actors – procure RECs to match their electricity consumption with the generation of renewable electricity.

RECs come in various forms:

- Bundled RECs – supplier generated: a company buys electricity and RECs from one supplier. The supplier generates the RECs themselves.
- Bundled RECs – third-party generated: a company buys electricity and RECs from one supplier. The supplier procures the RECs from a third-party and resells them to its own customers.
- Unbundled RECs: a company purchased electricity from one retailer and the RECs from another one.

In all cases, the company consumes electricity from the local grid. The procurement of RECs does not immediately – if at all – change the electricity mix on the grid, nor the electricity mix that a company takes from the grid. This means that if a company purchases RECs, its electricity-related emissions do not actually decrease.

The procurement of RECs is very unlikely to contribute to additional renewable electricity supply capacity. While the purchase of RECs could send a signal to investors that there is demand for renewable energy in theory, there are indications that this is often not the case in practice due to issues including oversupply of certificates and associated low prices, and implicit double counting.

Power Purchase Agreements

Power Purchase Agreements (PPAs) are a long-term contract between an offtaker and an energy supplier. The offtaker agrees to consume a certain amount of electricity against a predetermined price. PPAs are usually, but not necessarily, signed for new renewable energy installations. Companies often also purchase the RECs associated with the installation for which they signed a PPA. This avoids the risk that a third party would buy the RECs, and both that third party and the company that has signed the PPA claim the same renewable electricity.

Unless there is a direct grid line between the renewable energy installation and the company's facilities, companies consume electricity from the local grid. In most cases, there will not be a direct grid line between the company's facilities and the renewable electricity installation. Rather, the renewable electricity installation feeds electricity into the local grid. This implies that while the company may procure 100% renewable electricity through the PPA, it does not consume 100% renewable electricity. For this reason, companies should always report location-based emissions, which are based on the average grid emissions factor.

The causal link between a PPA and additional capacity is often very hard to prove. In some cases, the PPA may influence the energy supplier's investment decision, leading to truly additional renewable electricity generation capacity. However, investments in renewables are attractive in many markets, so a PPA and the long-term financial security it offers to a project developer may not be the decisive factor to go ahead with a certain renewable electricity project.

Table 12: Overview of renewable electricity procurement options.

RENEWABLE ENERGY PROCUREMENT CONSTRUCT	LIKELIHOOD OF CONTRIBUTING TO ADDITIONAL INSTALLED RENEWABLES CAPACITY			
	HIGH	MODERATE	LOW	
Own RE installation with storage capacity	×			Constructs ensure the installation of capacity that would not have come online otherwise. New storage solutions in combination with these new installations can help reducing the impact on the local grid and support 24/7 matching of demand and supply. However, in many cases, companies may still rely on the local grid when their generation and storage does not cover their demand. They should use the location-based emissions factor for the emissions reporting for the energy that is consumed directly from the grid. The emissions factor for the energy that they generate themselves may be zero.
Own RE installation without storage capacity	×			
Power Purchase Agreement (PPA)	×	×	×	PPAs can contribute to additional capacity if the PPA is signed with a new RE installation and provides the energy provider with the necessary financial security to go ahead with the construction of the installation. To contribute to reducing a company's energy-related emissions, it is necessary that the PPA is signed for an installation connected to the same electricity grid as the company's facilities. To avoid double claiming of renewable electricity, companies should purchase RECs from the RE installation for which they signed a PPA. PPAs are unlikely to contribute to the installation of additional capacity if the PPA is signed for an existing installation (unless the energy provider would need to shut down the installation in the absence of a new PPA). PPAs that are signed for an installation in a different geographical area may lead to additional capacity but do nothing to reduce emissions on the company's local energy grid. PPAs do not lead to a direct and immediate reduction of emissions from the consumed electricity at all times of the day. Electricity is still procured from the grid, supplied by a mix of generation technologies. The emission impact is not comparable to a reduction in electricity demand through energy efficiency measures. A location-based emissions factor should be used to accurately indicate the emissions impact associated with electricity consumption.
Capacity premium	×	×	×	The likelihood of a capacity premium leading to additional capacity can be considered high, moderate or low depending on the integrity of the entity that collects the capacity premium and on the construct (see this table's overview) for which the collected funds are invested in.
RECs bundled		×	×	While some claim that RECs may signal to the market that there is demand for renewable electricity, studies have found no evidence that the procurement of RECs leads to the development of additional renewable electricity capacity (Bjørn *et al.*, 2022).
RECs unbundled			×	Bundled RECs may have a moderate or low likelihood of contributing to additional RE capacity. Likelihood is larger if: • RECs are bundled with the energy that a company purchases and generated by the energy supplier (i.e. on the same local grid as the company); • RECs are from a new installation. RECs do not lead to a direct and immediate reduction of emissions from the consumed electricity at all times of the day. Electricity is still procured from the grid, supplied by a mix of generation technologies. The emission impact is not comparable to a reduction in electricity demand through energy efficiency measures. A location-based emissions factor should be used to accurately indicate the emissions impact associated with electricity consumption.
Investments in renewable energy installations				Investments in renewable energy capacity are a business case. They can be combined with a PPA or RECs.
24/7 monitoring				24/7 monitoring and matching energy consumption with renewable energy generation can be an add-on to using PPAs or RECs. This improves the quality of those constructs by ensuring that consumption is matched with renewable energy production around the clock.

3.2.3 Good practice assessment criteria

The criteria for good practice in Table 13 form the basis for the company assessments in section B. Full details on the methodology for rating companies' corporate target setting can be found in the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0, section 3.*

Table 13: Good practice for reducing own emissions

REDUCING EMISSIONS CORPORATE CLIMATE LEADERS EXHIBITING GOOD PRACTICE...	
A. Emission reduction measures	✓ Publish detailed information on the planned emission reduction measures for all relevant emission sources throughout the value chain ✓ Outline the expected emission reductions resulting from the implementation of those measures ✓ Adopt existing reduction measures and scale up demonstrated flagship projects to mainstream those projects across the organisation ✓ Invest in research and development of new technological solutions, where necessary ✓ Set out a clear plan to phase out all carbon-intensive infrastructure and products ✓ Refrain from using bioenergy where alternatives to combustion exist, and ensure that any bioenergy used does not have negative sustainability implications
B. Renewable electricity procurement	✓ Pursue the highest quality renewable electricity procurement option ✓ Use the most accurate and transparent accounting method, which reflects emissions from electricity consumed (location-based accounting), rather than the emissions from the electricity bought (market-based accounting)[+]

[+] We assess the accounting method for electricity-related emissions (i.e. scope 2) under 'tracking and disclosure of emissions' (see section 1).

3.3 Trends, role models, and bad practice

Summary of trends in 2022

Companies outline their emission reduction plans with a moderate level of transparency in 2022, but we did not identify significant progress on the integrity of those plans. Companies' descriptions of their reduction measures is lengthy but lacks clear commitments. Most companies focus on efficiency improvements or present innovations that address just a small share of their emissions, rather than plans that could sufficiently transform their businesses to place them on a 1.5°C-compatible trajectory within their respective sectors. Almost half of the companies assessed plan to or already rely on bioenergy, despite the negative sustainability implications of this energy source.

We found transparency on renewable electricity procurement to be very low across the board; many companies only report on their procurement approaches in their CDP disclosure. While renewable electricity generation and procurement is a demonstrated and relatively straightforward measure, the large majority of companies in this report continue to rely on Renewable Electricity Certificates that are highly unlikely to have any meaningful impact on grid decarbonisation. A small minority of companies are leading the way with meaningful and replicable measures for their own renewable electricity procurement as well as renewable electricity procurement for suppliers.

While most companies allude to measures targeting scope 1, 2 and 3 emissions, details are often lacking.

The majority of companies in this report present measures targeting emissions across the value chain. Compared to our last report, we find that an increasing number of companies implement measures to reduce emissions in their upstream or downstream value chain (i.e. scope 3): of the 24 companies assessed, 22 present reduction plans for upstream scope 3 emissions and 18 for downstream scope 3.

However, information on planned reduction measures is often vague, which hinders an understanding of whether the companies implement adequate measures and focus on the main emission sources. While 22 of the 24 companies outline their measures with at least a moderate level of detail, in almost all cases, it remains unclear at what scale measures are implemented and what share of current GHG emissions they address. We found that in some cases, companies present their plans in length without making any clear commitments. For instance, all three fashion retailers in this report commit to sourcing materials that are 'more sustainable' than the materials used today, without describing what this means. 'More sustainable' can simply mean a small improvement compared to the baseline and does not necessarily entail a commitment to shift to truly sustainable materials.

Companies' proposed measures are insufficient to catalyse the transformational change that is necessary to limit global warming to 1.5°C.

While most companies state to work on developing nascent zero-carbon technologies, these generally do not address company's key emission sources. Twenty of the 24 companies provide that they invest in new solutions. However, in most cases, these projects do not necessarily address key emission sources. Only few companies are working on innovative technologies that address their most important emission sources. These include, for instance, **Maersk**, which invests in alternative fuels and vessels, **Stellantis**, which works on developing batteries and alternative fuel cells, **Google**, which is pioneering 24/7 monitoring and matching renewable energy generation with consumption, and **Deutsche Post DHL**, which invests in electrifying its fleet and scaling up the production of low-carbon fuels for road transport.

Companies present only limited plans to improve product quality and lifetime, which would lead to lower production levels and substantial emission reductions. The three fashion retailers in this report – **Fast Retailing, H&M Group** and **Inditex** – produce and sell low-cost clothes in large quantities, releasing new product lines with high frequencies. The measures they propose include sourcing 'more sustainable' materials, recycling materials and energy efficiency (see company analyses in Section B). While these can lead to marginal reductions, a *decrease in production* is likely necessary to bring these companies on a 1.5°C trajectory. Likewise, **Foxconn**, **Microsoft** and **Samsung** present measures targeted

at reducing emissions that occur in the production process, but we found no evidence that these companies plan to significantly increase the lifetime of the products they sell. They could so by, for instance, ensure that software updates can be installed on older hardware and selling spare parts, so that consumers can repair their devices, rather than having to buy new ones. **Apple**, on the other hand, does report to take measures to prolong the lifetime of its devices. The tech company's software updates run on ten-year old devices, and the company collects used devices to refurbish them, although still at a small scale compared to the sale of new devices (Apple 2022a, p. 48).

Companies in sectors with particularly limited decarbonisation potential envisage a key role for bioenergy, but this is not an emissions-free energy source and is likely to negatively impact biodiversity, carbon storage and food security, among others.

Companies present bioenergy as part of their emission reduction plans but it is not a credible measure in most cases, given that bioenergy is likely to have a range of negative sustainability implications. At least 11 of the 24 companies plan on using bioenergy to decrease their emissions, including **American Airlines, Deutsche Post DHL, Holcim, H&M Group, Maersk, Stellantis** and **Thyssenkrupp**. Bioenergy is not an emissions-free energy source and is very likely to have negative sustainability implications. Companies like H&M Group and Stellantis can rely on alternatives to fossil fuel or biomass combustion to decarbonise their value chains (see section 3.2.1). The shipping and heavy industry sectors also have prospects of decarbonising without using bioenergy in the longer term.

Most of the companies in this report claim that they use 'sustainable' bioenergy but even if that would be true, this approach can exacerbate sustainability problems. Although it is commendable that companies set sustainability criteria for the bioenergy that they source, there is the inherent problem that by using sustainable bioenergy – which is and will remain a scarce resource – they push other companies to use non-sustainable biomass. To limit global warming to 1.5°C and protect ecosystems, it is key that *overall demand* of biomass decreases. Companies in sectors with other prospects for decarbonisation should pursue those alternative avenues.

Although sourcing high-quality renewable energy is a relatively accessible measure for many, the majority of companies assessed provide limited information on their renewable energy consumption.

While 10 of the 24 companies state to use renewable energy for more than 50% of their energy consumption, four of them fail to provide sufficient information to back up this claim and another four companies rely on RECs. Amazon, Deutsche Post DHL, Inditex and **Mercedes-Benz** provide very limited information on the renewable energy they procure, which makes it impossible to assess the integrity of their renewable energy claims. While **Mercedes-Benz** outlines that it uses on-site installations and PPAs to power its German factories, the car manufacturer does not outline if and how it sources renewable energy for its facilities in other countries. **H&M Group**, **Microsoft**, **Nestlé** and **PepsiCo** rely on RECs to make their renewable electricity claims, but RECs are extremely unlikely to lead to the installation of additional renewable energy capacity.

RECs remain an important feature of companies' renewable energy procurement approach. At least 14 companies assessed procured RECs in 2021, with another six companies not providing information on their procurement construct. With a few exceptions, those 14 companies provide limited information on the RECs they purchase. RECs typically do not send a meaningful signal to the market that there is demand for additional renewable electricity capacity and unbundled RECs may lead to double counting renewable electricity (See Table 12). Indeed, a study published in 2022 found that the widespread use of RECs leads to an inflated estimate of companies' mitigation efforts (Bjørn *et al.*, 2022).

We identified just two companies that pursue high quality renewable energy procurement constructs today. Apple sources 87% of its electricity consumption from local and newly installed PPAs, while 77% of **Google**'s energy procurement stems from on-site generation or local PPAs. Unbundled RECs were an important component of **Microsoft**'s renewable energy procurement in previous years, but the tech company plans to switch to high-quality PPAs on the local grid by 2025.

Some of the tech companies in this report are pioneering new approaches to securing 100% renewable energy consumption on an hourly basis. On-site installation and PPAs on the local grid are generally the most impactful procurement constructs that companies can pursue. However, there is a mismatch between renewable energy generation and consumption. For instance, a company that has signed a PPA for a wind park cannot claim to use renewable energy on windless days. **Google** and **Microsoft** have both pledged that 100% of their energy consumption will be matched with renewable energy generation by local installations by 2030.

We see traction for taking responsibility for energy-related emissions in the value chain.

A handful of companies in this report try to reduce the energy-related emissions of their suppliers, including through guidance on renewable electricity procurement and PPAs. Apple invests in renewable electricity and helps its suppliers sign PPAs (see Box 2) and **Walmart** sets up collective PPAs through its *Gigatonne PPA* programme. These represent good practice examples that other companies may replicate. Setting up collective PPAs can help unlock greater investments in renewable electricity capacity and may contribute to decarbonising local grids.

Other companies are looking to procure RECs for their suppliers, including **Foxconn** and **H&M Group**. However, procuring RECs for suppliers suffer from the same limitations as RECs for own electricity-related emissions and are unlikely to result in real emission reductions.

Renewable energy policies are underdeveloped in some countries, which makes it difficult for companies and their suppliers to source renewable energy. Large multinationals like the 24 assessed in this report can use their influence to lobby for regulations that allow for and encourage companies to procure renewable energy through PPAs or install their own renewable energy generation capacity. Companies especially mention Asia as a region where regulatory hurdles to renewable electricity procurement exist.

BOX 2

Apple's strategy for renewable energy in the supply chain

As part of its climate strategy to reach carbon neutrality and reduce 75% of its 2015 emissions footprint by 2030, Apple has set to transition the entire manufacturing supply chain to 100% renewable electricity (Apple, 2022b). If achieved, this goal could significantly impact the company's emissions footprint, as most of Apple's emissions (67%) originate from use of energy to manufacture products in third-party supply factories (Apple, 2022a, p. 84). To implement this vision, the company created the Supplier Clean Energy programme, which seeks to support suppliers to transition to 100% renewable electricity.

Apple launched the Supplier Clean Energy Program in 2015 to transition its 'entire manufacturing supply chain —including material extraction, component manufacturing, and final product assembly— to 100% renewable electricity' by 2030 (Apple, 2022b, p. 1). The programme encourages suppliers to commit to 100% renewable electricity for Apple production, with the current number of suppliers standing at 213, in 25 countries. Apple claims that this number corresponds to about 70% of supplier companies and accounts for 98% of Apple's expenses in materials, manufacturing, and assembly of the company's products worldwide (Apple, 2022a, p. 24). These suppliers report to Apple, and the company tracks their progress in renewable electricity procurement (Apple, 2022b, p. 3).

Apple supports suppliers both technically and financially. It created the Supplier Clean Energy Portal, where it offers internal training and resources that are tailored to each supplier's country and connects them to experts and renewable energy industry associations. Where renewable energy procurement options are limited, Apple has devised constructs such as the Supplier Co-Investment Model, in which Apple and suppliers invest in a common fund that is used to create new renewable electricity capacity for suppliers (Apple, 2022b, p. 3). The China Clean Energy Fund, based on this model, has invested in 1 GW of additional renewable capacity in China. As more renewable energy procurement options become available, the company connects suppliers to buy energy from project developers and utilities; and, to support suppliers further upstream, Apple has directly invested in 500 MW of renewable energy in Japan and China. The company reports that its support efforts have achieved a substantial increase in renewable energy capacity in the supply chain, increasing from about 2 GW operational or committed capacity in 2016 to about 10 GW operational and 6 GW committed capacity in 2021, double the capacity of that in 2020 (Apple, 2022b, p. 2).

Apple and its suppliers report that they strive for high-integrity renewable electricity procurement, where investments likely result in truly additional renewable electricity capacity Apple reports that it applies the same integrity criteria to suppliers' renewable energy that it applies to itself. For suppliers' renewable electricity, power-purchase agreements are prioritised and represent 79% of renewable electricity procurement mechanisms, followed by renewable energy certificates (8%), direct investments (10%), and on-site production (3%) (Apple, 2022b, p. 4). The company claims to advocate in suppliers' countries for regulations that create more opportunities for high-quality renewable electricity procurement. Regarding transparency, there is still some room for improvement in Apple's strategy. Although the company shares the list of suppliers that participate in the Supplier Clean Energy Program (Apple, 2022b, p. 6), it does not disclose details on their regional breakdown, their energy consumption, and their emissions, which are necessary to understand the company's progress in achieving its 2030 target (Wu *et al.*, 2022, p. 23).

4 Climate contributions and offsetting

Corporate climate leadership includes both implementing ambitious targets for emission reductions in the company's own value chain as well as taking responsibility for unabated emissions. Most companies do not have the ability to immediately eliminate their entire GHG emissions footprint. While more and more companies are charting a pathway to complete decarbonisation, it will usually take years or decades until they are able to entirely achieve this goal, even for the most ambitious entities.

For some companies, taking responsibility for unabated emissions means making climate contributions to support climate change mitigation beyond the company's value chain without making a neutralisation claim, while for others it means claiming to neutralise their emissions through the use of carbon dioxide removals or emission reduction offset credits. Some companies pursue both approaches in parallel. This section discusses emerging issues and trends for the credibility of these two approaches.

4.1 Snapshot summary

Table 14: Summary of good practice and trends for climate contributions and offsetting

SUMMARY OF GOOD PRACTICE PRINCIPLES (SECTION 4.2) AND PERFORMANCE FROM THE 24 COMPANIES ASSESSED

GOOD PRACTICE FOR CLIMATE CONTRIBUTIONS AND OFFSETTING		AVERAGE PERFORMANCE+	
		TRANSPARENCY+	INTEGRITY+
Responsibility for unabated emissions	✓ Pursue high transparency and integrity on climate contributions and any neutralisation claims made today (see criteria below).	Low —	Very low —
Climate contributions	✓ Provide an ambitious volume of financial support to climate change mitigation activities beyond the value chain, without claiming to neutralise the company's own emissions.	Low ▲	Very low —
Offsetting claims today	✓ Clearly disclose offsetting claims and plans; avoid misleading pledges and claims; avoid risk of distraction by also committing to measures for deep emission reductions; commit to procure only high-quality credits from ambitious projects with a permanent climate impact; and commit to preventing any form of double-counting of climate impacts.	Low —	Very low —
Offsetting plans for the future		Low —	Very low —

+ Transparency and integrity columns: the bar indicates the distribution of our rating of the 24 companies (Poor Moderate High n.a.); the text above the shaded bars represents the average rating across all the companies we assessed, calculated excluding non-applicable cases, on a 5-point scale (Very low, Low, Moderate, Reasonable, High); and an indication of progress since the last analysis in 2022 (▲ — ▼), based on the authors' interpretation of progress from the companies that were analysed also in 2022, against the current methodology version.

SUMMARY OF TRENDS, ROLE MODELS AND BAD PRACTICE (SECTION 4.3)

Limited traction for climate contributions, but stage is set for progress in 2023: Only four companies report climate contributions without a neutralisation claim but none of these companies frame this support in terms of taking responsibility for their emissions. Significant developments in guidelines and frameworks for the climate contribution model may facilitate progress in 2023 (see Table 15).

Carbon neutrality claims remain highly contentious: At least 11 of the 24 companies are claiming carbon neutrality in 2022, but the transparency and integrity of those claims remain critically low.

Offsetting through forests: 23 out of 24 companies have offsetting plans for the future, mostly though non-permanent removals from biological carbon dioxide removal and storage, at a scale that would outstrip the planet's resource potential if replicated by others.

PROMISING EXAMPLES

Transparency on offset projects: **Microsoft** publishes details on all of its offset projects in an interactive web-page, including volume of credits procured and 'contracted durability' for each project.

Shift to high-hanging fruit: **Microsoft** plans to neutralise its emissions in the future with more advanced carbon dioxide removal options with a reasonable degree of permanence, although to date the company's portfolio is still heavily focused on biological carbon dioxide removal.

BAD PRACTICE

Misleading coverage of carbon neutrality claims: Companies' carbon neutrality claims cover on average just 3% of their emissions. **Microsoft, Apple** and **Deutsche Post DHL** cover less than 2% of their emissions when they procure carbon credits to tell customers that their business or the service they provide is 'carbon neutral'.

Terminology of 'insetting' is gaining traction: **Nestlé** and **PepsiCo** are among the companies successfully lobbying to legitimise the contentious practice of what they label as "insetting", (see Spotlight section 4.4.4).

'Mitigating' the non-permanence of biological carbon removals: Most companies rely on the cheap option of non-permanent and scarce forestry-based carbon dioxide removals. Approaches put forward by **Amazon**, among other companies, to mitigate the issue of non-permanence are implausible (see Spotlight section 4.4.2).

SUPPORTING COMPANIES TO IMPROVE THEIR CLIMATE CONTRIBUTIONS AND OFFSETTING CLAIMS

Regulation on carbon neutrality claims is necessary to make those claims less accessible, and to increase their transparency and integrity.

A coalition of companies for climate contributions is necessary to create a critical mass for the transition to this more constructive approach.

Table 15 Summary of developments in 2022 related to corporate climate contributions and offsetting

DEVELOPMENTS IN 2022 FOR CORPORATE CLIMATE CONTRIBUTIONS AND OFFSETTING

PROGRESS IN COMPANIES' CLIMATE STRATEGIES (INCLUDING THE 10 COMPANIES ASSESSED IN BOTH THE 2022 AND 2023 CCRM)

	2023 RATINGS & PROGRESS+ SINCE 2022				ALL (AVERAGE)			
	TRANSPARENCY		INTEGRITY		TRANSPARENCY		INTEGRITY	
Amazon	Low	—	Very low	—	Low	—	Very low	—
Apple	Reasonable	—	Very low	—				
Carrefour	Very low	—	Very low	—				
Deutsche Post DHL	Low	—	Very low	—				
Google	Moderate	▲	Low	—				
JBS	Low	—	Very low	—				
Maersk	Moderate	—	Moderate	—				
Nestlé	Very low	—	Very low	—				
Volkswagen	Low	—	Very low	—				
Walmart	Low	—	Very low	—				

We did not identify significant progress on the low level of transparency and integrity of climate contributions and offsetting.

+ Authors' interpretation of companies' progress against the current methodology version since the last analysis in 2022 (▲ — ▼).

NEW GUIDELINES AND FRAMEWORKS RELATED TO CORPORATE CLIMATE CONTRIBUTIONS AND OFFSETTING IN 2022

UN High-Level Expert Group (UN HLEG, 2022)

Carbon credits may be used to claim a *contribution* to climate change mitigation, but should not be used to claim the *neutralisation* of emissions towards the achievement of specific 1.5°C-aligned emission reduction targets.

Additionality and permanence are essential for any carbon credits used beyond these 1.5°C-aligned emission reduction targets to claim net-zero emissions.

Any credit transactions must be transparently reported, including a specification of whether those credits could be double counted towards any country's own climate pledges.

ISO Net Zero guidelines (ISO, 2022b)

Permanence: Carbon credits should reflect emission reductions or removals that guarantee at least an equivalent degree of permanence to the lifetime of the greenhouse gases they are used to claim to offset. This would effectively rule out the use of carbon dioxide removal with biological storage – for example, forestry, soil sequestration and mangrove restoration projects – for claiming to neutralise any CO_2 emissions.

Offset projects should come from the high-hanging fruit of mitigation potential: Activities that address urgent and transformational climate priorities that are beyond the reasonable reach of unilateral action by a single country.

The UNFCCC Conference of Parties (COP27) decision (UNFCCC, 2022)

The climate contribution model appears to have been anchored in the Paris Agreement framework by agreements on the international use of carbon markets, which clarified the suggested uses of two *types* of unit for future transactions:

Corresponding adjustments with 'authorised A6.4ERs': If host countries *authorise* Article 6.4 Emission Reduction credits for the international transfer, then the mitigation outcome can be accounted to the GHG account of the buyer, and a 'corresponding adjustment' is required to ensure that the mitigation outcome is not double counted.

Climate contributions with 'mitigation contribution A6.4ERs': A 'mitigation contribution' unit is not recognised as a sale of an emission reduction by a country, and hence is counted towards the host country's climate target. Using these credits towards any other emissions target would amount to double counting. This decision represents a clear consensus amongst national governments that when emission reductions are counted by a country, they cannot also be claimed by a company in support of an offset claim. Companies may rather claim a *contribution* to climate action.

Other developments

Guidance on climate contributions demonstrates an emerging consensus on this new direction of travel for corporate climate responsibility, and ongoing debate on how to evaluate their quality (Höglund and Mitchell-Larson, 2022; WWF Germany, 2022; NewClimate Institute, 2023a).

Legal complaints against carbon neutrality claims were brought against KLM in the Netherlands and SK Lubricants in South Korea, amongst others. Legal experts ClientEarth published an influential briefing (ClientEarth, 2022), outlining the high risks of legal action associated with claims that companies' emissions are offset through carbon credits.

Carbon credit provider myclimate announced a shift from offsets to a new impact label in the vein of the climate contribution model. myclimate will no longer offer a carbon neutral label based on the recognition that the current market cannot deliver offsets that can credibly facilitate climate neutral claims in the era of the Paris Agreement (myclimate, 2022).

Note: The summaries in this table represent the authors' interpretations of the guidelines and developments presented.

4.2 Principles for good practice

Climate contributions and offsetting remain a hot topic with divergent views and inconsistent guidance. Despite the continued fragmentation of standards and guidance, a number of developments throughout 2022 underpin a strengthening consensus that there is a limited role for offsetting in credible corporate climate strategies. In the following sections we summarise principles for good practice that we have identified for climate contributions and offsetting claims. Full details on the guiding principles of our analysis can be found in section 4 of the methodology document.

4.2.1 Climate contributions without a neutralisation claim

In recognition of the limitations of offsetting and the need to ramp up financial support for climate action worldwide, some actors – including companies, standard setting initiatives and even providers of carbon offsets – are moving away from the offsetting model to make a climate contribution without any neutralisation claim.

We define climate contributions as finance provided by a company to support climate change action beyond the company's own value chain, without claiming to neutralise its own emissions. A company can claim to *contribute* to climate change mitigation activities, without claiming ownership of the emission reduction outcomes and without subtracting associated reductions from their own GHG inventory or net-zero target. Climate contributions, which represent an alternative approach to offsetting, are a central feature of NewClimate Institute's *Climate Responsibility* approach (NewClimate Institute, 2020) and the WWF-BCG Climate Blueprint (WWF and BCG, 2020). The Climate contribution model has been anchored in the framework of the Paris Agreement by the COP27 decision to create a type of unit under Article 6.4 that can be used only for this purpose (a 'Mitigation contribution A6.4ER', see section 4.3). Some established providers of offsets and carbon neutrality labels, including *myclimate*, are transitioning to this alternative model (see section 4.3).

An internal carbon price on emissions can inform the volume of financial support. This way, climate contributions are linked to a company's responsibility for its own unabated emissions. The volume of financial contributions can serve as a key indicator of climate leadership. Ambitious companies should use the proceeds of an internal carbon price across all scope 1, 2 and 3 emissions, that is set at a high enough level to send a clear incentive signal for embarking on a 1.5°C-compatible decarbonisation trajectory (e.g., usually at least USD 80/tCO_2e, unless otherwise demonstrated by the company; see the accompanying Methodology section 4.2.1).

Companies can channel their climate contributions towards a wide range of activities. Since they are not claiming to neutralise their emissions, companies making climate contributions are not tied to procuring carbon offset credits and enjoy far greater flexibility in the type of activities they can support to advance global decarbonisation. This could include, for example, support for carbon removals that do not offer sufficient guarantees of permanence to neutralise emissions (see Box 3 section 4.2.2), but which are critical to addressing climate change and require more financial support globally. Other examples include emerging technologies and measures for sectors where the mitigation potential of existing technologies is limited, and where innovation and investment are needed to find new solutions. Uncertainties regarding the specific impacts delivered by more immature technologies and higher-risk investments may make them less attractive to project developers looking to generate offset credits, but a more suitable avenue for those channelling financial support in the form of climate contributions.

Climate contributions without neutralisation claims can provide a transparent, constructive and ambitious approach to take responsibility for unabated emissions:

- **More transparent:** Targets that are formulated independently from offsetting, without any netting-out of actual climate impacts, are more transparent and provide a clearer signal to decarbonise the company's own value chain.
- **More constructive:** Developing countries need more financial support to ramp up their mitigation action; voluntary action from companies is a vital channel of such support. A constructive environment is required, where this finance positively reinforces ambition raising, rather than one that provides perverse incentives to limit the ratcheting up of national climate commitments. In contrast to offsetting approaches, if the financial support from voluntary action results in emission reductions that are owned by the actors supported and the host country they operate in, this action will not conflict with the host country's GHG emission reduction target. Instead, it can provide support for reaching and ratcheting up those targets.
- **More ambitious:** The climate contribution model is aligned with the concept of ratcheting ambition through a race to the top, a concept that underpins the Paris Agreement. If companies are free to self-determine their own ambition for their climate contributions – as countries do through Nationally Determined Contributions – this may result in a race to the top to demonstrate the highest ambition, without limits. This would mark a significant shift from the offsetting approach in which many companies race to the bottom and exploit loopholes to deliver a fixed target at the lowest cost.

Despite these potential advantages, there are still open issues to address with the climate contribution model to ensure that the approach can lead to high quality action. The increased flexibility regarding the types of projects that can be supported under this model can be beneficial for supporting carbon dioxide removals or emerging technologies, but it will also be a challenge to ensure that this flexibility is not used to pursue lower quality projects. In this regard, their remains a significant role for existing market players and standard setting initiatives to contribute to the discussion and tools available for quality assurance.

Companies should disclose details on their climate contributions, including the basis for determining the volume of their financial contributions, the amount that they contribute each year, the recipients and the anticipated or measured impacts. It is critical that communication around these climate contributions avoids any implication that they serve to offset the actual emissions of the company.

4.2.2 Offsetting claims

Companies make an offsetting claim when they assert that GHG emissions within their value chain are 'neutralised', 'netted-out', 'offset', 'inset' or 'counterbalanced' through other emission reduction activities or carbon dioxide removals – inside or outside of their value chain. The practice of claiming to offset emissions is afflicted by controversy and contention due to significant uncertainties in the real impact of offset credit use as well as the suitability of carbon dioxide removals for offsetting emissions. Accordingly, terminology for claiming the offsetting of emissions is highly sensitive and inconsistent. Many actors now avoid the term offsetting entirely; companies and initiatives more often refer to 'neutralisation', 'netting-out', 'compensation', 'reducing the footprint', 'counterbalancing', or other equivalent terminologies. 'Insetting' is also gaining traction as a term to claim the offsetting of emissions through carbon dioxide removals or reductions within a company's own value chain (see ***Spotlight 4.4.4:*** *What does insetting and climate positive really mean?*). Some standards and companies propose the use of multiple terminologies to distinguish between offsetting in different circumstances and at different times. We consider that the complication of this single concept creates additional and unnecessary confusion which may detract from the ability of consumers, investors and regulators to critically assess claims made by companies. The *Corporate Climate Responsibility Monitor* assesses all claims that unabated GHG emissions within the value chain are offset as *offsetting claims*, including all synonymous terminologies and project types.

The integrity of an offsetting claim has always depended on various factors, including but not limited to additionality, permanence, avoidance of double counting, avoidance of leakage, and the accuracy of quantified impacts (Carbon Credit Quality Initiative, 2021). In addition to these long-established principles, several new factors are now of key importance to the integrity of an offsetting claim, since the coming into force of the Paris Agreement:

- Avoiding double counting **(Methodology Version 3.0 Section 4.3.2.3):**
  The use of authorised emission reduction credits – or other mechanisms to avoid double counting – alone, does not guarantee the environmental integrity of an offset credit, but is a minimum requirement to uphold integrity. In the era of the Paris Agreement, it is a minimum requirement for offsetting claims that companies procure only carbon credits that are 'authorised' for the international transfer of mitigation outcomes by the governments of the host country. After such an authorised transfer, governments will apply 'corresponding adjustments' to their reporting of progress towards achieving their national targets, to avoid that mitigation outcomes are double counted when the credits are used by another party (e.g. a company) to substantiate an offset claim.

- Avoiding the risk of distraction and delay **(Methodology Version 3.0 Section 4.3.2.1):**
  Offsetting claims must be limited and transparent enough to ensure that they do not distract from the necessity of prioritising immediate emission reductions. To maintain a chance of meeting the 1.5°C temperature limit, all sectors need to embark now on deep decarbonisation trajectories to reach net-zero GHG emissions and eventually net-negative GHG emissions worldwide (IPCC, 2022). In this ever more urgent context, offsetting claims risk distracting from immediate emission reduction measures. If consumers, investors and regulators are led to believe that a company's emissions are lower than they really are, this may lead to a reduction in the extent to which these actors provide further pressure, incentives or support for necessary emission reductions. The relevance of this issue is independent of the quality of the credits used to offset the emissions. To avoid this risk, carbon neutrality and net-zero claims should not rely on offsets for a substantial proportion of the company's emissions: the ISO Net Zero Guidelines recommends that offsets towards net-zero targets should only be used to account for 'residual emissions', which it defines and illustrates as accounting for 0-5% of the 2019 emissions from most sectors (ISO, 2022b). We consider that the same logic applies to other synonymous terminologies, including carbon neutrality claims. Alternatively, this risk may be less relevant, companies communicate targets and emission reduction measures that are clearly sufficient for sector-specific 1.5°C-compatible decarbonisation trajectories.

- **Additionality in the context of safeguarding Paris ambition (Methodology Version 3.0 Section 4.3.2.2):**
  Under the global governance framework of the Paris Agreement, offset credits can only provide an appropriate guarantee of additionality if they are generated from high-hanging-fruit mitigation projects, that do not present credit-selling territories with a perverse incentive to limit the extent to which they ratchet up their own ambition during NDC revision cycles (see ***Spotlight 4.4.1:*** *How to assure offset additionality in the context of the Paris Agreement?*). This position is aligned with the requirements of the 2022 ISO *Guidelines for Net Zero* (ISO, 2022b).

- **Net-zero compatibility (Methodology Version 3.0 Section 4.3.2.4):**
  To support the objectives of the Paris Agreement, financial support must be channelled to the identification and scaling of long-term solutions. Investments in bridging technologies that represent marginal emission reductions, but which are not compatible with zero-emission technologies, may result in locking-in high carbon infrastructure, and can further delay investment in the cleanest technologies. For sectors that should be fully decarbonised before 2050, the supported technologies and measures must be compatible with a zero-emission sector at the earliest possible point in time. For harder-to-abate sectors, the supported technologies should be compatible with other best available or emerging decarbonisation technologies within those sectors.

- **Permanence and scarcity of carbon dioxide removals (Methodology Version 3.0 Section 4.3.3; summarised in Box 3):**
  It may be more appropriate for corporates to channel support for carbon dioxide removals through climate contributions without neutralisation claims. It can be good practice for companies to support the development of carbon dioxide removal projects inside or outside their value chain, in parallel to delivering actual emission reductions. It *could in theory* be credible for companies to claim to offset their emissions with carbon dioxide removals under the specific conditions that they only offset residual emissions from highly decarbonised sectors that have no technical prospects for the complete elimination of emissions, and with carbon dioxide removals that have a high likelihood of sufficient permanence. In practice, it is politically challenging to reach a consensus on which sectors these are, and there is very limited availability of carbon dioxide removal projects that can deliver the required guarantee of permanence. Scarce potential and environmental damages mean that CDR measures are not a credible means of offsetting emissions that could feasibly be reduced, while CDR measures that cannot guarantee permanence are not a credible means of offsetting any emissions at all (see ***Spotlight 4.4.2:*** *Is it possible to mitigate the non-permanence of climate impacts from biological carbon dioxide removals?*). Given these significant limitations, it may be more appropriate for corporates to set separate targets for emission reductions and carbon dioxide removals, and to channel support for carbon dioxide removals through climate contributions without neutralisation claims.

BOX 3

The suitability of carbon dioxide removals for offsetting claims

For further details see the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0, section 4.3.3*.

All scenarios consistent with limiting global warming to a maximum of 1.5°C include a major role for carbon dioxide removals (Rogelj *et al.*, 2018). This includes nature-based solutions for carbon sequestration in forests, soils, peatlands and mangroves, technological solutions such as bioenergy with carbon capture and storage (BECCS) and direct air carbon capture with storage (DACCS), and solutions with mineral storage. Finance is needed to scale up carbon dioxide removal efforts, and corporates could play a key role.

Conditions for credible offsetting with carbon dioxide removals

Credible offsetting of individual companies' GHG emissions through financing carbon dioxide removal initiatives must focus on storage options that provide a sufficient guarantee of **permanence** and are not significantly constrained by technical or physical limitations on the storage **potential**.

CDR permanence: The permanence of carbon-dioxide removals must be guaranteed over a timeframe of centuries to millenniums. The *permanence* of a CDR outcome refers to the degree of certainty that the sequestered carbon will not be released at a later point in time. The release of previously sequestered carbon negates any accrued benefits of the sequestration. A sufficient guarantee of permanence requires a high likelihood that the captured carbon will remain stored over a timeframe of centuries to millenniums. Significant reliance on measures that have a reasonable likelihood of releasing captured carbon over a timeframe of decades present a risk of materially increasing atmospheric carbon concentrations either this century or in the next.

Scarcity of CDR potential: Scarce carbon dioxide removal potential must be reserved for balancing out residual emissions in hard-to-abate sectors, for it to remain technically possible to achieve global net-zero emissions. The maximum potential of most carbon dioxide removal measures is technically limited, and further restricted by environmental constraints, such as land requirements, high water consumption, high energy consumption, land degradation and pollution. Many carbon dioxide removal technologies can only be scaled up so far without significantly endangering sustainable development goals including food security. The scarcity of carbon dioxide removal measures is an important consideration when evaluating net-zero claims at the level of individual actors. The use of scarce carbon dioxide removal options must be consistent with achieving net-zero and eventually net-negative emissions at the global level. To align with 1.5°C-compatible pathways at the global level, some sectors with the technical ability to fully decarbonise will need to reach zero emissions, while carbon dioxide removals are likely needed to balance out the residual emissions from other hard-to-abate sectors. Any allocation of rights of ownership to scarce carbon dioxide removals will require international oversight as well as detailed (and likely highly complex) considerations of fairness and appropriate use to ensure efficient and effective efforts to contain and then reduce the atmospheric stock of emissions. Accordingly, it is not appropriate for companies today to make climate pledges, assuming they will have the right to use scarce carbon dioxide removals to neutralise their own emissions decades in the future. If specific companies – for example in the energy industries – claim ownership of scarce carbon dioxide removals now or for a time in the future, then it will not be possible for those removals to balance out residual emissions in hard-to-abate sectors, and it will not be possible to reach net-zero emissions at the economy-wide level.

Based on these issues, we conclude that it *could in theory* be credible for companies to claim to offset their emissions with carbon dioxide removals under the specific conditions that they only offset residual emissions from highly decarbonised sectors that have no technical prospects for the complete elimination of emissions, and with carbon dioxide removals that have a high likelihood of sufficient permanence. In practice, it is politically challenging to reach a consensus on which sectors these are, and there is very limited availability of carbon dioxide removal projects that can deliver the required guarantee of permanence. Scarce potential and environmental damages mean that CDR measures cannot be considered a credible offset of emissions that could be feasibly reduced, while CDR measures that cannot guarantee permanence are not a credible means of offsetting any emissions at all. It may be more appropriate for corporates to channel support for carbon dioxide removals through climate contributions without neutralisation claims.

Assessment of specific CDR measures and technologies (according to current best available information)

CDR measures based on biological capture and storage are scarce relative to potential neutralisation needs and do not have the necessary degree of permanence to be credibly considered an equivalent to emission reductions. These measures are also vulnerable to the displacement of emissions to other locations.

For BECCS and DACCS with underground storage, long-term storage is possible, although uncertainty on the risk of leakage remains. The scarce potential of these measures, which may be constrained by environmental concerns and energy system inefficiencies, mean that these measures are not a reasonable equivalent alternative to emission reductions for emissions that could be feasibly reduced.

CDR measures with mineral storage have a reasonable likelihood to meet the criteria of permanence and additional potential to be potentially considered a credible offset of residual emissions from hard-to-abate emission sources. Uncertainties on the environmental limitations mean that the credibility of offset claims for other emissions that could be feasibly reduced remains contentious.

The *Corporate Climate Responsibility Monitor* evaluates the integrity of offsetting claims using the same criteria, regardless of whether the company claims to offset its emissions today or at a point in the future.

It is unlikely that an offsetting claim today can deliver on the criteria necessary for that claim to be credible. These limitations are an important reality, rather than a reason to identify more lenient rules for offsetting claims today. Existing offset market conditions make it far more difficult – potentially unrealistic – for companies to make offsetting claims that can be assessed as having high integrity today. The integrity of offsetting claims today is first and foremost hampered by the reality that there are currently no offset credits available from any markets that can meet all the aforementioned criteria for robust integrity. Although the Paris Agreement is already in force, an accounting mechanism for avoiding **double counting** is yet to be established under any international offsetting standard, though this will be possible through the procurement of authorised A6.4ER credits[1] in the future. There are also currently very few – if any – examples of existing offsetting projects that represent the high-hanging fruit of mitigation potential that can be considered **additional in the context of the Paris Agreement**, given that offsetting markets to date have mainly focused on reaching the most cost-effective mitigation potential. The simple *inability* of the current market to supply offset credits that can credibly underpin carbon neutrality claims was given by myclimate as the reason for their decision to discontinue their carbon neutrality label and transition to an impact label in the vein of a climate contribution (myclimate, 2022).

Credible offsetting plans for the future depend on solid mechanisms and accounting frameworks. Companies can already be transparent about their intentions and how they plan to navigate the many issues that affect the integrity of offsetting claims. Following from the limitations for offsetting claims today, the ability to follow through on high integrity plans for future offsetting will likely depend on the transformation of existing offsetting markets, or the development of new mechanisms that can serve the criteria for credible neutralisation claims. Companies planning to offset their emissions in the future may not be able to identify specific projects today, but they can make an explicit statement of intent to restrict offsetting activity to high-hanging fruit projects with corresponding adjustments, along with other necessary conditions for environmental integrity.

1 *A6.4ER credits refer to authorised emission reduction credits established under Article 6.4 of the Paris Agreement.*

4.2.3 Good practice assessment criteria

The criteria for good practice in Table 16 forms the basis for the company assessments in section B. Full details on the methodology for rating companies' climate contributions and offsetting claims can be found in the accompanying methodology document, *Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0, section 4*.

Table 16: Good practice for climate contributions and offsetting claims

CLIMATE CONTRIBUTIONS AND OFFSETTING CLAIMS CORPORATE CLIMATE LEADERS EXHIBITING GOOD PRACTICE...	
C. Responsibility for unabated emissions	✓ Pursue either a robust approach for climate contributions or neutralisation of emissions, to take adequate responsibility for unabated emissions today.
Climate contributions	✓ Provide support to projects for climate change mitigation beyond their value chains. ✓ Derive the volume of finance from an internal carbon price across all emissions at a price level commensurate with keeping global temperature rise below 1.5˚C above pre-industrialised levels. ✓ Disclose full details on the volume of finance, the project recipients, and the expected impact. ✓ Claim only to make a contribution, without claiming ownership of the reductions for the neutralisation of emissions.
Offsetting claims today	✓ Ensure that any carbon neutrality claims do not mislead, or distract from the need for emission reductions through the following means: • The company presents transparent disclaimers on the dependence on offsetting, and the inherent uncertainties that this entails, alongside carbon neutrality claims. • Any carbon neutrality claims apply to all scope 1, 2 and 3 emissions. • Carbon neutrality claims involve the offsetting of only residual emissions as defined by the ISO (0-5% of 2019 emissions from most sectors ISO, 2022b); **or** the company also has 1.5°C-aligned targets for the short-, medium- and long-term. ✓ Disclose details on all offsetting activities including the volume of offset credits, details of the projects supported, credit vintages and credit prices paid. ✓ Pursue only high-quality offsetting constructs through the following means: • Projects are additional in the context of the Paris Agreement *(high-hanging fruits)*. • Measures are in place to guarantee that the mitigation outcome cannot be double counted (for example through corresponding adjustments). • Projects are compatible with net-zero emission technology and infrastructure • Carbon dioxide removals measures have a high likelihood of high permanence, the means of storage is not "scarce" and not associated with high environmental costs.
D. Offsetting plans for the future	✓ Transparently disclose whether or not the company plans to offset any of its emissions in the future, for instance in its target year. ✓ If planning to make offsetting claims, the company demonstrates plans and a commitment to meet the aforementioned good practice criteria for offsetting claims.

4.3 Trends, role models, and bad practice

Summary of trends in 2022

Developments in 2022 charted a clearer path for a transition from offsetting to a climate contribution approach. Misleading offsetting claims are increasingly recognised as a reputational and legal liability. The climate contribution approach gained traction towards wider implementation through developments such as the COP27 decision to create a 'mitigation contribution' unit under Article 6.4, and the announcement by the prominent business consultancy *myclimate* that it will discontinue its climate neutrality label and transition to a climate contribution model.

But companies' climate strategies appear to be behind the curve of these developments. We did not identify any significant progress over the past year on the low level of transparency and integrity of offsetting claims and climate contributions amongst the 24 companies that we assessed, nor did we identify significant momentum for companies to transition to a climate contribution approach. Over reliance on biological carbon dioxide removals, such as forestry projects, remains a critical issue, while the practice of offsetting under the contentious terminology of 'insetting' is gaining momentum and undermining more companies' climate strategies.

Especially critical emerging issues are explored in *section 4.4 Spotlight on key questions*.

Developments in 2022 charted a clearer path for a transition from offsetting to a climate contribution approach, but companies' climate strategies are behind the curve of developments.

The COP 27 decision to create a 'mitigation contribution' unit under Article 6.4 is a key step towards the wider implementation of the climate contribution model. The UNFCCC Conference of Parties (COP 27) in November 2022 resulted in new agreements on the international use of carbon markets (Article 6 under the Paris Agreement), which clarified the suggested use of two types of unit for future transactions in voluntary and regulatory carbon markets and has anchored the climate contribution model in the rulebook of the Paris Agreement:

- **Corresponding adjustments with 'authorised A6.4ERs' (the offsetting model which limits double counting risks):** Host countries can *authorise* Article 6.4 Emission Reduction credits (authorised A6.4ERs) for the international transfer of mitigation outcomes to the buyer. This means that a mitigation outcome is credited to the GHG account of the buying party and cannot also be counted towards the targets of the host country. A 'corresponding adjustment' is required to ensure that the mitigation outcome is not attributed to two entities.
- **Climate contributions with 'mitigation contribution A6.4ERs' (the contribution model without offsetting):** This 'mitigation contribution' unit is not directly recognised as a sale of an emission reduction by a country, and hence not accounted for as such by the country. These credits represent emission reductions (or removals) that are counted towards the host country's climate target. The UNFCCC agreement specifies possible uses for such credits, such as results-based finance contributions, and sends a signal that using these credits towards any other emissions target would amount to double counting. This decision represents a clear international consensus amongst national governments that when emission reductions are counted by a country they cannot also be claimed by a company in support of an offset claim. Companies could frame their purchase of these credits as contributions to domestic mitigation, but must not make misleading offset claims. Through the creation of this type of unit, the concept of the 'climate contribution' appears to now be anchored in the rulebook of the Paris Agreement. This sends another signal to companies to start shifting from an offsetting paradigm to one of financing emissions reductions through a climate contribution model.

A transition from offsetting to a climate contribution approach also gained significant traction throughout 2022, with an increasing volume of emerging literature and guidance on its implementation (Höglund and Mitchell-Larson, 2022; WWF Germany, 2022; NewClimate Institute, 2023a). These guidance documents show that while there remains an ongoing debate on how to evaluate the quality and sufficiency of climate contributions, there is an emerging consensus on this new direction of travel for corporate climate responsibility.

Complaints against carbon neutrality claims also gained momentum throughout 2022. Following on from the 2021 decision of the Netherlands' Advertising Code Committee that Shell should cease its "Drive CO_2 neutral" advertising campaigns, legal cases were brought in 2022 against KLM in the Netherlands and SK Lubricants in South Korea, amongst others. Legal experts ClientEarth published an influential briefing on the legal risk of carbon offsets in September 2022 (ClientEarth, 2022), showing that companies are at higher risk of legal action if they claim to compensate their emissions through offsets, rather than pursuing a contribution approach.

***Myclimate* appears set to be a 'first mover' in implementation of the climate contribution model.** The business consultancy – which has been an internationally recognised provider of offsets and carbon neutrality labels – announced in December 2022 that it will discontinue its climate neutrality label and transition to a new impact label in the vein of the climate contribution model. myclimate will no longer offer a carbon neutral label based on the explicit recognition that the current market cannot deliver offset credits that can credibly facilitate climate neutral claims in the era of the Paris Agreement (myclimate, 2022).

Companies' climate strategies are behind the curve of these developments. Just four of the 24 companies we assessed reported activities or donations that could be interpreted as climate contributions without a neutralisation claim. **Google** makes significant donations to various climate-related projects through its foundation Google.org, while **JBS**, **Stellantis** and **Walmart** report activities or funds to support climate and biodiversity projects. None of these companies link these support activities to their emission footprints or frame the activities in the context of assuming responsibility for their unabated emissions. We found no indication that the climate contribution approach gained any significant traction among the sampled companies over the past year, since the publication of the *2022 Corporate Climate Responsibility Monitor*. Aside from the companies sampled in this analysis, a small number of organisations are announcing plans to pursue this approach, including the Dutch multinational chemical company **DSM** (Mooldijk *et al.*, 2022).

In 2023, companies looking to make climate contributions now have more guidance available and can look to a growing number of examples and service providers (see ***Spotlight 4.4.5:*** *Are companies ready for a shift to climate contributions?*).

Many companies are claiming carbon neutrality in 2022, but the transparency and integrity of those claims remains critically low.

At least 11 of the 24 companies assessed claimed in 2022 to have offset their emissions. This is slightly higher than for the proportion of companies sampled in the *2022 Corporate Climate Responsibility Monitor*. Including retailers that sell carbon neutral products, at least 14 of the 24 companies are presenting customers with some form of carbon neutrality claim. Our sample appears to indicate a clear trend that carbon neutrality claims are associated primarily with consumer-facing brands: of the companies we assessed, *all* of the technology and automobile manufacturing companies make some form of carbon neutrality claim, while very few of the heavy industrial companies make any form of carbon neutrality claim.

The degree of transparency in these carbon neutrality claims remains poor in most cases. We did not identify any improvement in the transparency of offsetting claims over the past year. Companies often do not report on details that are relevant for understanding the credibility or even the meaning of the claim, such as its scope coverage, or the precise source (project, vintage, etc.) of the credits on which the offsetting claim is based. **Microsoft** – whose overall climate strategy we found to be reasonably transparent (see Microsoft in Section B) – stands out in the level of transparency that it provides on its offsetting transactions. The company provides a webpage to browse the details of its various carbon crediting projects, including information not only on the projects but also the average prices paid for credits and the 'contracted durability' – or permanence – of the climate impact of each project. The level of detail provided is concise and in a basic format that could very easily be replicated by other companies; there is no clear barrier to the provision of these basic details that facilitate an understanding of a claim's integrity.

The very low degree of integrity in companies' carbon neutrality claims also did not improve over the past year. We found poor integrity of the claims for every one of the companies that we assessed. The integrity of claims is compromised by various issues, including the scope coverage, and the quality of the carbon credits procured, as discussed below.

Carbon neutrality claims cover just a small fraction of the companies' emission footprints.

Of the 11 companies that claim climate neutrality in 2022 in some form, these claims were found to be misleading in their coverage, covering only selected products, services or emission scopes. Of those 11 companies, **the average company's carbon neutrality claim covered 3% of their emission footprint,** although observers could be misled into understanding that the company is claiming carbon neutrality across its full emission footprint. None of these carbon neutrality claims covered more than 12% of a company's emission footprint:

- **Some offsetting claims cover only operational emissions** (scope 1 and 2), which usually account for a small minority of a company's overall emissions. **Google**, **Microsoft** and **Apple** claim to be carbon neutral already for several years, while in reality only procuring credits to account for 12%, 2% and less than 1% of their emission footprints, respectively (see ***Spotlight 4.4.3:*** *Is the tech industry really carbon neutral?*).
- **Some offsetting claims cover only specific divisions or products**, where the demarcation of relevant emission scopes is very unclear. **Deutsche Post DHL** claims 'climate neutral' deliveries, but procures only enough offset credits to cover transport-related emissions in specific regions, accounting for less than 1% of the company's full emission footprint. Likewise, all of the automobile manufacturers assessed – **Volkswagen**, **Mercedes-Benz** and **Stellantis** – claim carbon neutrality for a selection of their production lines, portraying a potentially misleading impression to customers about the climate impact of their brands.
- **Some companies advertise optional carbon neutral products and services**, while in reality this means procuring credits to offset the emissions of the same products, and only for customers who choose to pay a premium. **Holcim** offers carbon neutral variations of its products under its 'EcoPact Zero' label, while we understand that the only difference from the normal product offering is the acquisition of carbon credits. **American Airlines** offers the option to customers to offset the emissions associated with their flight, although this covers only the seat of the individual passenger, and does not cover the impacts of non-GHG climate forcers, which account for the majority of the flight's climate impact.

Additionality and permanence of offset credits used is highly contentious

Forestry-related projects account for most offset credit procurement, despite the fundamental unsuitability of these projects for offsetting claims. Most of the companies with carbon neutrality claims do not provide clear details on the projects that they procure offset credits from. However, the information provided is sufficient to understand that at least half of the companies are procuring credits from forestry-related products. This is consistent with research (Donofrio *et al.*, 2022), which found that the volume of forestry and land-use related offset credits transactions quadrupled between 2020 and 2021, representing nearly half of the overall volume of offset credit transactions on the voluntary market in 2021. Offset projects based on the biological storage of carbon – including forestry-related projects – are fundamentally unsuitable for offsetting claims due to the non-permanence of the climate impact (see ***Section 4.2.2 Box 3:*** *The suitability of carbon dioxide removals for offsetting claims* and ***Spotlight 4.4.2:*** *Is it possible to mitigate the non-permanence of biological carbon dioxide removals?*).

The additionality of offset projects is highly contentious, for all of the companies that provide information on their offset projects. None of the companies assessed reported the procurement of offset credits from projects that represent the high-hanging fruit of mitigation potential, while some of the projects even compare unfavourably to historic Kyoto-era definitions of additionality. **Google** explicitly recognises that some of its landfill gas projects may not be strictly additional (see ***Spotlight 4.4.1:*** *How to assure offset additionality in the context of the Paris Agreement?*).

Offsetting under the guise of 'insetting' is gaining traction, although this practice leads to low credibility GHG emission offsetting claims and the double counting of emission reductions.

Many companies appear to be distancing themselves from the terminology of 'offsetting', a term that is increasingly laden with controversy and liability. Across the 24 companies assessed in this study we found that most companies continue to rely on the practice of offsetting under the guise of other terminologies such as neutralisation, balancing out, netting out, compensating, and the especially problematic terminology 'insetting'.

'Insetting' is a business-driven concept with no universally accepted definition. The examples we have identified of insetting plans all amount to the offsetting of emissions without robust methodologies and the verification steps required from voluntary carbon crediting standards. We highlighted 'insetting' in the *2022 Corporate Climate Responsibility Monitor* (Day *et al.*, 2022) as an illegitimate concept with the potential to significantly undermine corporate climate strategies. Since then, the concept has gained considerable traction with increasing evidence on how it is already undermining climate strategies. **Deutsche Post DHL** and **PepsiCo** employ the label of insetting to illegitimately claim that their emissions have been offset. So-called "insetting" also forms a significant component of the medium- and long-term pledges of **Nestlé**, **PepsiCo** and **JBS**, who distance themselves from offsetting but actually plan to offset their emissions through non-permanent land-related carbon dioxide removals under the guise of 'insetting' (see ***Spotlight 4.4.4:*** *What does insetting really mean?*).

Companies are successfully advocating for 'insetting' to be recognised as an appropriate approach; a development with potentially damaging consequences for the credibility of corporate climate strategies. While Nestlé implicitly recognised in their 2021 *Net Zero Roadmap* that 'insetting' was not yet seen as a legitimate approach, the likes of **Nestlé** and **PepsiCo** have used the prominent roles they hold on advisory committees and the technical working groups of key standard setting initiatives to lobby for the concept. They can now refer to the 2022-published SBTi guidance for forestry, land use and agriculture (FLAG) as evidence of a certain recognition of the terminology. The new SBTi FLAG guidance allows companies to claim the achievement of their emission reduction targets through 'insetting', albeit without clarifying what the term means, nor a method for measuring and independently validating the legitimacy of any claims. This breaks from the long-held SBTi position that emission reduction targets should only be achieved through delivering actual emission reductions. This may have damaging consequences for the credibility of climate targets from companies with significant land use emissions, including not only agri-businesses but also retailers and the fashion industry.

Companies demonstrate excessive reliance on carbon dioxide removals to offset their emissions for net-zero targets.

All but one of the 24 companies assessed have plans to offset their emissions in the future. The only company not to do so – **Walmart** – does not currently set a long-term target for a reduction of its scope 3 emissions.

The role of offsets for achieving long-term net zero targets could fall between 23 and 45% of the companies' combined 2019 emission footprints. This broad range reflects the lack of transparency provided by companies on the role of offsets in the future plans: for the ten companies that are transparent about what their targets mean in terms of emission reductions and offsets, we estimate the reliance on offsetting to be equivalent to 23% of their 2019 emissions, on average. Across all 24 companies, including the companies for which the meaning of their net-zero targets remains ambiguous, we find that the role for offsets could be anywhere in the range from 23% up to the 45% of 2019 emissions that remain unaccounted for in companies' net-zero targets. Nineteen percent of the companies' combined emissions are explicitly excluded from their targets' coverage, while the commitment to the reduction of emissions amounts to just 36% of their combined current GHG emissions (see section 2).

This 23-45% is far in excess of the maximum role for offsetting indicated by SBTi's Net Zero Standard, which stipulates companies' net-zero targets should set out at least a 90% reduction of 2019 emissions, with the role of offsetting limited to a maximum of 10%, and even less in some sectors (SBTi, 2021c). The ISO Guidelines for Net Zero also recommend that offsetting claims should only account for residual emissions which – for most of the sectors indicated in the guidelines – should constitute less than 5% of 2019 emission levels (ISO, 2022b).

Planned reliance on nature-based solutions outstrips the technical potential of the planet's nature resources. Of the companies that offer any information about their offsetting plans for the future, we interpret that at least three-quarters of these companies rely heavily on forestry and land-use related carbon dioxide removal offsets. If three-quarters of the companies follow through on plans to procure offsets for 23-45% of their 2019 emission footprints, this equates to an annual demand of 380-740 $MtCO_2e$ worth of forestry and land-use related carbon dioxide removals offsets. For just 24 companies, which accounted for 4% of global emissions in 2021, this potential offset demand represents a very high proportion of the global environmentally constrained potential for biological carbon dioxide removal and storage measures, estimated at 1.7-6.7 $GtCO_2e$ per year (Fuss *et al.*, 2018; Hepburn *et al.*, 2019 see Methodology Version 3.0 Table 12). Extrapolating the trend of this sample of 24 leading companies to the global scale implies an annual demand for forestry-related carbon dioxide removals of 9.5-18.5 $GtCO_2e$. This exceeds the mid-point of the estimated global resource potential by at least 2-4 times.

Moreover, these plans demonstrate the widespread lack of awareness that the biological storage of carbon is fundamentally unsuitable for offsetting claims because the climate impact is not permanent. Companies are increasingly proposing plans to overcome the issue of non-permanence, but these plans are implausible (see ***Spotlight 4.4.2:*** *Is it possible to mitigate the non-permanence of climate impacts from biological carbon dioxide removal?*).

4.4 Spotlight on key questions (commentary)

This spotlight section presents a commentary from the authors on key issues related to current trends for climate contributions and offsetting.

4.4.1 How to assure offset additionality in the context of the Paris Agreement?

Analysis in this section on the offsetting activities of Deutsche Post DHL and Google are adapted from the Corporate Climate Responsibility Monitor 2022 (Day et al., 2022).

Additionality needs redefining in the context of the Paris Agreement to focus on the high-hanging fruit of mitigation projects. We do not consider any of the assessed companies' offset projects as additional in this context. Some of them cannot even be considered additional under old Kyoto-era definitions of additionality.

A key condition for determining the integrity of offset credits is the *additionality* of the emission reductions; that is, the guarantee that credited emission reductions are additional to what could be achieved without the incentives provided by the potential sale of carbon credits. In historical offsetting mechanisms, additionality could be proven by showing that local legislation did not require the activity and that credit revenues could help overcome barriers which would otherwise prevent implementation.

Since the Paris Agreement came into force, the concept of additionality needs to be redefined. The global governance framework of the Paris Agreement represents a different context from the Kyoto-era, under which most existing offsetting mechanisms and standards were developed.

The prospect of offset credit revenue may present a perverse incentive for countries to limit their climate change mitigation ambition. To overcome this potential ambition pitfall, offsetting projects should be sufficiently ambitious that they avoid presenting any conflict with the host country's own ambition.

The high-hanging fruit of mitigation potential refers to the technologies and measures to decarbonise emission sources that remain otherwise unambiguously inaccessible to host country governments in the near- and mid-term future, on account of high adoption costs. Examples of potential projects that have been conceptualised to fulfil this criteria include ground source heat pumps in Mongolia (Nascimento *et al.*, 2020) and near zero energy housing in Colombia (Kachi *et al.*, 2020). The marginal abatement costs of such projects may be in excess of EUR 100 / tCO_2e, demonstrating a significant shift from existing voluntary offsetting markets; the average price of voluntary market credit transactions between 2020 and 2021 was less than EUR 10 for all project types (Donofrio *et al.*, 2022). Further analysis on high hanging fruit projects is currently being undertaken for publication in 2023 (NewClimate Institute, 2023c).

None of the offset projects reported by companies represent the high-hanging fruit of mitigation potential. A shift to high-hanging fruit carbon crediting projects marks a significant transition from historical practices. Emission reduction projects registered under crediting programmes to date have been mostly developed in the context of cost-saving, rather than ambition-raising mechanisms. As such there are very few, if any, examples of existing credited projects that represent high-hanging fruits, and which could be considered truly in line with safeguarding and raising ambition in the context of the Paris Agreement.

On the whole, the companies assessed in this report did not provide extensive details about the offsetting projects from which they procure credits. Of the information that exists, companies had procured credits from forestry-related projects, renewable energy, landfill gas projects and household energy efficiency projects.

Deutsche Post DHL has looked for some of the higher quality credits available on the voluntary carbon markets. Based on its published quality criteria, the company sourced Gold Standard verified offset credits in 2020 from wind power projects in Aruba and in India, cookstove projects in Guatemala and Lesotho, a landfill gas project in Chile, and a biogas programme in Vietnam (Deutsche Post DHL, 2021b). Unlike the majority of projects that supply current voluntary carbon markets, there is a fair chance that some of these seven projects depend on revenue for continuation and that the support provided by Deutsche Post DHL may lead to some additional climate impact. However, in the context global governance framework of the Paris Agreement, which requires all countries to set ambitious emission reduction targets, the additionality of these types of projects is contentious, as they may be accessible to host countries and could be part of host countries' own GHG emission abatement efforts, if the country were to raise their own ambition, either unilaterally or through support. As such, the projects are not a credible equivalent to the reduction of Deutsche Post DHL's own emissions. The same is true for the eight projects that Deutsche Post DHL selected in early 2022 (Deutsche Post DHL, 2021b).

American Airlines purchases carbon offset credits from three programmes: protecting and restoring forests in Mexico, peat swamps in Indonesia, and building improved cookstoves in Honduras (American Airlines, 2022c). None of these projects can be considered unequivocally additional in the context of the Paris Agreement.

Microsoft announced that it will move away from using carbon credits based on reduced emissions – which it recognises are not aligned with the goals set out in the Paris Agreement (Smith, 2020, p. 8) – and aims to increase its share of what it terms 'high durability' carbon removal projects. Further details on what these technologies might consist of are not forthcoming. The portfolio of carbon credits used to claim to offset its emissions in the fiscal year 2021 consists of 99% low-durability carbon dioxide removals with biological storage, such as reforestation projects in the US and soil sequestration projects in Australia. Microsoft reports that these have a 'contracted durability' of just 20-25 years (Microsoft, 2022e, 2022c, p. 13).

Some projects are unlikely to meet even historical Kyoto-era definitions of additionality. Most of the offset credits that **Google** has procured stem from projects in the United States that capture and utilise methane from landfill sites to avoid its release into the atmosphere. The installation of methane capture technology is mandated by local or national government in several industrialised countries. Analysis for other countries where there is no policy mandate for the technologies shows that there is a high economic incentive to implement such projects without support, if the biogas can be used for electricity generation (Warnecke *et al.*, 2017). Accordingly, the additionality of the offset credits from the initial investment on this type of project is contentious. Google notes in a footnote of its carbon offsetting whitepaper that the credibility of offsets from these projects is contended, but that the company prefers to support projects that utilise captured gas (Google, 2011). Making use of the gas is indeed environmentally and economically attractive, and therefore good practice, but it is also the reason in this case why the credit revenue from Google may not lead to any additional climate action.

Google again implicitly recognises the questionable additionality of their offsets when they report that without their support, the 'additional cost for these community programs would have to be borne by local residents and businesses (Google, 2018). It is not clear whether Google is claiming to have subsidised the waste treatment bills of local residents and businesses for projects that were going to happen anyway, or to have financed additional emission reductions from projects that would otherwise not have happened.

4.4.2 Is it possible to mitigate the non-permanence of climate impacts from biological carbon dioxide removals?

More support is needed for carbon dioxide removal and storage measures – including nature-based solutions – but such measures are not suitable for neutralisation claims unless they can guarantee the permanence of the climate impact, among other important criteria. Neutralisation claims based on non-permanent carbon dioxide removals will lead to an increase in the atmospheric concentration of GHGs. The non-permanence of nature-based solutions cannot be mitigated; approaches that claim to do so are implausible.

All scenarios consistent with a 1.5°C temperature increase include a major role for CDR (Rogelj *et al.*, 2018). Finance is needed to scale up carbon dioxide removal efforts, and corporates could play a key role. But carbon sequestrated in soils and forests is highly vulnerable to natural and anthropogenic disturbances such as forest fire or soil erosion; permanence of sequestration is likely over a period of just years to decades. The release of previously sequestered carbon negates any benefits of the initial sequestration: at the point at which the carbon dioxide is released, the atmospheric concentration of carbon dioxide is restored to the same value that it would have been had the CDR activity never taken place. If non-permanent removals are used to claim to neutralise emissions released elsewhere, the global CO_2 concentration will increase as a result (Jeffery *et al.*, 2020). A sufficient guarantee of permanence requires a high likelihood that the captured carbon will remain stored over a timeframe of centuries, to millenniums.

Amid increased awareness that the non-permanence of nature-based carbon dioxide removal projects makes them unsuitable for claiming the neutralisation of emissions, companies and crediting mechanisms are proposing approaches which they claim can mitigate the issue of non-permanence. The Carbon Credit Quality Initiative (Öko-Institut *et al.*, 2021) categorises these into three approaches. Table 17 describes how each of these approaches are based on flawed assumptions:

Proponents of biological carbon dioxide removals for offsetting often point out the fact that there is not much more that project developers can do beyond these approaches to ensure permanence. This is true, and the reason why these projects are not suitable for claiming the neutralisation of emissions, rather than a justification for leniency.

Table 17: Implausible assumptions of approaches to mitigate the non-permanence of nature-based CDR

APPROACH	ISSUES
Temporary credits: Under this approach, offset credits are valid only for a specific period of time, after which they have to be renewed or replaced.	This approach works only in theory, under the implausible assumption that the credit issuing mechanism will continue to operate for the desired duration of permanence, which should be at least centuries. The only experience so far of a mechanism that issues temporary credits in this way was the Clean Development Mechanism. The second commitment period of the CDM is about to come to end in 2023 and a third commitment period is not envisaged. As such, it will become technically impossible to renew or replace temporary credits through this mechanism after 2023. Ensuring permanence through a credit issuing mechanism only works to the extent that there is a guarantee of permanence for the lifetime of the mechanism, which there is not.
Monitoring and compensating for reversals: A commonly proposed approach is to monitor, report and compensate for reversed mitigation outcomes through the cancellation of issued carbon credits, for a sufficiently long period. For example, the Climate Action Reserve (CAR) requires forestry projects to be monitored and reversals compensated for at least 100 years after credit issuance.	This approach only works under a set of highly implausible assumptions. The example given depends on the assumption that the Climate Action Reserve still exists in 100 years, and that it still follows the same set of rules. The assumption that the corporate governance framework for climate change and offsetting in 100 years from now still resembles the mechanisms in place today is improbable to say the least. An even more unlikely assumption is that the company purchasing the offset credit still exists in 100 years, and that it cares about maintaining the integrity of a carbon neutral claim that it made 100 years ago. This depends, in turn, on a high enough level of public scrutiny on the carbon neutrality claims that companies made 100 years ago. This assumption is entirely untenable. Without fulfilling all of these assumptions, the monitoring and compensation approach offers no value for robustly mitigating the non-permanence of nature-based carbon dioxide removals.
Discounting[+]: Credit issuance from non-permanent projects is discounted at a rate deemed to cover the risk of reversals over the desired time period. A certain proportion of the carbon dioxide removals would not be credited, so that these non-credited outcomes can counterbalance reversals in the future. **Buffer pool:** Projects maintain adequate buffer reserves of non-tradable carbon offsets to cover unforeseen losses in carbon stocks.	The proposal of a discounting or buffer pool approach to address the issue of the non-permanence of biological carbon dioxide removals is an indication that the issue of non-permanence is not well understood. The non-permanence of forestry and soil related carbon dioxide removal impacts is not merely a possibility; rather the storage of carbon in this form is *likely* to span a timeframe of only *years to decades* (see Methodology Version 3.0 Table 12) , and therefore the risk of reversals over a period of centuries can be considered a near-certainty. Discounting to address a risk that can be considered a near-certainty may require a discount rate of up to 100%, resulting in little to no credit issuance. Similarly, a buffer pool would need to be very many times larger – potentially infinitely larger – than the tradable volume of offsets.

[+] Discounting here refers to the approach to discount issuance to address permanence specifically. We do not discuss discounting approaches to address other issues of credit integrity, such as additionality. Discounting may be a more appropriate mechanism in other contexts.

4.4.3 Is the tech industry really carbon neutral?

Our analysis has shown that despite current and future neutrality claims of tech giants like Google, Microsoft, and Amazon, the ICT sector is far from being 'carbon neutral'. Serious plans for deep emission reduction measures are lacking while companies continue to strongly rely on biological carbon dioxide removals with low durability to meet their claims. While we could identify some good practice examples in the companies' sustainability strategies, in terms of transparency, renewable energy procurement, and innovative emission reduction measures, these good practices do not go nearly far enough to justify the bold and misleading carbon neutrality claims that Google, Amazon, and Microsoft put forward.

One of the main challenges the ICT sector faces is the environmental impact of its operations and products. The production and use of ICT devices and infrastructure – especially constructing and operating datacentres – requires a significant amount of energy. Datacentres and data transmission networks consumed about 1.5% of global electricity and were responsible for about 1% of the global energy related emissions in 2021 (IEA, 2022). The full emissions footprint of the ICT sector is substantially larger, peer-reviewed estimates put ICT emissions at a range between 1.8% to 3.9% of global GHG emissions, depending on the scope of activities included in the calculations (Freitag *et al.*, 2021). Demand for ICT services has grown rapidly over the past decades due to increased digitalisation and rising numbers of internet users, resulting in increased demand for data services, consumer electronic devices, and increased requirements for processing power (IEA, 2022). Similarly, emissions from the sector have also been increasing rapidly; while estimates of the exact global emissions share from the ICT sector vary there is a consensus in literature that ICT emissions have grown faster than global emissions in recent years (Freitag *et al.*, 2021). Despite this, energy efficiency improvements allowed emissions to rise at a slower pace than the sector's energy demand. ICT companies are now faced with the challenge to rapidly decrease emissions while keeping up with the constantly increasing demand for its products and services. Forecasts estimating the future energy consumption of the ICT sector are uncertain and vary significantly mainly depending on the assumptions regarding energy efficiency gains and limitations. The IEA (IEA, 2022) estimates that energy consumption for datacentres will modestly increase in the immediate future but long-term energy demand remains highly uncertain, but emissions are likely to increase in the absence of new emission reduction measures. Despite these challenges, the ICT sector also offers great opportunities that can help reduce emissions and support the mitigation and adaptation of climate change through the development and deployment of new technologies.

In our report, we analysed the climate strategy of three of the major ICT companies, Amazon, Google, and Microsoft. All three companies belong to the top five companies by market capitalisation (Johnston, 2022). Combined, they control over two thirds of the global cloud infrastructure market and were responsible for around 0.5% of the global GHG emission in 2021 (IEA, 2022; Synergy Research Group, 2022). Accordingly, these companies should be at the forefront and race each other to the fastest and most cost-effective deep decarbonisation to align their business with the 1.5°C Paris-aligned temperature goal. However, the results of our analysis suggest that tech companies are still far from reaching deep decarbonisation and 'carbon neutrality'.

Our findings indicate that ICT companies scramble for the title of 'carbon neutrality' and 'net-zero' in a race to the bottom, focused on speed rather than integrity.

Microsoft, Amazon, and Google are three consumer facing brands directly competing for market share thus, it is not surprising that these companies' follow similar climate communication strategies.

Both Microsoft and Google currently claim to be 'carbon neutral' while only covering 2% and 12% of their full emission print with these claims, respectively. By 2030, Microsoft claims to become 'carbon negative' and Google claims to reach 'net-zero' emissions, covering their full emission footprint. For the consumer it is difficult to distinguish the difference between 'carbon neutral' and 'net-zero' and make informed choices based on that information.

Microsoft, Amazon, and Google have pledges to reach net-zero emissions, but the insufficiency of their emission reduction targets is strikingly similar. Microsoft's future neutralisation claim entails a commitment to reduce emission by 37%; Google's net-zero target translates to an emission reduction commitment of just 38% compared to 2019 levels. While Amazon does not make any neutralisation claim today, it sets out a target to achieve 'net-zero carbon' by 2040 without making any commitments to actual emission reductions.

Offset credits play a major role in the fulfilment of these pledges. Microsoft, Amazon, and Google claim that their emissions are – and will be – 'neutralised' through the purchase of offset credits. While Google provides very limited information on the type of projects they plan to support, to fulfil their neutralisation claim in the future, Amazon and Microsoft will at first focus mainly on forestry-related projects but aim to shift their portfolio towards technological CDR that have a higher contracted durability and a higher likelihood to be additional in the long-run (Amazon, 2022a; Microsoft, 2022c). Microsoft is a best practice example for transparency when it comes to offsetting projects. The company issues an interactive website that allows the user to see all individual offsetting projects that Microsoft supports since 2021 (Microsoft, 2022b).

These neutralisation claims give consumers and investors the misleading impression that Amazon's, Google's, and Microsoft's activities – and the use of their products – do not contribute to climate change. Indulging consumers with the belief that they can use ICT services and products without any significant environmental consequences may lead to adverse effects on the emissions through overconsumption and unnecessary energy use. The extent to which consumer behaviour is influenced by these misleading claims and whether they result in increased consumption and emissions, remains an open question.

The lack of any planned emissions reduction measures and abatement strategies for all three of these major ICT companies beyond their mislabelled net-zero commitments for 2030 or 2040 is striking. Claiming 'net-zero' through the purchase of contentious offset credits is not enough to address climate change. Investment decisions made today are likely to impact the years beyond 2030 or even 2040 thus, it is crucial that companies include climate change into their long-term planning to signal to consumers and investors that they are deeply committed to decarbonisation.

ICT companies are among the frontrunners for high quality renewable energy procurement, but other emission scopes require closer attention. Google was the first company globally to match its used electricity with renewable energy on an hourly basis, shortly after followed by Microsoft. In 2021, Amazon was the world largest corporate purchaser of renewable energy and Google and Microsoft were under the top four (IEA, 2022). Microsoft and Google are best practice examples on how companies can reduce their scope 2 energy related emissions, tracking both their location- and market-based emissions and investing in additional renewable energy projects in the local grid that will have the largest impact on overall emission reduction. ICT companies tend to focus on highlighting their efforts procuring renewable energy, an emission source which is highly visible and relatively easy to decarbonise. But direct electricity consumption does not account for ICT companies largest emission source. Indirect scope 3 emission make up for the vast majority of Amazon's, Google's, and Microsoft's emission portfolio; in 2021 scope 3 emission accounted for 59%-77% of the full carbon footprint of those companies. Still, emission reduction measures targeted specifically at emission sources in scope 3 are rather undefined in the companies' sustainability plans.

The IEA (IEA, 2022) status report of the ICT sector makes it clear that ICT companies need scale up ambition to meet the goals of the Paris Agreement and continue to improve their emission monitoring systems, back up their neutrality claims with deep emission reduction targets, continue to purchase local renewable energy, invest in R&D and roll out new energy efficient technologies on a broader scale. Companies need to start raising the bar on serious climate action in the ICT sector.

4.4.4 What does insetting and climate positive really mean?

'Insetting' is a business-driven concept with no universally accepted definition. The approach can lead to low credibility GHG emission offsetting claims and the double counting of emission reductions.

The concept of insetting is promoted by some actors as a better alternative to offsetting, mainly for companies with links to agriculture and land-use sectors in their supply chains. Insetting is sometimes described as offsetting within the value chain. This can mean two different things, both of which are highly contentious:

- **Emission reduction projects in the value chain:** Here, an emission reduction project – similar to an offsetting project – is implemented within the company's value chain, rather than outside of it. Describing this as insetting is a false concept; this is simply a measure for the reduction of the company's own emissions. In claiming that the reduction of certain emissions neutralises the company's other GHG emissions, the company is either: a) rejecting responsibility for those sources and excluding them from the scope of its target or claim; or b) counting the emission reductions of those measures twice to claim reductions for some emission sources and neutralisation of other emission sources. The credibility of the claim is critically compromised in either case.

  In the most extreme case, companies may claim the complete carbon neutrality of their scope 1 and 2 emissions, by claiming the reallocation of marginal reductions from their scope 3 emissions. Given that scope 3 emissions account for the major share of many companies' emissions, such a claim may be possible with only very marginal reductions to scope 3 emissions that could possibly be achieved under business-as-usual trajectories. The possible outcome is that a company claims to be carbon neutral without having taken any action to reduce its scope 1 and 2 emissions.

- **Carbon dioxide removals in the value chain:** In this case, measures are taken within a company's value chain to achieve carbon dioxide removal and storage. This may include carbon storage in agricultural soils, and carbon storage in harvested wood and wood-based products. Here, the same environmental integrity issues apply as for any other carbon dioxide removal offsetting projects (see Box 3, section 4.2.2): the suitability of these measures for claiming the neutralisation of GHG emissions is compromised by the lack of permanence of the carbon storage and the scarcity of nature-based solutions for carbon dioxide removals. An apparent key difference between carbon dioxide removals under an 'insetting' approach, as opposed to carbon dioxide removals through certified offsets, is that the companies implementing an insetting approach may not seek independent measurement and verification of the carbon dioxide removals. Most carbon credit standards require projects to go through expert review, stakeholder consultation and independent verification to assess compliance with approved methodologies, and they have rules pertaining to defined crediting periods and the issuance of credits. Those processes do not guarantee a high-quality outcome – and they do not address the fact that biological carbon dioxide removals are fundamentally unsuitable for offsetting claims – but such processes are considered a pre-requisite for environmental integrity. By comparison, we do not see any evidence that companies claiming to inset their emissions are going through such processes. As such, this is simply a weaker variation of an already non-credible offsetting approach.

Several major companies are currently advocating for standards that recognise insetting as valid carbon compensation, including through holding prominent roles on advisory committees and technical working groups of key standard setting initiatives such as GHG Protocol's *Guidance for corporate accounting of land sector emissions and removals* (GHG Protocol, 2021). These companies can now refer to the 2022-published SBTi guidance for forestry, land use and agriculture (FLAG) as evidence of a certain recognition of the terminology. The new SBTi FLAG guidance allows companies to claim the achievement of their emission reduction targets through 'insetting', albeit without clarifying what the term means, nor a method for measuring and independently validating the legitimacy of any claims. This breaks from the long-held SBTi position that emission reduction targets should only be achieved through delivering actual emission reductions. SBTi explicitly acknowledges that the definition of insetting and its suitability towards emission reduction targets remains uncertain, while still allowing its use (SBTi, 2021c, p. 30 Box 3). This may have damaging consequences for the credibility of climate targets from companies with significant land use emissions, including not only agri-businesses but also retailers and the fashion industry.

Climate Positive pledges are based on the principles of insetting and avoided emissions, neither of which is recognised as a legitimate approach for claiming to offset emissions.

In recent years, a small group of companies have started to use the terminology "Climate Positive" for their climate targets. Those companies define climate positive as a state of reducing more greenhouse gas emissions than the value chain emits. We understand that those companies seek to differentiate this approach from offsetting, but we believe that observers are highly likely to interpret the terminology climate positive to mean that unabated emissions have been neutralised.

Companies' *climate positive* targets typically include a combination of insetting measures and claims of *avoided emissions*. 'Avoided emissions' is defined by the ISO Net Zero Guidelines as "a potential effect on greenhouse gas emissions that occurs outside the boundaries of the organization but arising through the use of its products or services, outside scope 1 emissions, scope 2 emissions and scope 3 emissions" (ISO, 2022b). A key difference here from emission reduction offsets is that there is no case for demonstrating the additionality of these avoided emission claims. For example, a company which sells PV modules to its customers may claim avoided emissions from the customers' use of those PV modules over their expected lifetime. If the sales of these PV systems constitute normal commercial transactions to supply an existing market demand, rather than subsidised interventions from the company, these estimated avoided emissions are in no way additional to what may have occurred had the company not participated in this market. The GHG Protocol already specified in 2004 that any claims of *avoided emission* may not be accounted against scope 1, scope 2 or scope 3 emissions (WBCSD and WRI, 2004). Most recently, the ISO Net Zero Guidelines confirmed this position (ISO, 2022b).

Recognising that neither the concepts of insetting, nor avoided emissions are legitimate approaches for claiming the neutralisation of emissions, we understand that companies using the *climate positive* terminology seek to differentiate this approach from offsetting, by arguing that climate positive does not constitute a neutralisation claim. On the contrary, we believe that observers are very likely to interpret the terminology *climate positive* to mean that unabated emissions have been neutralised and that the company has a net-positive impact on the climate through a net-negative GHG emissions balance.

4.4.5 Are companies ready for a shift to the climate contribution approach?

Offsetting remains the dominant and relatively easy option for companies to wipe away large chunks of their overall climate impacts at low cost and with appealing short-term marketing value. However, acknowledgement of its major limitations in today's climate is on the rise, with court cases highlighting legal risks, a major climate neutral label pulling the plug on their certification, and a recent decision by governments at COP 27 paving the way for greater endorsement of the climate contribution approach. To date, few companies are making climate contributions without neutralisation claims, but despite challenges in its appeal, the tide may be turning.

The findings in our report suggest that many companies only plan to reduce a small share of their full emission footprint, relying instead on offsetting their remaining emissions with contentious carbon credits. Climate neutral, or net-zero, claims backed up by limited actual emission reductions hide the real environmental impact of the company's products and services and risk delaying urgent decarbonisation measures (for more information on the risks associated with offsetting see section 4.2.2). The climate contribution approach provides an alternative route for companies to actively take responsibility for unabated emissions without claiming to neutralise them. This avoids many of the pitfalls associated with offsetting.

There is increased public acknowledgement of the contentious integrity around offsetting claims and over the last year the climate contribution approach has gained some momentum. A growing body of literature and guidance on the approach is emerging (for more information see section 4.3). Still, our analysis does not provide any evidence that the climate contribution model is gaining traction at the company level.

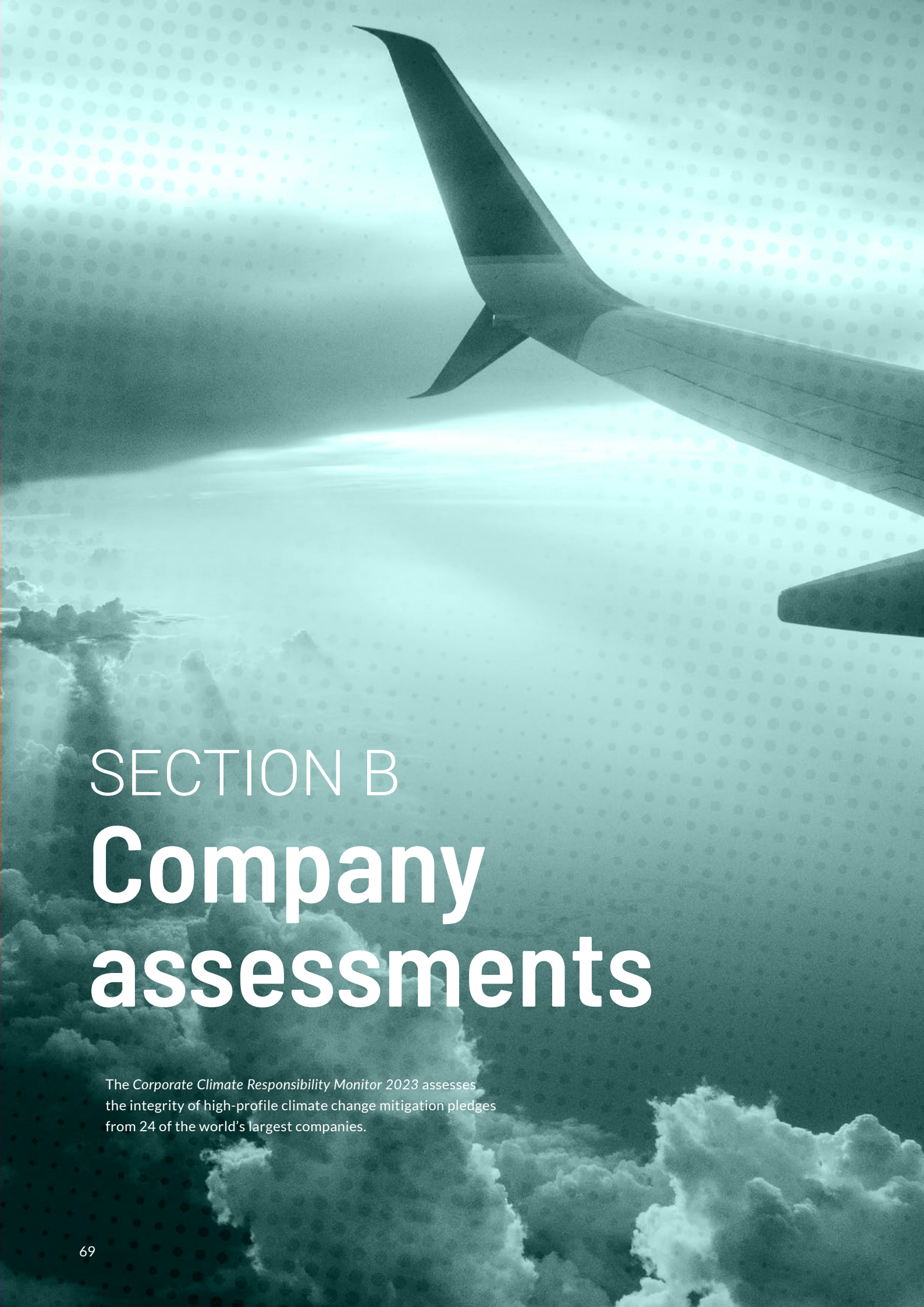
Why is it that the climate contribution approach is still not implemented more broadly by companies despite apparent advantages over offsetting in terms of delivering greater transparency and environmental integrity? Reasons for this implementation gap can be found on both the supply and demand side.

There is currently not enough pressure from consumers, investors, or governments to increase the environmental integrity of neutralisation claims and regulate offsetting claims. Companies are increasingly labelling their products and services as 'carbon neutral' or 'net-zero', to communicate to consumers, investors and even potential regulators that they are not contributing to climate change. Carbon or climate 'neutral' labels are – on the face of it – easy to

understand and give the impression that a brand, product or service has no detrimental impact on the climate, enabling consumer-facing brands to effectively market their product as environmentally friendly. Despite the falsehoods that often underpin this impression, many companies today appear to identify significant marketing value from making these claims, whilst avoiding implementing serious emission reduction measures. This can change if governments (and courts) take steps to more stringently regulate claims or if consumers and investors send a signal that they are not willing to pay a premium for environmental credentials that rely heavily on contentious offsetting practices.

A lack of knowledge and awareness by companies may hinder uptake of the climate contribution approach. The concept of funding climate action in return for carbon credits that allow the holder to offset their own impacts has been used as a tool to raise climate finance for at least three decades. Despite historical challenges in attracting private sector interest in the model, a whole infrastructure of methods, tools and in particular professional interests are vested in offsetting markets, along with an array of recent company showcases. Companies today that are exploring how to take responsibility for their emissions may be unaware about alternatives to offsetting or do not fully understand the associated risks it entails. Since adoption of the climate contribution approach is limited to date, there are fewer established best practice examples to draw from. And service offerings – such as off-the-shelf products, or business advisory providers – that support companies to navigate the switch from offsetting towards climate contributions are in short supply.

However, recent developments suggest that there is movement in the market towards the contribution model. At COP 27, in November 2022, a decision was made to label certain credits as 'mitigation contributions' where they support a country to achieve its national target. Shortly after followed an announcement by the business consultancy, myclimate, that it would no longer offer its 'climate neutral' label because it is not aligned with the Paris Agreement. It will instead offer a new 'climate impact' label to its customers which appears more aligned with the climate contribution approach (myclimate, 2022). To our knowledge, this is the first label of its kind that provides a clear and accessible pathway for companies to implement the climate contribution approach. These are promising steps towards reducing the implementation barriers of the climate contribution model and presents companies, the consultants that advise them, and the wider stakeholders with the opportunity to play a pivotal role in facilitating the transition to the climate contribution model. There are already a few frontrunners implementing the climate contribution approach, such as Gold Standard, Klarna, and DSM which have distanced themselves from offsetting to increase the environmental integrity of their business. More examples like this can serve as an inspiration for other companies to adopt the climate contribution approach.



SECTION B

Company assessments

The *Corporate Climate Responsibility Monitor 2023* assesses the integrity of high-profile climate change mitigation pledges from 24 of the world's largest companies.

This analysis assesses only companies that have committed to high-profile climate change mitigation pledges under one of the main corporate climate action networks and initiatives. The key objective of the analysis is to identify replicable good practice while assessing the integrity of the most influential global corporate actors that are putting themselves forwards as climate leaders and role models for other companies. Scrutiny of their plans is also necessary to identify whether these influential leaders really are setting the right examples, and whether the guidance and frameworks upon which they are making their plans are sufficient.

We assess the top three global companies for each of the eight following sectors, according to their annual revenue in 2021 (Forbes, 2022): Automotive manufacturers; electronics; fashion retail; food and agriculture; information and communication technology; shipping and aviation; steel and cement, supermarket retail. Our analysis excludes state-owned companies due to our perception that fundamental differences in management structures and decision-making structures for climate change strategy may significantly detract from the comparability of these companies' plans, and the insights that we can draw from the company sample.

An overview of the selected companies and our evaluations is presented in Table 18. The 24 companies covered by this monitor account for approximately USD 3.16 trillion of revenue in 2021, approximately 10% of revenue from the world's largest 500 companies (Forbes, 2022). Their total self-reported GHG emission footprints in 2019, including scope 3 emissions, amount to approximately 2.2 $GtCO_2e$. This is equivalent to roughly 4% of global GHG emissions.[2] 10 of the 24 companies selected through the process described above were also assessed in the *2022 Corporate Climate Responsibility Monitor*. The repeat analysis of this small sub-set of companies offers insights into what progress has been made over the past year.

Our company-specific assessments include a rating of the **transparency** and **integrity** of their approaches across the key elements of corporate climate responsibility discussed in section A: **tracking and disclosure of emissions** (section A1), **setting specific and substantiated targets** (section A2), **reducing emissions** (section A3), and **climate contributions and offsetting** (section A4).

Transparency ratings are primarily based upon the extent to which a company publicly discloses the information necessary for an observer to fully understand the integrity of that company's approaches towards the various elements of corporate climate responsibility. **Integrity**, in this context, is a measure of the quality and credibility of those approaches. A full overview of the rating methodology for transparency and integrity of every indicator is presented in the accompanying methodology document, Guidance and assessment criteria for good practice corporate emission reduction and net-zero targets: Version 3.0 (NewClimate Institute, 2023b).

The *Corporate Climate Responsibility Monitor* promotes transparency with the philosophy that consumers, regulators, shareholders, and other observers should be able to follow and assess the integrity of companies' claims. Accordingly, the company assessments in this section are based only on publicly available information that could be identified by the authors. Each rating represents the authors' understanding of the publicly available information. In some cases, company information was scattered across different sources (e.g. annual reports, press releases and statements, webpages, and other marketing materials); it is possible in this process that information may have been misinterpreted, or overlooked. Companies should consider how to present information as transparently as possible, to ensure that observers are able to readily identify all the relevant information necessary to understand their climate strategies.

2 *Some overlap in emission statistics is likely in the cases that one company's scope 3 emissions are included in the scope 1 or 2 emissions of another company in this analysis. We anticipate that any overlap is marginal and of limited significance to the key insights derived from this report. The companies' combined emission footprint may also be higher than this estimate, due to some companies' incomplete emission disclosure. We use 2019 as a base year for analytical purposes, as the most recent year with complete GHG reporting before the COVID-19 pandemic distorted emission trends.*

Table 18: Overview of companies assessed in the Corporate Climate Responsibility Monitor 2023

HIGH INTEGRITY	HEADLINE PLEDGE	TRANSPARENCY	INTEGRITY	PAGE
No companies achieved a high integrity rating				
REASONABLE INTEGRITY	**HEADLINE PLEDGE**	**TRANSPARENCY**	**INTEGRITY**	**PAGE**
Maersk	Net zero by 2040	Reasonable	Reasonable	p. 100
MODERATE INTEGRITY	**HEADLINE PLEDGE**	**TRANSPARENCY**	**INTEGRITY**	**PAGE**
Apple	Carbon neutral by 2030	Reasonable	Moderate	p. 78
Arcelor Mittal	Net zero by 2050	Moderate	Moderate	p. 80
Google	Net zero by 2030	Moderate	Moderate	p. 90
H&M Group	Net zero by 2040	Moderate	Moderate	p. 92
Holcim	Net zero by 2050	Reasonable	Moderate	p. 94
Microsoft	Carbon negative by 2030	Reasonable	Moderate	p. 104
Stellantis	Net-zero carbon by 2038	Moderate	Moderate	p. 112
Thyssenkrupp	Climate neutral by 2050	Moderate	Moderate	p. 114
LOW INTEGRITY	**HEADLINE PLEDGE**	**TRANSPARENCY**	**INTEGRITY**	**PAGE**
Ahold Delhaize	Net zero by 2050	Moderate	Low	p. 72
Amazon	Net-zero carbon by 2040	Low	Low	p. 74
Deutsche Post DHL	Net zero by 2050	Moderate	Low	p. 84
Fast Retailing	2030 emission reduction targets	Moderate	Low	p. 86
Foxconn	Net zero by 2050	Low	Low	p. 88
Inditex	Net zero by 2040	Moderate	Low	p. 96
Mercedes-Benz	Carbon neutral vehicles by 2039	Low	Low	p. 102
Nestlé	Net zero by 2050	Low	Low	p. 106
PepsiCo	Net zero by 2040	Low	Low	p. 108
Volkswagen	Carbon neutral by 2050	Moderate	Low	p. 116
Walmart	Zero emissions by 2040	Moderate	Low	p. 118
VERY LOW INTEGRITY	**HEADLINE PLEDGE**	**TRANSPARENCY**	**INTEGRITY**	**PAGE**
American Airlines	Net zero by 2050	Moderate	Very low	p. 76
Carrefour	Carbon neutral by 2040	Very low	Very low	p. 82
JBS	Net zero by 2040	Very low	Very low	p. 98
Samsung Electronics	Net-zero carbon by 2050	Low	Very low	p. 110

RATINGS **5-point scale** High Reasonable Moderate Low Very low **. See individual company analyses.**
Assessments were made based on public information identified by the authors. A poor rating may not necessarily be an indication that a company's climate strategy is weak, but could also indicate that the information was insufficient to confirm good practice. Ambitious companies can improve their ratings by ensuring that all aspects of their climate responsibility strategies are transparently and accurately disclosed, and in the public domain.

Ahold Delhaize

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Food, beverages & agriculture	USD 79.5 bn (2021)	70.3 $MtCO_2e$ (2021)	Net zero across entire value chain by 2050	Moderate	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

70.3 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: 88% of reported emissions are from purchased goods and services (upstream s3), mainly related to agricultural activities.

Disclosure: Emissions disclosed in full in CDP disclosure, but no s3 breakdown in main reporting. S1 and s2 presented with a breakdown. Market-based s2 used for sum.

Scope 1	1.7
Scope 2	1.7
Scope 3 upstream	63.5
Scope 3 downstream	3.3

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net zero across entire value chain by 2050*		
Short- and medium-term targets (up to 2030)	*- Reduce s1 and s2 by 29% by 2025 and 50% by 2030, compared to 2018* *- Reduce s3 by 37% by 2030, compared to 2020*		
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2019): 33-34% by 2030	Targets translate to ~33% emission reduction by 2030 (2019 baseline). None of the separate s1, s2 and s3 targets are fully aligned with benchmarks.		
Long-term vision (beyond 2030)	*S1 and s2: net zero by 2040. S3: net zero by 2050.*		
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2019): 82% by 2050	Net-zero targets presented with emission reduction targets, translating to ~82% reduction by 2050 (2019 baseline). Close to available benchmarks.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Comprehensive strategy for s1 and s2. S3 strategy includes various measures, but no clear signs of transformative reductions in significant emission sources.		?
Renewable electricity procurement	Very limited amount of information in consumer-facing reporting. RE accounts for just 14% of electricity demand.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Neutralisation claim for certain sold products.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	Ahold Delhaize's brands sell 'climate-neutral' products. Little information about the used offsets.		?
Offsetting plans for the future	About 18% of 2019 emissions to be offset. No information on project types.		

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Ahold Delhaize (2022a, 2022b, 2022c, 2022d) and Albert Heijn (2021).

See **Annex II** for more details on our assessments of companies' targets

Ahold Delhaize

Koninklijke Ahold Delhaize N.V. (hereafter: Ahold Delhaize) is the holding company of various supermarkets, chemists and e-commerce retailers. The company's major emissions are related to purchased goods and services, including agricultural activities, which account for 88% of its emissions footprint. Ahold Delhaize has a net-zero target for 2050, covering all its global activities. Alongside this pledge, the company presents emission reduction targets, which translate to roughly 82% reduction of its estimated 2019 emissions. Ahold Delhaize also commits to roughly 33% emission reductions across the value chain by 2030, compared to estimated 2019 levels. Ahold Delhaize's emission reduction strategy for scope 1 and 2 is extensive, but the company provides limited detail on how it wants to reduce scope 3 emissions.

Ahold Delhaize has a net-zero target for 2040 (scope 1 and 2) and for 2050 (scope 3), accompanied with emission reduction targets for the target years, but does not clarify how it will address remaining 18% of emissions. With the emission reduction targets of 90% (2018 baseline) for scope 1 and 2 and 83% (2020 baseline) for scope 3, Ahold Delhaize clarifies what share of emissions it will reduce to reach its net-zero pledge (Ahold Delhaize, 2022b, pp. 4; 9). The reduction targets translate to reducing the company's 2019 emissions footprint by roughly 82% by 2050. Ahold Delhaize sees the need to use carbon removals for the remaining 18% of emissions but does not provide any details on the projects or carbon removal measures it intends implement (Ahold Delhaize, 2022c). Without information on the planned offsetting strategy, it is not possible to determine whether the approach to offset these emissions will be credible.

Ahold Delhaize describes its emission reduction strategy for scope 3 in broad terms and focuses mainly on scope 1 and 2. Although scope 3 emissions account for about 95% of Ahold Delhaize's emissions footprint, the company mainly focuses on its scope 1 and 2 emissions in its emission reduction strategy. These measures target the main emission sources of the scopes, are presented with quite some detail and are likely to be in line with the 2030 emission reduction target (Ahold Delhaize, 2022c, 2022d, pp. 4–8). Scope 3 emission reductions are presented in broad terms and mainly depend on actions from others: Ahold Delhaize plans to increasingly engage with suppliers and wants to influence consumers' decisions to choose more sustainable products (Ahold Delhaize, 2022c, 2022d, pp. 4–8). Ahold Delhaize does not provide details on the expected emission reductions from these measures and does not strongly commit to them. Moreover, a large share of measures seems to target operations in Europe, while the majority of emissions occurs in the United States.

Ahold Delhaize's climate neutrality claims for its products, including dairy, coffee and bananas, are contentious and potentially misleading. Its Dutch subsidiary Albert Heijn claims that the emissions related to dairy production are compensated by carbon storage in grazing land (Albert Heijn, 2021, p. 31; Ahold Delhaize, 2022a). While carbon storage in grazing lands is a good practice and enhancing it will benefit the climate, claiming this leads to 'climate neutral' dairy products is misleading and inaccurate. The permanence of the carbon storage in grazing lands cannot be guaranteed and grazing lands are not an endless sink. With events such as a change in management practices or extreme weather the carbon is likely to be re-released into the atmosphere within years or decades (see Box 3, Section 4.2.2), and over time, the soil's saturation level is reached and no additional carbon can be stored.

In addition to 'climate neutral' dairy, Albert Heijn sells coffee and bananas branded as climate neutral. Albert Heijn states that the climate impact of its coffee is reduced as much as possible and that residual emissions are compensated with CO_2 credits from forestry and renewable energy projects (Albert Heijn, 2021, p. 27). The emissions footprint of bananas is reduced by 25% and the remaining 75% are offset. We did not find evidence that the offsetting projects are suitable for making a neutralisation claim. One of the major issues related to forestry-based offsetting is the limited permanence (see Box 3 section 4.2.2). Renewable energy projects usually do not represent the high-hanging fruit of mitigation potential and the purchase of offset credits from these projects are unlikely to lead to additional impact (see section 4.4.1).

Ahold Delhaize's reporting on emissions and renewable electricity consumption limits the facilitation of a thorough understanding of recent trends. Ahold Delhaize wants to achieve 100% renewable electricity consumption (Ahold Delhaize, 2022a, p. 60, 2022b, pp. 9–10) and describes the use of PPAs and RECs to claim zero electricity-related emissions (Ahold Delhaize, 2022d, p. 10). The company uses a market-based approach to show a decreasing trend in emissions (Ahold Delhaize, 2022a, p. 58), but the renewable energy constructs do not justify the claim that scope 2 emissions are really zero (see Table 9 Section 3.3.1 in the Methodology). By using the location-based method, which reflects the electricity that is actually consumed by Ahold Delhaize, reductions in 2021 equal 3.3%, compared to 2020 (Ahold Delhaize, 2022a, p. 262).

Amazon

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Technology & Services	USD 469.82 bn (2021)	71.5 $MtCO_2e$ (2021)	Net-zero carbon by 2040	Low	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

71.5 $MtCO_2e$ in 2021

Only financially integrated subsidiaries are covered.

Major emission sources: The majority of Amazon's emission footprint comes from s3 emissions (77%).

Disclosure: Emission disclosure lacks transparency, only market-based emissions are reported and major emission sources in s3 are missing.

Scope 1	12.1
Scope 2	4.1
Scope 3	55.4

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero carbon by 2040*		
Short- and medium-term targets (up to 2030)	*- Sourcing 100% of its used electricity from RE sources by 2025* *- By 2030 50% of Amazon's shipments will be net-zero*		
Scope coverage: S1, S2, S3 Own emission reductions (compared to full value chain in 2019): max. 16% by 2030	Max. emission reduction of 16% (parts s1, s2), but possibly much less: details are lacking, potential use of RECs and offsets to reach targets.		
Long-term vision (beyond 2030)	*Amazon pledges to reach net-zero carbon across its operation by 2040.*		
Scope coverage: ? Own emission reductions (compared to full value chain in 2019): ? by 2050	Unlear scope coverage and if the target refers to CO_2 only, or all GHG emissions. No emission reduction target alongside the net-zero pledge.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Measures with the potential for deep deacrbonisation are implemented for transport and buildings. Coverage and overall impact of those measures is unclear.		
Renewable electricity procurement	Today 85% RE electricty by 2025, target of 100%. Lack of transparency on RE procurement at an aggregated level, potential use of unbundled RECs.		?

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	No information on offsetting claims.		
Climate contributions	Right Now Climate Fund: $100m for biological CDR. Unclear if related to climate contribution or future neutralisation.		
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	Offsetting emissions mainly with forestry-related projects. Unclear to what extent Amazon relies on offsets to reach its target.		

RATINGS

Overall 5-point scale High, Reasonable, Moderate, Low, Very low. Average of sections 1-4.
Sections 1-4 5-point scale High, Reasonable, Moderate, Low, Very low. Average of the criteria in each section.
Rating criteria 3-point scale High, Moderate, Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Amazon (2021a, 2021b, 2021c, 2022a, 2022b).

See **Annex II** for more details on our assessments of companies' targets

Amazon

Amazon.com, Inc. (Amazon) is a major platform for e-commerce and IT services, and retail. Amazon's footprint includes a broad range of emission sources, but the key emission drivers continue to be unclear due to poor granularity of data (Amazon, 2022a, p. 97). Amazon is currently taking proactive steps to test a variety of decarbonisation technologies, especially for renewable electricity and transportation, but medium- and longer-term plans for other emission sources remain unclear (Amazon, 2022a, pp. 20, 22, 24). The company's 'net-zero carbon' by 2040 pledge is unsubstantiated without any explicit reduction target for the company's own emissions, and with a significant role envisaged for offsets. Amazon has made very little progress over the past year to address these significant gaps in their climate strategy.

Key developments over the past year: We could identify only minor changes to Amazon's sustainability strategy since our previous analysis of the case study in the *2022 Corporate Climate Responsibility Monitor* (Day *et al.*, 2022). Accordingly, only minor modifications were made to this case study.

Amazon's 'net-zero carbon' by 2040 pledge currently remains unsubstantiated. Amazon announced its headline target as a co-founder of *The Climate Pledge*, an initiative that mobilises business to commit to 'net-zero carbon' emissions by 2040 (Amazon, 2022a, p. 10). Amazon previously committed to substantiating this 'net-zero' pledge with more detailed emission reduction targets in 2022 (Amazon, 2021b), but this has not yet happened. In the meantime, it is unclear whether the target covers only CO_2 or also other GHG emissions and whether it covers emissions across the full value chain. Amazon has also not yet specified to what extent it will reduce its emissions and what the relative importance of offsets will be, although the company stated that offsets will play a role in achieving its target (Amazon, 2022a, p. 10).

Amazon's pledge is weakened by relying on offset credits from CDR with biological capture and storage. Amazon played a major role in the mobilisation of finance for the *Lowering Emissions by Accelerating Forest finance* (LEAF) Coalition, and since 2019 also through the USD 100 million *Right Now Climate Fund* (Amazon, 2022a, p. 18). Through that fund, Amazon provides financial support for the immediate implementation of 'nature-based solutions' that generate credits, that Amazon may plan to use to achieve its 'net-zero' by 2040 pledge (Amazon, 2021a, pp. 2–5). We interpret that the fund is used towards Amazon's 'neutralisation' claim in the future. Although these two initiatives feature a well-considered plan for the provision of long-term support to higher-quality forestry projects, issues related to permanence and additionality of carbon dioxide removals with biological capture and storage mean that such projects are not appropriate sources of credits to support 'neutralisation' claims (see Box 3 Section 4.2.2).

To reduce its emissions, Amazon continues to proactively test a range of decarbonisation technologies, but the lack of granular data on GHG emission sources does not facilitate a thorough understanding of how sufficient these measures are. Amazon's proactive approach for addressing transport emissions continues to include its agreement with Rivian to roll out 100,000 electric vehicles by 2030, investments made in 2020 to test battery- and hydrogen based trucking technologies for longer distance freight, and Amazon's commitment to decarbonise shipping under the *Cargo Owners for Zero Emission Vessels* initiative (Amazon, 2022a, pp. 16, 17, 24). These measures could significantly reduce transport related emissions from scope 1 and scope 3. Amazon is also demonstrating technologies for energy efficiency on flagship sites and is investing in rooftop solar and on-site storage solutions.

Amazon's efforts to reduce emissions from electricity use appear comprehensive at first, but transparency is lacking. Amazon claims to be the largest corporate procurer of renewable energy in the world; the company claims to have used 85% renewable energy in 2021 and aims to procure 100% renewable energy by 2025 (Amazon, 2022a, p. 20). Amazon also pledges to match the electricity consumption of all active Echo devices with renewable energy procurements (Amazon, 2021c, p. 1). The development of a portfolio of high-quality renewable electricity procurement takes time, and it is commendable if Amazon does not reach for lower-quality constructs in order to immediately claim all its electricity use is renewable today. Parts of Amazon's renewable electricity is derived from high-quality renewable energy procurement options: PPAs with new off-site solar and wind farms, and from on-site rooftop solar procurements (Amazon, 2021c, pp. 2, 3). Nevertheless, despite their higher quality, PPAs cannot guarantee full decarbonisation of electricity supplies. It would be more transparent and constructive for Amazon to report electricity-related emissions with the location-based accounting method in addition to the market-based method used, to ensure full disclosure around the emissions associated with its electricity use (see Table 3-2, Section 3.2.2). Although Amazon publishes the location and capacity of all its renewable energy projects individually (Amazon, 2022b, p. 1pp), the lack of aggregated data on consumed and delivered electricity leads to a lack of overall transparency and makes it difficult to assess the overall situation. Without complete aggregated information it is not clear whether the company also makes use of lower quality renewable energy procurement options in addition to the higher-quality projects that are individually featured. Amazon leaves the door open to the purchase of unbundled RECs from renewable energy projects still under construction to bridge periods where Amazon's PPAs do not develop fast enough to meet its claim of 100% renewable electricity consumption procurements (Amazon, 2021c, p. 22). Depending on the extent to which this construct is relied upon, this could considerably undermine the integrity of Amazon's renewable energy claims.

Amazon continues to provide much less detail on how it plans to decarbonise downstream scope 3 emissions. Although several measures are being put in place to reduce material use, improve recycling and extend the lifetime of Amazon branded products, the limited breakdown of scope 3 emissions in its reporting makes it difficult to assess the significance and sufficiency of those measures, as well as the gaps that remain. We did not identify any significant additional information on this issue since our assessment in 2021.

American Airlines

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Transport and logistics	USD 29.9 bn (2021)	42.0 $MtCO_2e$ (2021)	Net-zero GHG emissions by 2050	Moderate	Very low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

42.0 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Jet fuel accounts for 99% of s1 and 30% of upstream s3 emissions.

Disclosure: Various non-GHG emissions disclosed but not contrail cirrus, which is the most relevant non-GHG forcer from aviation. Comprehensive reporting of GHGs across s1, s2 and upstream s3.

TRANSPARENCY & INTEGRITY

Scope 1	28.8
Scope 2	0.3
Scope 3 upstream	12.5
Scope 3 downstream	0.4

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero GHG emissions by 2050*		
Short- and medium-term targets (up to 2030)	*Source 2.5 mn GJ of RE by 2025; achieve absolute reduction of 50 million gallons of jet fuel from fuel-efficiency initiatives; and use 10% SAF by 2030.*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2030 — No intensity or absolute reduction commitments for 2030. The SAF target is at the very minimum of what sectoral benchmarks require.		
Long-term vision (beyond 2030)	*Reduce the intensity of jet fuel by 45% and s2 emissions by 40% by 2035 compared to 2019; and net-zero GHG emissions by 2050.*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2050 — Targets cover jet fuel but exclude various s3 emission sources. They do not meet 1.5°C-aligned sectoral benchmarks.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Measures to improve efficiency of aircraft and ground handling; investments in SAF. No commitment to phase out carbon-intensive activities or decreasing demand for aviation.		
Renewable electricity procurement	40% of purchased electricity is labelled as 'renewable'; American Airlines purchases unbundled RECs to make this claim.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	American airlines offers its customers the option of 'offsetting' the emissions associated with their flight.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	Projects supported do not represent high-hanging fruit projects and removal projects do not permanently store carbon.		
Offsetting plans for the future	American Airlines expects it will need to rely on carbon offsets to 'neutralise' residual emissions; no further information identified.		?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from American Airlines (2021, 2022a, 2022b, 2022c).

See **Annex II** for more details on our assessments of companies' targets

American Airlines

American Airlines Group Inc. (American Airlines) is the world's largest airline in terms of revenue and is headquartered in Texas. Most of its GHG emissions stem from the production and use of jet fuel (about 85%). The company has not committed to any emission reduction target in the next decade. Its net-zero pledge does not include a commitment to reduce *own* emissions. The airline foresees an important role for alternative aviation fuels, but the availability and sustainability of these are uncertain.

American Airlines' offsetting programme has the potential to mislead customers. The company offers its customers the possibility of 'offsetting' the emissions associated with their flight, stating that offsetting reduces 'the impact of air travel on the environment' (American Airlines, 2022c). American Airlines purchases carbon offset credits from three programmes: protecting and restoring forests in Mexico, peat swamps in Indonesia, and building improved cookstoves in Honduras. None of these projects can be considered unequivocally additional in the context of the Paris Agreement, which requires all countries to set ambitious reduction targets and global emissions to move to net zero (see Methodology section 4). Although it is important to scale up financial support for protecting forests and peat lands, the non-permanence of the carbon storage in these measures means that they are not a credible equivalent to emission reductions and do not lead to the CO_2 emissions from flights being 'offset', let alone the complete climate impact from aviation.

American Airlines has not yet presented a reduction target for 2030 and its target for the use of sustainable aviation fuels for that year falls short of what sectoral benchmarks show is necessary. To stand a reasonable chance of limiting global warming to 1.5°C, CO_2 emissions need to be halved between 2019 and 2030 (IPCC, 2022, p. 21) and various studies indicate that the aviation sector should reduce its emissions by at least 20% by 2030 (IEA, 2021b, p. 199; CAT, 2022). American Airlines has not set any emission reduction targets for 2030 or earlier, but committed to use 10% sustainable aviation fuel (SAF) by 2030, to source 2.5 million GJ of renewable energy by 2025, and to achieve absolute reductions of 50 million gallons of jet fuel from fuel-efficiency initiatives by 2025 (American Airlines, 2022a, p. 7). While the SAF target meets some sectoral benchmarks, it falls short on others. Teske (2022, p. 212) and the UNFCCC (UNFCCC, 2021, p. 12) show that SAF must reach a 9-10% share by 2030, but Boehm *et al.* (2022, p. 7) and the IEA (IEA, 2021b, p. 138) found that shares of 13-18% are necessary.

American Airlines has committed to reduce 'well-to-wake' GHG emissions associated with jet fuel by 45% per revenue tonne kilometre (RTK) by 2035, compared to 2019. Although SBTI verified this target as 'below 2°C compatible', the target does not meet the Transition Pathway Initiative's aviation benchmarks aligned with global warming of 1.5°C or below 2°C (TPI, 2022a). The target covers jet fuel but leaves out other emission sources and also does not include non-GHG climate forcers from flying, which account for about two thirds of aviation's climate impact (Lee *et al.*, 2021).

American Airlines net-zero pledge neither entails a clear commitment to reduce own GHG emissions nor does it explicitly cover non-GHG climate forcers from aviation. The airline expects its emissions from burning jet fuel and fuel production to double between 2019 and 2050 in a business-as-usual scenario (American Airlines, 2022a, p. 11). Eighty-five per cent of these expected emissions – or about 70% of 2019 levels - may be reduced through technological and operational improvements, as well as sustainable aviation fuels. The remaining 15% of projected business-as-usual emissions may be 'offset' to claim 'net-zero' (American Airlines, 2022a, p. 11). However, the airline does not make a clear *commitment* to these projected emission reductions. Sectoral benchmarks indicate that a 1.5°C compatible pathway would require the aviation sector to reduce GHG emissions by 80-94% by 2050 and address the non-GHG climate forcing impact from aviation (IEA, 2021b, p. 199; CAT, 2022a; Teske, 2022, p. 216).

American Airlines plans to scale up its use of sustainable aviation fuels (SAF) but these may have negative sustainability implications. SAFs are a critical measure in reducing emissions from aviation (Boehm *et al.*, 2022, p. 91; Jaramillo *et al.*, 2022, p. 60). American Airlines currently uses 0.05% SAF but commits to increase this to 10% by 2030 (American Airlines, 2022a, p. 7, 2022b). The company has partnered with the fuel company Aemetis, which uses wood and vegetable oils to produce SAF (American Airlines, 2021). While it is commendable that American Airlines invests in alternatives to standard jet fuel, reliance on bio-based SAFs will very likely contribute – directly or indirectly to problems such as deforestation and destruction of natural habitats (Pavlenko and Searle, 2021, p. 15; P. Jaramillo *et al.*, 2022, pp. 60–61). Further, it is likely that scaling up the production of SAFs made from cooking oil or other waste oils leads to an increase of emissions in those sectors that currently use those waste oils (Pavlenko and Searle, 2021, p. 15). We could not identify evidence that American Airlines invests in the development of synthetic SAF, which requires less water and land resources than bio-based fuels and have a larger abatement potential but are still in the early development stage (Jaramillo *et al.*, 2022, p. 61).

While American Airlines presents a range of decarbonisation measures, it does not address the elephant in the room and the only currently available measure for deep decarbonisation: managing demand for aviation. In addition to its plans to scale up the use of SAFs, the company outlines various other measures, including fleet renewal and operational efficiency (American Airlines, 2022a, pp. 11–18). However, in the absence of new technologies that can be rolled out at scale without negative sustainability implications, the aviation sector can only reach deep levels of decarbonisation through a reduction in activity levels, meaning fewer flights (CAT, 2022a; Graver *et al.*, 2022). We did not identify any clear plans or commitment to phase out all carbon-intensive infrastructure. Accordingly, it is unclear how American Airlines could achieve the deep decarbonisation that its net-zero target implies.

Airlines could support a transition to alternative transport modes, such as rail. It is counterproductive for decarbonisation of the transport sector to lobby against the implementation of taxes and levies. According to InfluenceMap, American Airlines has a mixed track record on climate lobbying (InfluenceMap, 2022a). While the company seems to support federal- and state-level legislation promoting the uptake of SAF, American Airlines also states to 'continue to advocate for [the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)] as the single global approach to addressing emissions from international aviation' (American Airlines, 2022a, p. 22). CORSIA is the key instrument to achieve 'carbon neutral growth' in international aviation from 2020, but it is extremely unlikely to do so. The scheme will likely cover less than 50% of international aviation emissions between now and 2035 and the carbon offset credits it allows are unlikely to lead to real emission reductions elsewhere (CAT, 2022a).

Apple

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Technology - Electronics	USD 365.8 bn (2021)	24.2 $MtCO_2e$ (2021)	Carbon neutral by 2030	Reasonable	Moderate

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

24.2 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Purchase of goods for manufacturing (67%) and emissions from the use of sold products (21%).

Disclosure: Detailed disclosure. The lower market-based estimate for scope 2 emissions is used for aggregation.

Scope 1	0.1
Scope 2	1.0
Scope 3 upstream	16.9
Scope 3 downstream	6.2

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Carbon neutral by 2030*		
Short- and medium-term targets (up to 2030)	*Carbon neutral by 2030*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	63% by 2030 — Full coverage of life-cycle emissions. 75% reduction by 2030 relative to 2015. Aligned with benchmarks for 1.5°C warming. No short-term target.		
Long-term vision (beyond 2030)	*No long-term vision for emission reductions beyond 2030.*		
Scope coverage	N/A		
Own emission reductions (compared to full value chain in 2019)	? by 2050 — No long-term vision communicated.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Detailed information on measures covering all major emission sources, including transition of supply chain to renewable electricity and measures to extend product lifetimes.		
Renewable electricity procurement	Detailed information. 100% of electricity consumption is renewable, mostly supplied through high-quality PPAs. Investments in on-site installations with storage.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Carbon neutrality claim for <1% of emissions.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	Carbon neutrality claim for s1, s2, employee commute, and business travel. Offset credits from nature-based carbon removals.		
Offsetting plans for the future	Plan to offset 37% of 2019 emissions by 2030 with nature-based carbon removals.		

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Apple (2020, 2022a, 2022b, 2022c).

See **Annex II** for more details on our assessments of companies' targets

Apple

Apple Inc. (Apple) is a US-based multinational corporation that specialises in consumer electronics, software, and online services. Most of its emissions stem from the energy used to manufacture products (67%), followed by energy-related emissions from product use (21%). The company's climate strategy focuses on achieving carbon neutrality by 2030, including the reduction of 63% of its 2019 emissions footprint, with the rest to be offset. Apple implements reasonably comprehensive emission reduction measures that chart a trajectory for deep decarbonisation in the medium term. However, its current and planned carbon neutrality claims are potentially misleading exaggerations of this trajectory, and there is no clear vision for going beyond the 63% reduction by 2030.

Key developments over the past year: We identified no significant changes to Apple's climate strategy since the previous iteration of this analysis was published in February 2022.

Apple commits to achieve carbon neutrality by 2030, including reducing 63% of its 2019 emissions footprint and offsetting the rest; the company does not commit to further emission reductions beyond 2030. In 2020, Apple announced its *2030 Climate Roadmap* with the aim to achieve carbon neutrality by 2030 (Apple, 2020). The goal includes a commitment to reduce 75% of the company's emissions footprint in 2015 and offset the remaining 25% (Apple, 2022a, p. 12). The 75% emission reduction goal equates to a reduction of 63% of Apple's 2019 emissions footprint, a target approved by SBTi as '1.5°C compatible' (SBTi, 2023a). Although a 63% emission reduction by 2030 represents a steep decarbonisation pathway, it does not represent the degree of decarbonisation that the 'carbon neutral' terminology implies. Apple also does not commit to reductions beyond 2030, even though a continuation of the pledged pathway would put the company on track for significantly deeper decarbonisation by 2035 or 2040. Setting a deep decarbonisation target for 2035 or 2040 might provide a more transparent representation of Apple's ambition and prospects than a carbon neutrality target by 2030.

Apple's offsetting policy could be misleading, as the company currently makes a carbon neutrality claim that covers less than 1% of its emissions footprint in 2021, while relying on nature-based carbon removals for current and future claims. Apple's headline on its environmental website reads: 'We've been carbon neutral since 2020. By 2030, all our products will be too' (Apple, 2022c). Apple's 'carbon neutral' claim today may be misleading, as it only covers offices, retail stores, data centres, employee commuting, and business travel, which together cover less than 1% of the company's emissions footprint in 2021 (Apple, 2022a, p. 15). The carbon neutrality claim is based on the procurement of carbon offset credits from biological carbon dioxide removals in Colombia and Kenya (Apple, 2022a, p. 30). In 2021, the credits amounted to 167,000 tonnes used to offset corporate operations, and Apple procured an additional 500,000 tonnes to offset the increase in scope 3 emissions from 2020 to 2021 (Apple, 2022a, pp. 30, 84). For its 2030 carbon neutrality target, Apple created the Restore Fund to invest USD 200 million in similar projects, aiming to remove 1 $MtCO_2$ each year (Apple, 2022a, p. 29). Due to the scarcity and limited permanence of nature-based carbon removals, the climate impact of Apple's current and planned support for these measures is not equivalent to the reduction of the company's own emissions. The integrity of Apple's approach would be stronger if the company provided support for these projects as climate contributions, without claiming that its investments 'neutralise' the impact of its emissions.

Apple's emission reduction plans are reasonably comprehensive and target the company's main emissions sources. Apple created the *Supplier Clean Energy Programme* to address emissions from product manufacturing by transitioning the whole manufacturing supply chain to renewable electricity by 2030 (Apple, 2022a, p. 24). The programme trains suppliers, helps them find renewable electricity solutions, and directly invests in renewable electricity projects for suppliers (Apple, 2022a, pp. 24–26) (see Box 2). Other emission reduction measures in product manufacturing include the use of recycled materials (Apple, 2022a, p. 17), innovative aluminium smelting technologies (Apple, 2022a, p. 28), and R&D of lower-emissions integrated circuits (Apple, 2022a, p. 16). Emissions from product use are being tackled through improvements in energy efficiency (Apple, 2022a, p. 18), while the company aims to reduce emissions from product waste through improved designs that allow for higher repairability and extended lifespans (Apple, 2022a, pp. 44–48). The implemented measures have reduced Apple's emissions intensity by unit of revenue by 11% on a yearly average since 2018, although absolute emissions have plateaued due to a significant increase in revenue in 2021.

Apple claims to use 100% renewable electricity since 2018 and discloses information on its high-quality renewable electricity construct, but it could improve the transparency of its energy-related emissions accounting. Apple claims that its facilities use 100% renewable electricity and discloses details on how this electricity is sourced, including location of projects, technologies used, capacities, and supply constructs (Apple, 2022a, pp. 89–99). Ninety percent of renewable electricity comes from 'Apple-created' renewable projects: 9% from directly owned projects, for which the company is also investing in electricity storage; 2.7% from projects in which it owns equity and matches energy generation with use; and 78.3% from local and newly installed PPAs (Apple, 2022a, p. 22). The remaining 10% is procured through utility green energy programs, colocation facility vendors, and RECs, for which Apple applies the same quality standards as for its 'Apple-created' projects. The company also supports community-based renewable electricity projects under the Power for Impact programme, but it is unclear how Apple and other local actors claim the environmental attributes of these projects (Apple, 2022a, p. 27). Regarding indirect energy-related emissions (scope 2), Apple reports both market- and location-based estimates (Apple, 2022a, p. 109) but only uses the lower market-based value when estimating its total emissions footprint (Apple, 2022a, p. 84). In this case, it would be more ambitious to use the location-based method, which shows that there is still room for energy efficiency improvements to reduce the climate impact of Apple's electricity use.

ArcelorMittal

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Steel and cement	USD 76.6 bn (2021)	166.2 $MtCO_2e$ (2021)	Net-zero by 2050	Moderate	Moderate

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

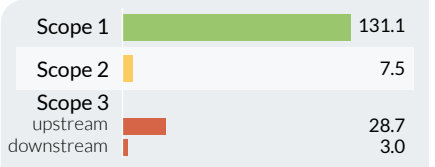
166.2 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Emissions from steelmaking processes (s1) account for over 80% of reported emissions.

Disclosure: S1&2 emissions are broken down to emissions from mining and steelmaking. Potentially significant share of s3 emissions is not reported on.

TRANSPARENCY & INTEGRITY



2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero by 2050*		
Short- and medium-term targets (up to 2030)	*Global: reduce emissions intensity by 25% below 2018 levels in 2030 (eq. 1.54 tCO_2/tsteel)* *Europe: reduce emissions intensity by 35% below 2018 levels in 2030 (eq. 1.11 tCO_2/tsteel)*	●	◐
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2019): ? by 2030	Supporting measures indicate alignment with some 1.5°C aligned sectoral benchmarks, although benchmarks are not directly comparable.		
Long-term vision (beyond 2030)	*Net-zero by 2050*	◌	◌
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2019): ? by 2050	We interpret that the target covers s1 and s2 emissions. Company does not explicitly commit to own emissions reduction target by 2050.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Measures cover s1 and s2, and include the use of different potential low-carbon technologies without specifying the technology split in 2030.	◐	◐
Renewable electricity procurement	Renewable energy procurement constructs not disclosed.	◌	?

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	No information on contributions or offsetting claims.	◌	◌
Climate contributions	*No climate contributions identified.*	N/A	◌
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	Plans to offset less than 5% of 2018 s1 and s2 emissions with 'high-additionality' credits, to achieve 2050 target.	◐	◐

RATINGS

Overall 5-point scale ● High ◕ Reasonable ◐ Moderate ◔ Low ◌ Very low. Average of sections 1-4.
Sections 1-4 5-point scale ● High ◕ Reasonable ◐ Moderate ◔ Low ◌ Very low. Average of the criteria in each section.
Rating criteria 3-point scale ● High ◐ Moderate ◌ Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from ArcelorMittal (2021, 2022a, 2022b).

See **Annex II** for more details on our assessments of companies' targets

ArcelorMittal

ArcelorMittal, headquartered in Luxembourg, was the world's second biggest steelmaker by volume of crude steel production in 2021. Over 80% of its reported emissions are related to the steelmaking process, which includes emissions from mining. ArcelorMittal has pledged to reach net-zero emissions by 2050. To achieve its goal, the company has set out a decarbonisation roadmap including concrete measures but has not committed to zero or near-zero emissions steelmaking.

Although ArcelorMittal estimates it will offset not more than 5% of its emissions, its 2050 net-zero target remains ambiguous without a clear commitment to reduce its own emissions. In its *Net Zero Roadmap*, ArcelorMittal presents its net-zero target for 2050, complemented with interim targets for 2030. All targets cover scope 1 and 2 emissions, which together represent almost 90% of the total value chain emissions reported by the company in 2019 (ArcelorMittal, 2021b, pp. 58–63). As part of its plan to achieve net zero, ArcelorMittal stated it will offset residual emissions through the purchase of high-quality carbon credits, and currently estimates that these residual emissions will not represent more than 5% of its operational emissions (ArcelorMittal, 2021a, p. 12). Although ArcelorMittal estimates that this volume of residual emissions in 2050 will be relatively small, it does not explicitly commit to a specific level of emission reductions. We were unable to find more details on what types of credits will be used regarding the activities generating the credits, the purchase price, and the date when ArcelorMittal plans to start purchasing credits to claim emission reductions.

It remains unclear whether ArcelorMittal's 2030 target requires action beyond Europe. The company has a global target of reducing emission intensity by 25% below 2018 levels by 2030. This target translates to a company-wide emissions intensity of 1.54 tCO_2e/ tonne steel (ArcelorMittal, 2021a), which falls short of existing 1.5°C compatible benchmarks for the steel sector (1.13 to 1.35 tCO_2e/tonne steel) (CAT, 2020b; Boehm *et al.*, 2021; Boehm *et al.*, 2022; Dietz, Gardiner, and Scheer, 2022). However, a direct comparison of company targets to sectoral benchmarks is not possible without further information about reporting boundaries. ArcelorMittal's target also includes emissions from mining, which hinders a direct comparison with available benchmarks. Meanwhile, its European target of 35% intensity reduction would lead to an emission intensity of 1.11 tCO_2e/tonne. ArcelorMittal's European operations represent the majority of the company's crude steel production (53%), so it is possible that lowering the carbon intensity of steel production in line with their European target would bring the company's global average intensity close to their global target without action outside of Europe. This could compromise the company's plans to reach net zero globally by 2050, as most of its climate action over the medium-term may be focused on one specific region.

ArcelorMittal presents two main decarbonisation pathways, but it does not set a clear plan to completely phase out its emission-intensive infrastructure. As part of its *Net Zero Roadmap*, ArcelorMittal plans to develop several Direct Reduced Iron -Electric Arc Furnace (DRI-EAF) facilities. DRI-EAF is currently the most promising technology for deep emission reductions in primary steel production towards 2050; it can use natural gas or hydrogen. The company also plans to support the increase of green hydrogen production both through its own assets and in the European market. These plans include collaborations with actors in Germany that would enable green hydrogen supply to some of their plants (ArcelorMittal, 2021a). At the same time, ArcelorMittal also plans to adapt its existing Blast Furnace-Basic Oxygen Furnace facilities to use bioenergy with carbon capture, utilization, or storage (CCU/S). Both technologies are expected to play a role in decarbonising the steel sector over the short- to medium-term (de Villafranca *et al.*, 2022). While the DRI-EAF pathway can lead to scalable, low-risk zero emissions steel when powered by renewables and green hydrogen, the use of bioenergy and CCUS presents several potential challenges that limit its actual emission reductions (de Villafranca *et al.*, 2022), including the scalability of sustainably sourced biomass, and the effectiveness of carbon capture mechanisms, among others.

ArcelorMittal is not clear about its plans for renewable electricity. As part of its *Net Zero Roadmap*, the company acknowledges that a switch to DRI-EAF will substantially increase its power needs, and states that it plans to focus on sourcing renewable electricity through PPAs and RECs to address this (ArcelorMittal, 2021a). However, ArcelorMittal does not provide any details on what specific types of constructs will be used, and how much of their energy will come from renewables and/or be self-generated. More details on the procurement constructs that ArcelorMittal plans to rely on are needed to better understand the potential climate impact of its renewable electricity strategy.

Carrefour

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Retail (consumables)	USD 87.8 bn (2021)	136.3 $MtCO_2e$ (2021)	Carbon neutrality by 2040	Very low	Very low

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

136.3 $MtCO_2e$ in 2021

Subsidiaries are not covered.

Major emission sources: Upstream emissions for products and packaging (72%), mostly from agriculture. Downstream use of non-food products (23%).

Disclosure: 99% of s3 emissions are excluded from public reports. Reported values include only 'integrated' stores that account for less than 20% of Carrefour stores.

Scope 1	0.8
Scope 2	1.0
Scope 3 upstream	113.4
Scope 3 downstream	21.0

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Carbon neutrality by 2040*		
Short- and medium-term targets (up to 2030)	*- 50% reduction of s1 & 2 emissions by 2030 compared to 2019.* *- 29% reduction of s3 emissions by 2030 compared to 2019.*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	est. 6-15% by 2030		
Most Carrefour locations appear to be excluded from the targets; we interpret these targets only apply to 20-50% of Carrefour output.			
Long-term vision (beyond 2030)	*Carbon neutrality by 2040*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	less than 1% by 2050		
Target includes a commitment to 70% reduction of only s1 and s2 emissions, and only in selected locations.			

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Plans address key emission sources but are limited in geographical coverage and lacking concrete commitments.		
Renewable electricity procurement	Limited use of RE currently. Organisation-wide data could not be identified. Geographical coverage of the 2030 target is unclear.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	No information on contributions or offsetting claims.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	No details are provided although the 70% target alongside the carbon neutrality pledge implies a significant role for offsets.		?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Carrefour (2022a, 2022b, 2022c).

See **Annex II** for more details on our assessments of companies' targets

Carrefour

Carrefour S.A. – headquartered in France – is a major global retailer, with around 14,000 convenience stores and supermarkets in over 40 countries. Its supply chain for products and packaging constitutes the major emission source, mostly from agriculture. Carrefour's public reporting of its climate impact and pledges contains significant transparency deficiencies: public GHG emission reporting continues to exclude 98% of the company's emission footprint, and the company's targets and measures appear to exclude more than 80% of Carrefour locations. Due to these scope exclusions and unexplained neutralisation plans, we interpret that Carrefour's 2040 carbon neutrality target entails a commitment to the reduction of less than 1% of its emissions.

Key developments over the past year: We identified no significant changes to Carrefour's climate strategy since the previous iteration of this analysis was published in February 2022. In 2022, the company set out an improved portfolio of emission reduction measures that address key supply chain issues, but concrete commitments remain ambiguous. Carrefour has not provided clarity on the scope exclusions and uncertain neutralisation plans that undermine the company's targets.

Carrefour's carbon neutral by 2040 target entails a commitment to eliminate less than 1% of the company's emission footprint. Carrefour announced a new carbon neutrality target for 2040 on the eve of COP26 in October 2021, accompanied by the more specific target to reduce its scope 1 and 2 emissions by 70% by 2040, compared to 2019 (Carrefour, 2022a, p. 3). This is a direct update of its existing SBTi approved 55% reduction by 2040 target. The significance of these targets is highly limited, since scope 1 and 2 emissions account for less than 2% of Carrefour's emissions. Carrefour's separate interim target of 29% emission reductions from scope 3 emissions by 2030 is a far more significant target, given that scope 3 emissions account for 98% of the company's footprint, but these emissions are not covered by the 2040 carbon neutrality target. Moreover, Carrefour's targets exclude the majority of Carrefour locations, which are explicitly excluded from the company's GHG reporting in its most recent annual reports (Carrefour, 2022c, p. 163).

The continued inconsistent disclosure of GHG emissions does not facilitate a good understanding of the company's emissions. As with the targets set, Carrefour's disclosure of emissions in its *2020 Annual Report* and the *2021 Annual Financial Report* includes only a small subset of the company's emission sources and locations: emissions are reported for the company's 'integrated' stores only: this includes less than 11% of Carrefour's 5,799 stores in France, and less than 20% of its 13,894 stores worldwide. Other administrative buildings, warehouses, and supply chain emissions associated with over 80% of Carrefour stores worldwide are excluded (Carrefour, 2022c, p. 163). In addition to these exclusions, Carrefour's reporting of its scope 3 emissions has the potential to be highly misleading. Although Carrefour acknowledges that scope 3 emissions account for 98% of the company's emissions (Carrefour, 2022c, p. 74), and breaks these emissions down with reasonable detail in its CDP responses, the company's main public documentation discloses less than 1% of these scope 3 emissions (Carrefour, 2022c, p. 159). Accordingly, Carrefour reports total company emissions of 1.79 $MtCO_2e$ in its *2021 Annual Financial Report*, although full value chain emissions reported to CDP amount to 136 $MtCO_2e$ (Carrefour, 2022b).

Carrefour's emission reduction plan discusses key emission sources throughout the supply chain, but commitments are highly limited in their scope or remain ambiguous. Although Carrefour does not assume responsibility for scope 3 emissions in its GHG emission reporting or its headline carbon neutrality target, the company does have a separate target to reduce these emissions by 29% by 2030 (Carrefour, 2022a, p. 3). Its *2021 Annual Finance Report* includes a more detailed portfolio of emission reduction measures to achieve this, compared to the *2020 Annual Report*. The significance of these measures is limited by the fact that – like the company's emission disclosure and targets – these measures are limited to only its integrated stores in selected countries. Carrefour's strategy to reduce food waste by 50% by 2025 compared to 2016 is substantiated by specific actions for its stores as well as measures to engage consumers. The company also set out a package of measures to transition to less emission intensive products, including measures to engage suppliers in Carrefour's *Food Transition Pact*, and measures to increase consumer awareness on lower-carbon product alternatives. These measures represent a step in the right direction for the food and agriculture industry, although they are not complemented by a clear vision for how far that transition should go beyond 2030. While Carrefour sets out individual plans for avoiding deforestation for seven key agricultural products, its 'Zero Deforestation' policy falls short of a commitment to completely eliminate deforestation, as it rather sets targets for all materials to be 'covered by a risk reduction plan' for deforestation by 2025 (Carrefour, 2022a, p. 3). More stringent targets related to deforestation, as well as issues such an organic agriculture, are applied only to selected product lines (Carrefour, 2022c, p. 61).

Carrefour does not yet procure a significant volume of renewable energy but plans for 100% renewable electricity use by 2030, from higher quality sources. Since 2020, Carrefour started to install solar PV on selected stores, supplying a small but undisclosed proportion of the company's electricity demand in France (Carrefour, 2022c, p. 78). On the longer term, Carrefour plans to establish Power Purchase Agreements (PPAs) and to install more renewable energy capacity on its own sites, achieving 100% renewable electricity by 2030 (Carrefour, 2022c, p. 78). It is commendable that Carrefour plans to implement their renewable electricity target with higher quality constructs, but the company is a laggard regarding its lack of action on renewable energy to date, and could be more transparent about the barriers it faces to achieve this transition earlier than 2030.

Carrefour's plans for offsetting emissions and taking responsibility for unabated emissions remain unclear. Carrefour does not currently procure carbon offsets to offset its own emissions. It may, however, intend to do so for its carbon neutrality by 2040 pledge, which was accompanied by a 70% emission reduction target for the same year, but with no further details regarding the remaining emissions (Carrefour, 2022a, p. 3). Carrefour also does not take responsibility for unabated emissions through making a climate contribution.

Deutsche Post DHL

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Transport and logistics	USD 96.6 bn (2021)	45.7 $MtCO_2e$ (2021)	Reduce all logistics-related emissions to net zero by 2050	Moderate	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

45.7 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Emissions from subcontractors (upstream transportation and distribution) account for 66% of reported emissions; scope 1 emissions for 16%.

Disclosure: Aggregate reporting excludes non-logistics-related emissions (14% of total reported emissions); full climate impact of aviation is not disclosed.

Scope 1	7.3
Scope 2	0.8
Scope 3 upstream	37.6
Scope 3 downstream	?

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	***Reduce all logistics-related emissions to net zero by 2050***		
Short- and medium-term targets (up to 2030)	***Reduce s1 and s2 by 42% and selected s3 emissions by 25% by 2030, compared to 2021.***		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	12% by 2030 — Emissions increased substantially since 2019, targets translate to a redcution of just 12% compared to 2019 emissions.		
Long-term vision (beyond 2030)	***Net-zero logistics-related emissions by 2050***		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2050 — No clear emission reduction commitment. Non-logistics emissions excluded from the target.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Measures cover all emission sources. They include investments in innovative solutions for electric vehicles and low- and zero-carbon fuels.		
Renewable electricity procurement	86% of electricity consumption comes from renewable sources, but RECs account for over 95% of RE consumption.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Offsetting claim at product level.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	'Climate neutral delivery' through offsetting (low volume of medium-quality offsets) and 'insetting' (reductions in the value chain).		
Offsetting plans for the future	Emissions will be 'fully compensated by recognized countermeasures (without offsetting)' but no explanation as to what this means.		

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Deutsche Post DHL (2019, 2021, 2022a, 2022b, 2022c, 2022d, 2022e, 2022f, 2022g, 2022h, 2022i).

See **Annex II** for more details on our assessments of companies' targets

Deutsche Post DHL

Deutsche Post DHL Group (hereafter: Deutsche Post DHL) is the world's largest logistics provider. Its GHG emissions stem mostly from its own and subcontracted transport (scope 1 and upstream scope 3). Deutsche Post DHL commit to net-zero logistics-related GHG emissions by 2050 and implements a range of measures to decarbonise its business model. However, it remains unclear whether its net zero pledge is a commitment to deep decarbonisation and the company's 2030 targets fall short of the required emission reductions in the transport and logistics sector.

Key developments over the past year: We identified some positive developments to Deutsche Post DHL's climate strategy since the previous iteration of this analysis was published in February 2022. The logistics provider improved the transparency of its emissions disclosure, although there still is room for improvement. Deutsche Post DHL also clarified that its net-zero target covers logistics-related emissions, but it remains unclear whether this target represents a commitment to deep decarbonisation.

Deutsche Post DHL does not comprehensively disclose all GHG emissions and other climate impacts from its business activities. The logistics provider prominently reports that its 2021 emissions amounted to 39 $MtCO_2e$ in 2021 but this number excludes at least 5.8 $MtCO_2e$ of upstream and downstream scope 3 emissions (Deutsche Post DHL, 2022a, 2022c). Deutsche Post DHL reports on emissions from purchased goods and services, capital goods, and employee commuting in its annual ESG Statbook, but leaves out these emission sources from the aggregate emissions totals in the Statbook and its annual sustainability report (Deutsche Post DHL, 2022c, 2022a). The company does not disclose other scope 3 emission sources, including waste and investments, at all. Seventy per cent of Deutsche Post DHL's logistics-related emissions come from air freight, while road transport accounts for 22% (Deutsche Post DHL, 2022c). The company discloses SOx, NOx and particulate matter emissions but does not report on the full climate impact of its aviation activities, including the radiative forcing impact of contrail cirrus. Deutsche Post DHL could provide a more comprehensive indication of its climate footprint by including the non-GHG climate-forcers from aviation in its annual reporting, since those are responsible for about two thirds of aviation's climate impact (Lee *et al.*, 2021).

It is unclear whether Deutsche Post DHL's net zero target is a commitment to deep decarbonisation of logistic activities. The logistics provider aims to reduce its logistics-related emissions (87% of all emissions disclosed in 2019) to the 'unavoidable minimum' (Deutsche Post DHL, 2022a, p. 18). Deutsche Post DHL could enhance transparency by indicating the order of magnitude for residual emissions that cannot be 'avoided' and what measures the company will take to 'fully compensate' these. Sectoral benchmarks for air freight show reductions of at least 80% by 2050, while road transport and ocean freight needs reduce emissions by over 90% (IEA, 2021b, p. 199; Smith *et al.*, 2021, p. 106; CAT, 2022a, 2022b; SBTi, 2022e, p. 11; Teske *et al.*, 2022, pp. 213, 216). Further, Deutsche Post DHL could improve the integrity of its net-zero pledge by including emissions from purchased goods and services, capital goods and employee commuting, which accounted for 13% of disclosed emissions in 2019.

Deutsche Post DHL's targets for 2030 fall short of sectoral 1.5°C Paris Agreement-aligned benchmarks for aviation, shipping, and road transport. The company committed to reduce scope 1 and 2 emissions by 42% by 2030 and scope 3 emissions from energy and fuel-related activities, upstream transportation and distribution, and business travel by 25% (Deutsche Post DHL, 2022a). Both targets use 2021 as the baseline year and translate to a committed reduction of 12% across the value chain between 2019 and 2030. They replace a target that Deutsche Post DHL had announced in early 2021: to reduce logistics-related emissions to below 29 $MtCO_2e$ by 2030 (Deutsche Post DHL Group, 2021). This target translated to a 11% reduction in full value chain emissions between 2019 and 2030. Deutsche Post DHL is not yet on track to meet its 2030 target. Due to business growth and impacts of the COVID-19 pandemic, the company's emissions increased by almost 20% between 2019 and 2021 (Deutsche Post DHL, 2022c, p. 21). The IEA shows that CO_2 emissions from air and ocean freight need to decrease by 23% and 20%, respectively, between 2019 and 2030, and emissions from road transport by 33% (IEA, 2021b, p. 199). Some other sectoral benchmarks require even larger reductions.

Deutsche Post DHL is pioneering alternatives for internal combustion engines and focuses its reduction measures also on other transport modes. Deutsche Post DHL implements a range of reduction measures that address all relevant emission sources, including sustainable aviation fuels, a shift from road to rail, e-vehicles and e-trikes, and installing on-site renewable energy installations on its German distribution centres (Deutsche Post DHL, 2022a, pp. 25–31). Provided that these alternative transportation modes are based on renewable electricity or other sustainable energy sources, they can significantly reduce scope 1 and upstream scope 3 emissions. Deutsche Post DHL states that 86% of its electricity consumption comes from renewable resources (Deutsche Post DHL, 2022a, p. 22), but the lion's share of this electricity is procured through RECs (Deutsche Post DHL Group, 2022b). In 2020, PPAs and on-site installations accounted for just 0.6% of the company's renewable electricity consumption (Deutsche Post DHL, 2022b). As Deutsche Post DHL's reduction targets depend on the shift to e-vehicles and alternative fuels, it is critical that the company pursues renewable electricity procurement constructs that are likely to contribute to *additional* capacity, including PPAs for new installations and on-site installations (see Section 3.2.2).

Deutsche Post DHL presents biofuels as part of its decarbonisation measures for ocean, air, and road transport but also recognises that these may have negative sustainability implications (Deutsche Post DHL, 2019, pp. 11–12, 2022h, 2022f). While biofuels may play a role in decarbonising air freight, maritime shipping and heavy road transport, overreliance on bio-based fuels risks hindering the transition in other sectors and may indirectly lead to negative sustainability impacts (see Section 3.2.1)

Deutsche Post DHL offers climate neutral delivery through offsetting and so-called insetting practices, which could give customers a false impression of the company's activities' true climate impact. Under the 'GoGreen' label, Deutsche Post DHL has offered its customers 'climate neutral' delivery of mail and parcels since 2011. However, less than 1% of Deutsche Post DHL's total emissions are actually covered by the 'climate neutral' claim and the offset credits that the company procures are highly unlikely to have the same climate impact as emission reductions within the value chain (Deutsche Post DHL, 2022d, 2022e) (see further information in Section 4.2.2).

In 2022, Deutsch Post DHL announced a new label for its deliveries in Germany: 'GoGreen Plus' (Deutsche Post DHL, 2022b). The company promises customers one year of climate neutral deliveries through offsetting under the term 'insetting', if they pay a premium of EUR 3.79 (USD 4.5). In this context, insetting means that Deutsche Post DHL uses the small sum that each customer pays to implement reduction measures elsewhere in the value chain. We consider 'climate neutral' deliveries based on 'insetting' controversial and potentially misleading to customers. Given that Deutsche Post DHL includes all logistics-related emissions in its 2030 and net-zero targets, it is highly possible that the company could double count the emission reductions achieved through their GoGreenPlus programme: once to claim the 'neutralisation' of the emissions associated with the delivery of specific letters and parcels, and a second time to claim progress towards its scope 3 emission reduction targets. It would be more transparent if Deutsche Post would tell its customers that the company uses the paid premium towards emission reductions in the value chain without making a 'climate neutral delivery' claim.

Fast Retailing

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Fashion retailing	USD 19.4 bn (2021)	5.50 $MtCO_2e$ (2021)	To reduce scope 1 and 2 emissions by 90% and scope 3 emissions (from the production of raw materials for products, fabric production and garment manufacturing) by 20% by FY2030	Moderate	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

5.50 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Procurement of materials in the supply chain (76%), specifically raw material production, fabric production and sewing (upstream scope 3).

Disclosure: Complete disclosure. No estimate for downstream transportation and distribution. Market- and location-based estimates provided for scope 2 emissions.

TRANSPARENCY & INTEGRITY

Scope 1	0.01
Scope 2	0.3
Scope 3 upstream	4.8
Scope 3 downstream	0.4

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*To reduce scope 1 and 2 emissions by 90% and scope 3 emissions (from the production of raw materials for products, fabric production and garment manufacturing) by 20% by FY2030*		
Short- and medium-term targets (up to 2030)	*Emission reductions by 2030 (2019 baseline):* - 90% in operations (s1, s2) - 20% in raw materials, fabric and garment production (s3, Uniqlo and GU brands)	High	Very low
Scope coverage	S1 S2 S3 — 74% of 2019 emissions footprint. Exclusion of emissions from brands other than Uniqlo and GU, and downstream scope 3 emissions.		
Own emission reductions (compared to full value chain in 2019)	19% by 2030 — Targeted emission reductions across the company's whole value chain are insufficient to meet the global benchmark of 43% GHG emission reductions by 2030.		
Long-term vision (beyond 2030)	*Net zero by 2050*	Very low	Very low
Scope coverage	? — Long-term vision is unclear. Concrete plans and emissions coverage have not been made public.		
Own emission reductions (compared to full value chain in 2019)	? by 2050 — No clear long-term vision is set out.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Outlined for most emission sources, e.g., energy efficiency improvements, materials recycling, emission reduction plans for suppliers. Too few details to gauge impact.	Moderate	?
Renewable electricity procurement	Low share of RE (<10%). Plans underway for 100% RE by 2030. On-site solar PV in Japan, RECs in other regions.	Very low	Very low

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	No information identified.	Very low	Very low
Climate contributions	*No climate contributions identified.*	N/A	Very low
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	The company has not announced any plans to offset emissions in the future, although it mentions to aim for carbon neutrality by 2050.	Very low	N/A

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Fast Retailing (2021, 2022a, 2022b).

See **Annex II** for more details on our assessments of companies' targets

Fast Retailing

Fast Retailing Co., Ltd. (Fast Retailing) is a Japanese fashion retail multinational company that owns the Uniqlo brand, among others. Most of its emissions stem from the production of clothes in third-party supplying factories. To tackle these emissions, the company provides suppliers with emission reduction plans and related support, but it discloses few details on the goals and ambitions of these plans. The company's headline emission reduction targets fall far short of what is needed to limit global warming to 1.5°C. It wants to reach net-zero emissions in 2050 but has not announced plans for emission reductions after 2030.

Fast Retailing's headline pledges collectively amount to a reduction of 19% of the company's emissions footprint by 2030 compared with 2019, which is not aligned with global efforts to limit global warming to 1.5°C. Fast Retailing has two targets that are to be achieved by 2030, certified to be 1.5°C-compatible by the SBTi. The first one is 20% absolute reduction of supply-chain emissions, specifically from raw materials, fabric, and garment production for the Uniqlo and GU brands, which represent ~95% of the company's revenue (Fast Retailing, 2021, p. 64). The second one is 90% absolute reduction of operational emissions (scopes 1 and 2, under direct company control) (Fast Retailing, 2021, p. 29). These two targets cover 74% of the company's emissions footprint and exclude emission sources like the end-of-life treatment of sold products. They equate to an emissions reduction commitment of just 19% across the full value chain, compared to 2019 levels, falling short of the IPCC's estimate of minimum 43% global GHG emission reductions by 2030 to keep warming below 1.5°C (IPCC, 2022). Furthermore, a sectoral 1.5°C-aligned benchmark indicates that fashion retailers should reduce upstream scope 3 emissions by a minimum of 41% between 2019 and 2030 (Teske, 2022), but Fast Retailing only commits to 16% upstream scope 3 emission reductions by that year.

Fast Retailing has expressed the aim to reach net-zero emissions by 2050, but it has not disclosed a concrete plan for emission reductions between 2030 and 2050. Fast Retailing's climate strategy focuses on 2030 emission reduction targets. Although it expresses the intention to 'strengthen our efforts to achieve net zero GHG emissions by 2050' (Fast Retailing, 2021, p. 29), it does not clarify what these efforts would entail in the future. The company does not disclose whether it will reach the net-zero target through further emission reductions or through emissions offsetting in the 2030–2050 period.

Fast Retailing's emission reduction measures focus on emission reduction plans for supplying factories, but details on how the company engages with suppliers—the company's main source of emissions—remain limited. To address emissions from corporate sites, Fast Retailing aims to improve energy efficiency by installing LED lighting, automatic temperature control, and more efficient air conditioning (Fast Retailing, 2021, p. 29, 2022b). However, these measures only target 5% of the company's emissions footprint (scope 2) (Fast Retailing, 2022b). Fast Retailing's most significant source of emissions (76% of its emissions footprint) is the manufacturing of garments in third-party factories, including raw material production, fabric production, and sewing. To address these emissions, the company reports to be recycling more materials and piloting clothing repair stations (Fast Retailing, 2022b; Uniqlo, 2022). While repair stations could potentially extend products' lifetimes, they would have a significant impact in emission reductions only if they would lead to a shift in consumer behaviour and a reduction in the volume of new garments purchased and produced. We did not identify any clear indication that Fast Retailing is preparing to shift away from a fast fashion business model. Fast Retailing also claims to cooperate with suppliers by providing them with supplier-tailored emission reduction plans (Fast Retailing, 2021, p. 29, 2022b). These are mentioned to include energy-saving and renewable-energy measures, like eliminating coal energy from manufacturing processes, and Fast Retailing pledges support for their implementation (Fast Retailing, 2021, p. 29). However, the company does not provide specifics on the coverage and depth of the emission reduction plans, what its pledged support entails, or how it aims to enforce them. While this level of supplier interaction may represent good practice, the lack of details does not facilitate a complete understanding of whether Fast Retailing's strategy will be sufficiently effective at reducing supply-chain emissions.

Fast Retailing aims to use 100% renewable electricity by 2030, but it does not commit to procurement options that would likely result in additional renewable electricity capacity. In 2021, less than 10% of Fast Retailing's electricity consumption was sourced from renewable sources (Fast Retailing, 2022a). The company recently installed solar PV capacity at 13 stores in Japan, and it will source renewable electricity for other stores around the world. However, it does not specify the types of constructs that it will pursue to source renewable electricity; the quality of the electricity procurement constructs will determine whether the company's 2030 target will result in truly additional renewable electricity capacity and the abatement of the company's energy-related emissions.

Foxconn

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Technology - Electronics	USD 214.6 bn (2021)	29.4 $MtCO_2e$ (2020)	Net-zero emissions in the value chain by 2050	Low	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

29.4 $MtCO_2e$ in 2020

Subsidiaries are covered.

Major emission sources: S3 accounts for 82% of disclosed emissions, but Foxconn provides no breakdown of emission sources.

Disclosure: Incomplete disclosure. S3 emissions only reported for 2020, no breakdown provided. Highest estimate reported for s2 emissions (location based).

Scope 1	0.2
Scope 2	5.3
Scope 3	24.0

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	***Net-zero emissions in the value chain by 2050***		
Short- and medium-term targets (up to 2030)	***Carbon emissions reduction targets, 2020 baseline: 21% by 2025, 42% by 2030. Net-zero emissions in Taiwanese offices by 2030.***		
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2020): 42% by 2030	Unclear whether targets cover CO_2 or all GHG emissions. The pledged 42% reduction by 2030 is almost aligned with a 1.5°C compatible trajectory.		
Long-term vision (beyond 2030)	***Net-zero emissions in the value chain by 2050.***		
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2020): 63% by 2050	Full coverage of value-chain emissions. 63% reductions by 2035 (2020 baseline). No reduction target alongside net-zero emissions target by 2050.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Little information. Energy-saving measures. Guidance for suppliers to procure RE and set targets, but proportion of suppliers covered is unclear.		?
Renewable electricity procurement	Only 5% of electricity is renewable, with 50% aim for 2030. Details on procurement constructs not provided, although most comes from on-site installations.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	No information identified.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	Unclear to what extent Foxconn plans to rely on carbon offsets to reach its future targets.		?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Foxconn (2021, 2022).

See **Annex II** for more details on our assessments of companies' targets

Foxconn

Hon Hai Precision Industry Co., Ltd. (Foxconn) is a Taiwanese multinational electronics corporation that manufactures electronic products for major companies such as Apple, Sony, and Nintendo. It established a net-zero emissions target by 2050 and increasingly stringent emission reduction targets up to 2035. The company does not yet specify the level of emission reductions that it will pursue after 2035 to claim net zero by 2050. Most of Foxconn's emissions are indirect (scope 3, 82%), but the company does not disclose the relevance of specific scope 3 emission sources. Its emission reduction strategy remains unsubstantiated, as the company does not share its complete emissions footprint or concrete, detailed emission reduction measures.

Foxconn commits to a carbon emission reductions path leading to 63% reductions by 2035, compared to 2020. Although this pathway up to 2035 is likely aligned with a 1.5°C warming trajectory, the company does not commit to further emission reductions to reach its 2050 net-zero target. Foxconn's headline pledge is a long-term target to achieve net-zero emissions in the value chain by 2050 (Foxconn, 2022, p. 94). The company commits to reduce carbon emissions by 21% by 2025, by 42% by 2030, and by 63% by 2035, from a 2020 baseline (Foxconn, 2022, p. 94). Foxconn could more transparently state if these targets apply to its complete value chain, and whether they cover all GHGs, as it uses the terms 'carbon emissions' and 'emissions' interchangeably when referring to the targets (Foxconn, 2022, pp. 11, 94). The targets draw a consistent path of reducing emissions up to 2035. If we assume that they apply to the full value chain and to carbon dioxide emissions specifically, Foxconn's goals would be close to meeting the IPCC's benchmarks to keep global warming below 1.5°C: 48% CO_2 emission reductions by 2030 and 80% CO_2 emission reductions by 2040 (IPCC, 2022). Clarifying that its 2050 net-zero target entails further emission reductions, with a limited role for any offsetting of residual emissions, would send a clearer signal for investments and long-term decarbonisation beyond 2035.

Foxconn's emissions disclosure is incomplete and lacks detail, making it difficult to understand the company's overall emissions reduction strategy. Foxconn disclosed a scope 3 emissions estimate for the first time for the year 2020, without providing a breakdown into specific emission sources (Foxconn, 2021, p. 100, 2022, p. 95). The total emissions footprint that year amounted to almost 30 $MtCO_2e$, of which 82% corresponded to scope 3 emissions. Foxconn has not yet shared a scope 3 emissions estimate for the year 2021 (Foxconn, 2022, p. 95). Due to the lack of a complete and detailed emissions disclosure, we are not able to tell what Foxconn's most relevant emission sources are and whether the company is addressing them sufficiently in its climate strategy.

Foxconn presents limited information on emission reduction measures, which include energy efficiency improvements and the transition of its suppliers to renewable electricity. In its sustainability report for the year 2021, Foxconn outlines a work plan for energy and carbon reduction measures (Foxconn, 2022, p. 96). It includes implementing government regulations for energy efficiency, formulating energy-saving plans, and pursuing the certification of energy management systems. However, Foxconn does not provide more detail on these measures, nor has it shared a timeline for the expected emission reductions, or the share of emissions targeted with each measure. For example, in promoting 'green manufacturing systems' (Foxconn, 2022, p. 96), the company does not explain what 'green' means, and what specific measures it will implement to make its processes 'greener'. Foxconn requires suppliers to commit to achieve net-zero emissions by 2050 and establish long-term emission reduction targets (Foxconn, 2022, pp. 82, 86). The company appraises suppliers' progress and reduces transactions with poor performers. To support suppliers, Foxconn wants to 'guide' them in manufacturing products with 100% renewable electricity (Foxconn, 2022, pp. 87–88). In 2021, Foxconn's guidance included investments in solar PV or procurement of RECs for at least five suppliers, and the company is planning to expand this to over 220 suppliers in the 2022–2050 period. However, Foxconn does not disclose how many suppliers it has in total, the emissions that could be reduced from their transition to renewable electricity, and the extent to which they may rely on RECs.

Foxconn currently consumes a low share of renewable electricity and provides insufficient details on the renewable electricity procurement constructs that it pursues. Foxconn aims for half of its energy consumption (electricity, steam, heat, and fuel) to be renewable by 2030 (Foxconn, 2021, p. 102, 2022, p. 11). The company currently has a 5% share of renewable electricity consumption. Almost two thirds (61%) of this limited renewable consumption is produced on site with solar PV in Chinese campuses and 39% is directly purchased in China and other countries (Foxconn, 2022, p. 99). The lack of information about the contracts that the company signs to purchase renewable power (e.g., whether the electricity bought is generated in the same location where it is consumed) does not allow us to determine if the purchase results in truly additional renewable capacity.

Google

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Technology & Services	USD 257.54 bn (2021)	16 $MtCO_2e$ (2021)	Net-zero emissions by 2030	Moderate	Moderate

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

16 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: S3 emissions (59%) and s2 emissions from consumed electricity (41%).

Disclosure: S3 reporting lacks detail; market- and location-based s2 emissions disclosed, but the lowest of the two used for aggregated emissions.

TRANSPARENCY & INTEGRITY

Scope 1	0.05
Scope 2	6.6
Scope 3	9.4

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero emissions by 2030*		
Short- and medium-term targets (up to 2030)	*- Net-zero emissions by 2030* *- Match 100% of consumed electricity with 24/7 RE by 2030.*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	37% by 2030 — Commitment to reduce market-based emissions by 50% by 2030, which translates to a 37% reduction of location-based emissions.		
Long-term vision (beyond 2030)	*Google does not have any long-term targets beyond 2030.*		
Scope coverage	?		
Own emission reductions (compared to full value chain in 2019)	? by 2050 — No emission reduction plans identified after 2030.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Emission reduction measures across all scopes, precise mitigation impact in s3 remains unclear. Emissions increased by 5% in 2021.		
Renewable electricity procurement	66% of consumed electricity is matched with 24/7 RE (100% annually). RE from PPAs (77%), the grid (23%), and on-site installations (0.05%).		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	No information on contributions or offsetting claims.		
Climate contributions	Google finances mitigation projects through Google.org. No link to unabated emissions. Limited detail on projects, volume, and timelime.		?
Offsetting claims today	Neutrality claim covers ~12% of 2021 emissions, based on RE purchases and offsets. We interpret this claim as misleading.		
Offsetting plans for the future	Google plans to offset 67% of its emissions by 2030. Little information on the future offset portfolio.		

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Alphabet (2022), Google (2022a, 2022b) and Google.org (2022).

See **Annex II** for more details on our assessments of companies' targets

Google

Alphabet Inc., the holding company of Google LCC (hereinafter referred to as Google), is a provider of diverse information technology services and products. Its major emission sources stem from product manufacturing and use, and electricity consumption in data centres. Google's net-zero target for 2030 equates in reality to a 37% emission reduction commitment, with no commitment to deeper decarbonisation beyond 2030. The company's plans for the decarbonisation of its electricity-related emissions are comprehensive and innovative, but it is unclear if the targets and measures for other emission sources are sufficient, especially for scope 3 emissions, which represent the majority of Google's GHG emission footprint.

Key developments over the past year: We could identify only a few changes to Google's sustainability strategy since our previous analysis of the case study in the *2022 Corporate Climate Responsibility Monitor* (Day *et al.*, 2022), including a substantiation of its net-zero pledge with an emission reduction target. Accordingly, only minor modifications were made to this case study.

Google's headline pledge is to reach 'net-zero emissions' by 2030 while keeping its continuous goal of 'carbon neutrality' each year. We consider both claims misleading as they are not substantiated with deep emission reduction commitments. The 'carbon neutrality' claim excludes major scope 3 emission sources that accounted for 58% of the company's GHG emissions in 2021 (Google, 2022b, p. 11). Emission sources covered by the target are 'neutralised' through procurement of renewable energy and offset credits that have highly contentious environmental integrity (see Table 3-2, Section 3.2.2). The provided guidance of what Google perceives as 'high-quality' offsets dates back to 2011 (Google, 2011). Google could update that guidance to the newest available standards to improve the integrity of its 'neutralisation' claims. Google's net-zero target for 2030 covers the company's entire operations and value chain emissions. In 2022, Google clarified that this target entails a 50% reduction of its market-based emissions across all three scopes by 2030 compared to 2019 baselines. This translates to an effective emission reduction of 37% of Google's emissions using a location-based accounting method (Google, 2022a, p. 5). This is an improvement compared to a year ago, when the company had not made any commitment alongside its net-zero target (Day *et al.*, 2022). However, a 37% reduction commitment implies that Google will claim to 'neutralise' the majority (67%) of its real emission footprint with carbon offset credits by 2030 or potentially other creative accounting methods. It remains unclear what the portfolio of offset projects will look like, as Google provides only limited information on this. Google acknowledges that a shift towards carbon dioxide removal credits is required to align with the ambition set out in the Paris Agreement but also claims that in the short-and medium-term those credits are not economically feasible at scale (Google, 2022a, p. 12). Google does not transparently disclose whether these carbon dioxide removal measures will be based on biological, geological or mineral carbon storage. Google plans to use 'avoided emission credits' until carbon dioxide removals become available at scale. The company's credit portfolio includes credits from landfill gas projects to reduce methane emissions in the United States, which Google itself recognises as having questionable additionality (Google, 2022a, p. 13) (see Section 4.4.1). The company leaves the door open for other purchases of contentious carbon credits.

Google has been developing a comprehensive portfolio of renewable energy generation and procurement since 2017 and demonstrates a good understanding of the limitations of various renewable energy procurement options. The company claims to have 'matched' its energy consumption with renewable energy generation between 2017 and 2021 (Google, 2022b, p. 9). In 2021, 77% of renewable energy procurement stemmed from on-site generation and PPAs within the same grid as the electricity consumption (Google, 2022b, p. 12). Google demonstrates a good understanding of the limitations of various renewable energy procurement options: the company notes that only 66% of its electricity use in 2021 was matched on an hourly basis with regional carbon-free sources, which is one percent less than in 2020 (Google, 2022b, p. 9). Google pledges to increase this share to 100% and achieve 24/7 carbon-free energy by 2030 (Google, 2022b, p. 9). This good practice approach has been adopted by other companies, and the innovative technologies that Google is developing to implement and monitor progress against this target may in the future support other actors and grid operators to optimise their own decarbonisation measures. Google reports both location-based and market-based scope 2 emissions, but the latter is used to discount electricity emissions from aggregated company-wide emission statistics. This is somewhat inconsistent with Google's shrewd observation that purchasing enough renewable energy to match annual electricity use may reduce but not eliminate emissions. More prominent reporting of location-based emissions would be more transparent and constructive, given the recognised limitations of its current renewable energy procurement.

Google implements a range of measures to reduce emissions across most emission sources, but more information is needed to judge if they are sufficient. Google reports on a range of emission reduction measures, particularly related to improving energy efficiency in datacentres and office buildings (Google, 2022b, pp. 8–10). Flagship project investments for high-tech and data-driven efficiency in selected office locations can have a positive impact for demonstration purposes and enabling replication of good practice, but we could not identify whether Google has mainstreamed these measures across a large proportion of its locations. Google engages with its suppliers to reduce its scope 3 emissions, invests in renewable energy projects located on the same grid as its main manufacturing regions, and works on improving the energy efficiency of its hardware products (Google, 2022a, p. 11). Still, we could not determine the sufficiency of these measures for scope 3 emissions due to the lack of information on the depth and breadth of measures as well as the poor granularity of GHG emission data on scope 3 emission sources; Google groups most scope 3 emission sources – constituting the majority of the company's total GHG emission footprint – into a single data point, for 'business reasons' (Alphabet, 2022, pp. 35, 38). Despite the range of implemented emission reduction measures Google's absolute emissions increased by 5% in the last year, mainly driven by an increase in emission from consumed electricity (scope 2 emissions increased by 12%) (Google, 2022a, p. 12). This increase is likely due to an increase in demand for Google's cloud and datacentre services indicated by the increase in revenue.

Google invested around USD 70 million in the advancement of innovative climate solutions through its charity Google.org (Google, 2022a, p. 21). Google.org is a Google-owned charity that provides USD 200 million annually to different non-profits and social organisations to foster innovation and support disadvantaged communities (Google.org, 2022). In the past, Google.org has helped restore ecosystems, enable small businesses to track their emission footprint, and support cities through data-driven climate solutions in areas such as mobility optimisation and mapping solar energy potential (Google, 2022a, p. 21; Google.org, 2022). It is unclear what share of the annual funding is targeted towards climate change mitigation. Increased transparency on the use of the Google.org fund would help to show whether these financial contributions represent good practice.

H&M Group

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Fashion retailing	USD 23.2 bn (2021)	8.2 $MtCO_2e$ (2021)	Net zero no later than 2040	Moderate	Moderate

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

8.2 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Fabric production (35%) and product use (21%) are the most important emission souces.

Disclosure: Detailed breakdown of emissions from purchased goods (scope 3, category 1). Some other scope 3 categories are not disclosed.

Scope 1	0.01
Scope 2	0.5
Scope 3 upstream	5.5
Scope 3 downstream	2.2

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net zero no later than 2040*		
Short- and medium-term targets (up to 2030)	*Reduce s1 and s2 emissions by 56% by 2030; and reduce s3 emissions also by 56% by 2030.*		
Scope coverage / Own emission reductions (compared to full value chain in 2019)	56% by 2030 — Aligned with global benchmarks for necessary GHG emission reductions, but no reduction target within the next 5 years.	High	Moderate
Long-term vision (beyond 2030)	*Carbon neutrality by 2040*		
Scope coverage / Own emission reductions (compared to full value chain in 2019)	90% by 2040 — Commitment to reduce s1 and s2 emissions, as well as s3 emissions by 90%, compared to 2019.	High	High

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Biomass in the production phase has adverse climate and sustainability implications. Potential impact of recycling and sourcing more sustainable materials is unclear due to limited information.	Moderate	Poor
Renewable electricity procurement	RECs cover over 95% of electricity consumption.	Moderate	Poor

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	H&M Group joined the LEAF coalition.	Poor	?
Climate contributions	H&M Group joined the LEAF coalition but we could not identify further details.	Poor	?
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	10% of 2019 emissions will be offset. H&M Group will source DAC removals, but LEAF coalition membership may imply reliance on biological CDR.	Moderate	Moderate

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from H&M Group (2021, 2022a, 2022b, 2023).

See **Annex II** for more details on our assessments of companies' targets

H&M Group

H&M Group is a Sweden-based fast fashion retailer that comprises eight brands, including H&M, COS and Monki. The majority of H&M Group's emissions stem from fabric production, garment manufacturing and raw materials (all scope 3, category 1), which jointly account for over half of reported emissions. Although H&M Group has ambitious emission reduction targets for 2030 and 2040, those may be severely undermined by the lack of a clear decarbonisation plan and reliance on biomass in the production phase.

H&M Group plans to reduce emissions across its value chain by 56% by 2030 and by 90% by 2040. These are ambitious targets that signal the need for immediate climate action, as long as they are not undermined by reliance on RECs and biomass to claim decarbonisation of the supply chain. In 2022, H&M Group replaced its 'climate positive by 2040' target with a commitment to achieve 'net zero CO_2e emissions by 2040, taking a climate positive approach and having a net positive impact on biodiversity' (H&M Group, 2022b, p. 18). The net-zero target is accompanied by the commitment to reduce emissions across the value chain by 90% (H&M Group, 2023). As part of its net-zero commitment, H&M Group committed to reduce emissions across the entire value chain by 56% between 2019 and 2030. This ambition level goes beyond the global benchmark for a 1.5°C-compatible emission reduction trajectory. However, the true ambition level of H&M Group's targets depends on the measures used to achieve them. We see signals that the company could be planning to rely heavily on RECs and biomass to claim the decarbonisation of its supply chain, which could severely compromise these targets.

While H&M Group refers to a wide range of emission reduction measures, more detailed information is needed to understand the likely reduction impact. Decarbonising the fashion sector requires a diverse set of reduction measures, including reducing overproduction, phasing out coal, switching to renewable energy, maximising material and energy efficiency, and ramping up the development of innovative materials (Berg *et al.*, 2020; Ley *et al.*, 2021; Sadowski *et al.*, 2021). While H&M Group refers to most of these measures in its public communications, it remains unclear to what extent these will reduce emissions across the value chain (H&M Group, 2022b, pp. 31–46). For instance, the company lists various innovative materials it is investing in but does not outline at what scale these could be used in the next decade and what their emission reduction potential is. H&M Group refers to various initiatives through which it procures 'more sustainable' materials, including cotton (H&M Group, 2022b, p. 31). However, more sustainable can simply mean a small improvement compared to the baseline and does not necessarily entail a commitment to shift to truly sustainable materials. More details are needed to understand the mitigation potential of shifting to alternative materials. While H&M Group offers repair and rental services and is expanding its sales of second-hand clothes (H&M Group, 2022b, pp. 41–42), these initiatives can help to significantly reduce emissions *only if* they are scaled up to the point at which they lead to a significant reduction in the number of new clothes produced. However, we could not identify clear plans to reduce (over)production and shift away from a fast fashion business model to a less resource intensive model that focuses on longer-lasting products.

H&M Group committed to phasing out coal in the supply chain, but this pledge is undermined by a heavy reliance on biomass. The company announced it will no longer onboard any new suppliers with on-site coal boilers in their factories and is committed to phase out coal in its supply chain. The company works on addressing barriers to transitioning to biomass boilers in Indonesia and plans for Cambodia to be H&M Group's first production country to use 100% biomass boilers (H&M Group, 2022b, p. 24). While biomass, along with natural gas, are options that are currently available to replace coal in thermal processes, neither are suitable long-term decarbonisation options. Biomass is associated with severe sustainability implications, including deforestation, food insecurity and release of sequestered carbon into the atmosphere (see Section 3 in the Methodology). The very limited potential for sustainable biomass should be used in sectors that have no alternatives for fossil fuel combustion. The fashion sector, however, has these alternatives and needs to transition to zero-carbon options, including green hydrogen and concentrated solar (Ley *et al.*, 2021, p. 21). As those options are not yet viable at commercial scale today, large investments are needed to unlock their decarbonisation potential.

H&M Group commits to 100% renewable electricity in its supply chain by 2030 but it is unclear what share of suppliers are covered by this target and what electricity procurement options H&M Group pursues. H&M Group states in a footnote that the goal of 100% renewable electricity in the supply chain only applies to markets where renewable electricity is available for purchase (H&M Group, 2022b, p. 19). This statement potentially undermines the target's ambition level, as H&M Group provides no information on the share of suppliers that would not be able to source renewable electricity. More details are also needed to understand whether or not H&M Group proactively supports its suppliers in sourcing renewable electricity – and other forms of energy - in countries that have insufficient policies in place to stimulate and allow for renewable energy capacity development. We see a risk that H&M Group abandons any responsibility for electricity-related emissions in its supply chain in countries where there are no renewable electricity certificates already available for sale.

H&M Group also commits to 100% renewable energy in its own operations, but this target will only result in real emission reduction if the renewable energy is sourced from high-quality constructs. H&M Group purchased RECs to claim that 95% from its electricity consumption came from renewable sources in 2021, up from 90% in 2020 (H&M Group, 2022b, pp. 21, 24). RECs do generally not contribute to the installation of additional renewable energy capacity and are not a suitable approach for companies to reduce their electricity-related emissions (see Table 3-2, Section 3.2.2). However, we see some early signs that H&M may move to high-quality procurement options. In December 2022, H&M Group signed a PPA for a new and large solar park in Sweden and stated that 'PPAs play a very important role in the company's climate work to achieve its targets.' (H&M Group, 2022a).

Holcim

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Steel and cement	USD 29.3 bn (2021)	149.1 $MtCO_2e$ (2021)	Net zero by 2050	Reasonable	Moderate

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

149.1 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: S1 related to cement manufacturing (82%) and s3 purchased goods and services (9%).

Disclosure: S2 emissions reported using both a location- and market-based accounting approach, while the company uses the higher value to present total emissions. Unclear why some s3 sub-categories are excluded.

TRANSPARENCY & INTEGRITY

Scope 1	119.3
Scope 2	7.0
Scope 3 upstream	22.8
Scope 3 downstream	7.0

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero by 2050*		
Short- and medium-term targets (up to 2030)	*By 2030, reduce the carbon intensity:* *- of cementicious materials below 2018 by 22.5% for s1 and 65% for s2* *- of bought clinker and cement below 2020 by 20% for s3 (purchased goods)* *- of bought fuel below 2020 by 20% for s3 (fuel- and energy related)* *- of sold products below 2020 by 24% for s3 (downstream transport)*		
Scope coverage	S1 S2 S3 (94%)		
Own emission reductions (compared to full value chain in 2019)	? by 2030 (intensity target) 2030 intensity targets for s1 and s2 partially meet 1.5°C-aligned sectoral benchmarks. Absolute emission reductions cannot be quantified.		
Long-term vision (beyond 2030)	*Net zero by 2050, including:* *- s1&2: 95% reduction in CO2/t cement below 2018* *- s3: 90% reduction in absolute emissions below 2020*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2050 (intensity target) Targets meet 1.5°C-aligned sectoral benchmarks, but intensity target and heavy reliance on CCUS makes the appropriateness of net zero terminology contentious.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Measures cover all emission sources, include additional targets, emission reduction estimates and plans to mainstream innovative solutions, but limitations of CCUS are not discussed.		
Renewable electricity procurement	Total volume of energy procured by construct only reported in CDP response, showing a high reliance on RECs.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Product-level offsetting claims.		
Climate contributions	*No climate contributions identified.*		
Offsetting claims today	At a product-level, the company offers costumers to offset emissions under its 'ECOPact Zero' label. No information on type and volume of credits disclosed.		?
Offsetting plans for the future	Net-zero strategy includes a small role for emission removals through passive recarbonation of sold products.		

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Holcim (2021, 2022a, 2022b).

See **Annex II** for more details on our assessments of companies' targets

Holcim

Holcim Limited is a Swiss-based multinational and one of the world's largest cement manufacturers by production capacity. Most of its emissions stem from cement production (scope 1), especially clinker production and fuel combustion in cement kilns. Holcim has pledged to reach net zero across its entire value chain by 2050, providing clear emission and intensity reduction targets alongside. The company presents measures to address most of its value chain emissions but does not fully clarify the role of emission removals in its strategy.

Holcim set a 2050 net-zero target alongside deep decarbonisation targets covering all its emission sources. Holcim presents its headline pledge of reaching net zero by 2050 alongside *own* emission reduction targets along the value chain: reducing the GHG-intensity of cement by 95% below 2018 for scopes 1 and 2 and reducing absolute scope 3 emissions by 90% below 2020. These targets are in line with existing 1.5°C-aligned benchmarks for the cement sector (see full assessment in Annex II). However, Holcim's interim targets of reducing the GHG intensity of cement by 22.5% for scope 1 and 65% for scope 2 by 2030, both below 2018 levels, only partially align with 1.5°C-compatible benchmarks. Therefore, it remains unclear whether Holcim's 2030 targets are fully in line with a 1.5°C-compatible trajectory to meet its 2050 net-zero target.

Holcim sets out mitigation measures to address all value chain emissions. In its net-zero strategy, Holcim clearly communicates its mitigation plans and measures classified by emission scope, including scope 3 emissions . While the company provides an illustrative pathway indicating each measure's contribution towards net-zero scope 1 and 2 emissions, it stops short of disclosing specific emission reduction estimates for 2030, and the intended amount of removed emissions through passive carbonation. The company showcases many of its initiatives to potentially reduce the GHG intensity of cement products, including recycling construction and demolition waste, reducing the amount of clinker in cement, switching out fossil fuels for waste biofuels, and capturing carbon (Holcim, 2022b, pp. 15–21). Holcim does not clearly acknowledge the challenges associated with such measures, for example related to the availability of waste-fuel supply, or the effectiveness and feasibility of CCUS in cement plants (Lehne and Preston, 2018, pp. 7–9; Bataillle, 2020, pp. 5–8; Fennell, Davis and Mohammed, 2021, pp. 5–6).

Holcim plans to rely on passive carbonation to reach net zero by 2050, adding uncertainty to the real emission reduction impact of its strategy. As part of its pathway to net zero, Holcim includes emission removals from passive carbonation. Passive carbonation is a *natural* process through which cement reabsorbs CO_2 during its lifecycle and stores it permanently. The actual amounts of sequestered CO_2 depend on many external factors such as the weather, the use of coatings, characteristics of the soil and others (Holcim, 2022b, p. 34), but can reach up to 26% of cement's manufacturing emissions including those from fuel as well as process emissions (Xi *et al.*, 2016). Currently, Holcim does not clearly quantify the emissions removal it plans to achieve through passive carbonation, or its assumptions regarding capture rates per unit of material. Without such information, the credibility of Holcim's carbonation plans remains in question. However, based on Holcim's scope 1 and 2 pathway to net zero (Holcim, 2022b, p. 14) we estimate that the share of the company's emissions expected to be removed through passive carbonation is conservative and not likely to undermine its climate strategy.

Holcim mostly procures renewable electricity through low quality RECs and may have PPAs with fossil-based power producers. Holcim's latest CDP disclosure indicates that low-quality RECs account for the majority of Holcim's renewable electricity purchases (Holcim, 2022a, pp. 29–32). In its public documents, Holcim also recently announced several PPAs with local producers for some of its plants (Holcim, 2022b, pp. 18–19). In 2021, the company signed PPAs for renewable electricity of 500 GWh, which represented around 5% of Holcim's total electricity consumption in the same year (Holcim, 2021, p. 8). The PPAs' impact remains unclear because Holcim fails to provide further information on whether the associated RECs are transferred or cancelled. If Holcim would not purchase certificates alongside its PPAs, it could enable other actors to claim emission reductions using such certificates, leading to the double counting of renewable electricity (see Table 3-2 Section 3.2.2). Holcim provides little information on the emissions impact of its own captive power plants and whether it plans to phase-out all its GHG-intensive power generation. Additionally, Holcim's scope 2 emissions are lower under location-based reporting that market-based reporting. This suggests the company has PPAs with fossil-based power producers in place, making its purchased electricity more carbon-intensive than the grid average.

Holcim makes a contentious product-level claim to offer 'carbon neutral cement' based on the use of offset credits, but the company discloses neither the volume nor the type of credits procured. Under its ECOPact product line, Holcim promotes cement with a 30–90% lower carbon footprint compared to standard (CEM I) concrete (Holcim, 2022b, p. 33). The company further promotes 'carbon neutral' ECOPact^{zero} concrete by offsetting an undefined amount of emissions through offset credits. Holcim neither clarifies the extent nor any sustainability criteria for these credits. The promotion of low-carbon cement based on offsetting can be misleading for end consumers, especially as currently existing technologies in the cement sector are not sufficient for (near-)zero emissions production (Lehne and Preston, 2018, pp. 7–9; Bataillle, 2020, pp. 5–8; Fennell, Davis and Mohammed, 2021, pp. 5–6).

Inditex

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Fashion retailing	USD 32.8 bn (2021)	13.9 $MtCO_2e$ (2021)	Net-zero GHG emissions by 2040	Moderate	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

13.9 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: S3 emissions account for 99.6% of the total. Most relevant categories are purchased goods and services (59%) and use of sold products (21%).

Disclosure: Almost all s3 reported, except for downstream transport and distribution. S2 reported under market and location-based methods, but lowest estimate used for targets.

TRANSPARENCY & INTEGRITY

Scope 1	0.01
Scope 2	0.5
Scope 3 upstream	13
Scope 3 downstream	0.4

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero GHG emissions by 2040*		
Short- and medium-term targets (up to 2030)	*-Reduce s1&2 emissions by 90% below 2018 levels by 2030.* *-Reduce s3 emissions from purchased goods and services by 20% below 2018 levels by 2030.*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	10% by 2030 — Targets represents a 10% reduction in total emissions, well below 1.5°C-aligned benchmarks for the fashion industry		
Long-term vision (beyond 2030)	*Net-zero GHG emissions by 2040*		
Scope coverage	?		
Own emission reductions (compared to full value chain in 2019)	? by 2050 — Net-zero target scope not clear. No own emission reduction target presented alongside net-zero pledge.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Insufficient information is provided to understand the significance and sufficiency of emission reduction measures.		?
Renewable electricity procurement	Inditex does not publicly disclose RE procurement constructs. CDP responses indicate high reliance on RECs.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Contributions identified.		
Climate contributions	Climate contribution to nature conservation projects, but limited volume (eq. to EUR 0.24/tCO_2e)		
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	No details on plans for emission neutralisation towards 2040 target. Membership of the LEAF coalition may imply reliance on biological carbon dioxide removals.		?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Inditex (2022a, 2022b).

See **Annex II** for more details on our assessments of companies' targets

Inditex

Industria de Diseno Textil S.A. (Inditex) is a Spanish-based multinational fashion retailer, better known for its flagship brand, Zara. It is the biggest fast fashion group in the world by revenue, with EUR 27.7 billion in 2021. Most of its emissions stem from its supply chain, especially those related to the sourcing and processing of raw materials. The headline pledge for net zero emissions by 2040 is ambiguous and unsubstantiated; the company does not provide a clear commitment to reduce its emissions by any more than 10% below 2019 levels, and the sufficiency of its emission reduction measures remains unclear.

Due to the lack of transparency around Inditex's net-zero pledge, it is not possible to assess what the commitment entails. Most of Inditex's emissions are scope 3 emissions (~97% in 2021). However, based on its public reports, we cannot independently assess the scope of Inditex's target, or the share of own emissions reduction it would entail. Inditex plans to achieve its net-zero pledge by neutralising residual emissions but does not clarify its approach in terms of the total share of emissions which will be offset, or the types of credits it will purchase (Inditex, 2021a, p. 250). With these ambiguities, the net-zero pledge does not entail any specific commitment regarding the breadth and depth of emission reduction plans.

The company's interim 2030 targets amount to a 10% emissions reduction below 2019 levels, which is not clearly aligned with global efforts to limit global warming to 1.5°C. Inditex has two SBTi-certified targets: to reduce scope 1 and 2 emissions by 90% below 2018 levels by 2030, and to reduce scope 3 emissions from purchased goods and services by 20% below 2018 levels by 2030 (Inditex, 2021b, p. 250), although the latter target appears to fall short of SBTi's own emission reduction benchmark for scope 3 emissions in the apparel sector. This equates to a commitment to reduce emissions across the value chain by just 10-12% compared to 2019 levels. This level of ambition falls well short of sector-specific benchmarks and Inditex is well on track to meet these targets with limited further action. Through its untransparent renewable energy claims, Inditex claims to have already reduced scope 1 and 2 emissions by 86% in 2021 compared to 2018 levels (already achieving 95% of its target). By 2021, the company had also achieved half of its 2030 goal for scope 3 emissions. It is not clear to what extent Inditex' targets really represent an effort that requires significant further action.

Inditex has also committed to sourcing 100% renewable electricity by 2022 but appears to rely on low quality procurement constructs. In 2021, the company reported it covered 91% of its electricity needs with renewable energy (Inditex, 2021b, p. 254), but information from non-public documentation indicates that this is based extensively on the purchase of RECs (Inditex, 2022, pp. 30–37). If Inditex plans to achieve its target largely or exclusively through the procurement of unbundled renewable energy certificates, its actions would be very unlikely to lead to an increase in renewable energy capacity and the abatement of the company's energy-related emissions. Inditex also invests in increasing its own renewable energy generation capacity. In 2021, it reported generating 5,920 MWh from its own solar and wind assets (Inditex, 2021b, p. 255), which remain only a small share (0.3%) of its total electricity consumption.

Inditex' emission reduction measures are not detailed enough to understand their potential significance. The company's sustainability strategy showcases many measures and initiatives targeting different emission sources throughout its value chain (Inditex, 2021b, p. 178,260). It has also committed to mainstream some of its current initiatives, such as sourcing sustainable cotton, but without specifying what that means or how it compares to traditional cotton. Without clear indications of the expected scope and emissions impact of such measures, it is not possible to assess how significant they are. Raw material procurement represents an especially challenging but key emission source for the deep decarbonisation of the sector. While Inditex is working towards improving the durability of their products and extending their life (Inditex, 2021b, p. 194), it is not clear if such measures will achieve the scale required to lead to a significant reduction in their emissions. Reaching net zero through deep decarbonisation will require fashion retailers to move away from a quantity-focused fast fashion business model to a less resource intensive production model. However, Inditex does not set out a clear plan to prepare the business for such a transition.

It is not clear if and how Inditex plans to procure carbon credits to neutralise its emissions. In 2021 the company joined the LEAF coalition (Inditex, 2021b, p. 165), which aims at leveraging finance for tropical forest protection, including through carbon credits. It is unclear whether Inditex' participation in the LEAF coalition represents a climate contribution or a means of claiming offsets. Inditex made no claims of offsetting its own emissions through the purchase of carbon credits in 2021, nor did it state that it will achieve its 2040 target through the offset credits from the LEAF programme. Due to the scarcity of land for forestry-related carbon dioxide removal, as well as the non-permanence of these removals, such measures cannot represent a credible equivalent to the reduction of emissions, but it would be a more credible approach to support such projects through a contribution claim. In 2022, Inditex partnered with WWF and pledged to provide around EUR 10 million between 2022 and 2024 to support projects focusing on biodiversity and forest protection (Reklev, 2022). We consider this as a form of climate contribution, as Inditex does not clearly plan to purchase or claim any carbon credits through it. However, the volume of finance – equivalent to approximately 0.01% of annual revenue and approximately EUR 0.24/tCO_2e compared to full value chain emissions – is far from a volume that would represent a credible approach for assuming responsibility for emissions.

JBS

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Food, beverages and agriculture	USD 64.7 bn (2021)	71.1 $MtCO_2e$ (2021)	Net-zero GHG emissions by 2040	Very low	Very low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

71.1 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Major emissions are in s3. Although no breakdown provided, we assume that emissions related to rearing cattle are the main emission source.

Disclosure: JBS reports 10 times larger s3 emissions in its 2021 sustainability report than in previous ones. We could not identify a clear explanation for the increase.

TRANSPARENCY & INTEGRITY

Scope 1	4.7
Scope 2	1.6
Scope 3	66

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero GHG emissions by 2040*		
Short- and medium-term targets (up to 2030)	*Reduce s1&2 emissions by 30% by 2030 from a 2019 baseline.*		
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2019): 3% by 2030	Unclear language around intensity vs. absolute target. Does not cover s3 (>90% of emissions).		
Long-term vision (beyond 2030)	*Net-zero emissions by 2040*		
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2019): ? by 2040	JBS does not specify an emission reduction target alongside its net-zero emissions pledge; the sufficiency of that long-term vision is unclear.		?

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Emission reduction measures described in vague terms; potential impact remains unclear. Unclear how most important emission sources (rearing cattle) will be reduced.		
Renewable electricity procurement	Little public information on RE procurement. Claim that 46% of electricity demand is RE-based, but little to no info on existing and planned procurement constructs.		?

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Climate contributions with insufficient finance volume.		
Climate contributions	*Fund for the Amazon* projects may have a positive climate impact. Sum of support is not proportional to JBS' GHG footprint.		
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	Plans to offset emissions towards the net-zero target for 2040. No further details identified.		?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from JBS (2021, 2022) and Fund for the Amazon (2022a, 2022b, 2022c).

See **Annex II** for more details on our assessments of companies' targets

JBS

JBS S. A. (JBS) is a meat processor headquartered in Brazil. Over 90% of its reported emissions are from farms and feedlots for rearing cattle. The company plans to continue growth in a GHG emission-intensive industry; we did not find evidence of any planned deep decarbonisation measures. JBS does not have an emission reduction target alongside its net-zero emission target for 2040. Its interim targets for 2030 would lead to a 3% emission reduction compared to its reported 2021 emissions.

Key developments over the past year: We could identify only minor changes to JBS's sustainability strategy since our previous analysis of the case study in the *2022 Corporate Climate Responsibility Monitor* (Day *et al.*, 2022). Most notably, JBS has increased its share of reported scope 3 emissions, although key emission sources are still excluded. Otherwise, only minor modifications were made to this case study.

JBS does not specify what share of its 2040 net-zero target will be based on emission reductions and what share will rely on offsetting. In its communication on its net-zero target, JBS says that it wants to reduce direct and indirect GHG emissions, while offsetting residual emissions (JBS, 2022, pp. 7, 63). We could not identify an emission reduction target accompanying its net-zero headline pledge. It is therefore unclear what share of JBS's emissions footprint will be offset by 2040. Given the limited detail on emission reduction measures and the expected continuous growth of the company, this share could be significant. JBS does not specify any details regarding what kind of offsetting projects it will procure credits from, the potential volume of credits it envisages needing, nor general criteria for ensuring robust environmental integrity in any offsetting claims it may make.

JBS's formulation of its interim emission intensity target for scope 1 and 2 is not transparent, and the target is highly insufficient, omitting the company's main emission sources. JBS says it wants to reduce scope 1 and 2 emissions intensity by at least 30% by 2030 compared to 2019 (JBS, 2021, p. 11), but is presented as an absolute target in its most recent sustainability report (JBS, 2022, p. 16). This inconsistency undermines the transparency of the target. Moreover, since its reported scope 3 emissions accounted for over 90% of its total emissions footprint in 2021 (JBS, 2022, p. 19), the target is also highly insufficient. We did not identify substantial emission reduction targets for JBS's most important emission sources in scope 3, which are primarily related to cattle rearing, including emissions from enteric fermentation, feed and manure.

We could not find significant details on how JBS intends to achieve its 2030 emission intensity target and 2040 net-zero target. Rather, JBS plans to continue growth in a GHG emission-intensive industry. We did not identify a comprehensive emission reduction strategy: the company provides minimal detail on how it wants to realise its targets. We did not find evidence that JBS intends to substantially innovate or diversify from its current activities. Without major innovations to drastically reduce the emissions footprint of meat production or diversifying away from this highly GHG emissions intensive industry, it is not credible for livestock agribusinesses to claim that they are on a path to deep decarbonisation. JBS describes it is in the process of developing an emission reduction strategy, but this is not expected before late 2023 (JBS, 2022, p. 10).

JBS aims for 60% renewable electricity in its facilities by 2030 and 100% by 2040 but provides little information about current and planned renewable energy supply constructs. The company claims that renewable electricity accounted for a major share of its consumption in 2021 (43%) (JBS, 2022, p. 68). JBS has some renewable energy generation on-site, using solar systems and residue biogas (JBS, 2022, p. 67). The company aims for 60% renewable energy by 2030 and 100% by 2040 (JBS, 2022, p. 16). To achieve this, on-site generation and high-quality energy procurement structures are necessary. However, the company does not specify what procurement constructs it currently uses and what it plans to use. It remains unclear whether these targets are credible.

JBS includes a larger share of emissions in its disclosure, but the data is still not presented transparently, and land-use changes related to rearing cattle are excluded. In its 2022 sustainability report, JBS included more emission sources in its emissions reporting, compared to its 2021 sustainability report (JBS, 2021, p. 43, 2022, pp. 64–65). JBS says that key emission sources including enteric fermentation, feed and manure management are included in its reported scope 3 emissions, but the company does not provide a breakdown of the emissions to these sources (JBS, 2022, pp. 64–65). Moreover, land-use change emissions related to rearing cattle are not covered for its emissions reporting for Brazil (JBS, 2022, p. 65). With the current level of detail, JBS's emissions disclosure does not allow for a thorough understanding of the emission sources and effectiveness of potential mitigation measures.

With its *Fund for the Amazon programme*, JBS will contribute to local sustainable development without claiming neutralisation, but these contributions are significantly lower than is required to be in proportion to the company's climate footprint, equating to only 0.01% of JBS' annual revenue. With projects such as 'RestaurAmazônia' and 'Release Credit for Forest Bioeconomy', JBS wants to support projects related to sustainable development in the Amazon biome (Fund for the Amazon, 2022b, 2022c). These projects are framed as contributions; we did not find evidence that JBS intends to claim neutralisation of emissions based on the projects' outcome. However, JBS will contribute a maximum USD 93 million to the fund up to 2030 (Fund for the Amazon, 2022a), equal to roughly 0.01% of its revenue. The volume of this financial contribution is equivalent to a carbon price on the company's emissions footprint of approximately just 0.13 USD per tonne CO_2e. This is substantially lower than the range of emerging carbon price recommendations for meaningful climate contributions, that equate to at least 80 USD per tonne of CO_2e (see section 4.2 of the Methodology).

Maersk

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Transport and logistics	USD 61.8 bn (2021)	78 $MtCO_2e$ (2022)	Net zero across the business and value chain by 2040 with 100% green solutions for customers	Reasonable	Reasonable

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

78 $MtCO_2e$ in 2022

Subsidiaries are covered.

Major emission sources: Fuel consumption on own vessels (s1) accounts for half of all emissions; upstream transportation and distribution and use of sold products for 17% and 13%, respectively.

Disclosure: Disclosure of GHGs is complete. Maersk reports separately on SOx, NOx and particulate matter emissions, including black carbon, but does not report on the climate impact of those emissions.

TRANSPARENCY & INTEGRITY

Scope 1	34.2
Scope 2	0.4
Scope 3 upstream	35.2
Scope 3 downstream	8.3

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net zero across the business and value chain by 2040 with 100% green solutions for customers*		
Short- and medium-term targets (up to 2030)	*2030 targets for ocean activities: 50% reduction in GHG intensity (below 2020) and 25% of cargo to be transported with green fuels. Separate targets for air cargo, logistics facilities, landside and own terminals.*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2030 — Absolute emission reductions cannot be derived from the company's emission intensity targets. The green fuel targets for shipping exceed 1.5°C-compatible benchmarks for this sector.		
Long-term vision (beyond 2030)	*Net zero across the business and value chain by 2040 with 100% green solutions for customers*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	91% by 2040 — 90% reduction from 2020 levels is in line with sectoral benchmarks. No explicit mention that non-GHG climate forcers are covered, but these will decrease as Maersk makes the transition from fossil fuels to zero-carbon fuels.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Comprehensive plans to shift from fossil fuels to low-carbon and zero-carbon alternatives. No commitment to using bio-based fuels as an interim solution only.		
Renewable electricity procurement	All European terminals are powered by renewable energy, but more details are lacking. Focus on PPAs and on-site installations in the future.		?

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	'Natural climate solutions' to sequester at least 5 $MtCO_2$ in 2030.		?
Climate contributions	Plans to remove and store at least 5 MtCO2 in 2030 without making a neutralisation claim; further details are lacking.		?
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	Plans to 'neutralise' 10% of 2020 emissions through nature-based climate solutions to make a net-zero claim by 2040.		

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Maersk (2021, 2022a, 2022b, 2022c, 2022d, 2022e, 2022f, 2022g, 2022h, 2023a, 2023b).

See **Annex II** for more details on our assessments of companies' targets

Maersk

Maersk is one of the world's largest container shipping line and vessel operators. Close to half of Maersk's GHG emissions stem from fuel use on their ships; while upstream transportation and distribution accounts for about 30% of the company's GHG footprint. The company committed to net zero by 2040 and specified this includes a reduction of 90% across the value chain, compared to 2020 levels. Maersk could enhance its climate ambition by committing to use bio-based fuels as an interim solution only, before making the full switch to zero-carbon technologies, such as e-fuels.

Maersk commits to reduce emissions across the value chain by 90% below 2020 levels but does not yet specify what type of carbon dioxide removals it will use to offset the remaining 10%. Maersk announced its net-zero target for 2040 in January 2022 and has recently specified this target entails a commitment to reduce scope 1, 2 and 3 emissions by 90% below 2020 levels [Maersk, 2023a, p.22]. Compared to 2019 emissions, this means a reduction of 91% across scopes 1, 2 and 3. Maersk's reduction commitment is in line with benchmarks for the maritime sector, most of which show that the shipping sector should fully decarbonise in the 2040s (IRENA, 2021, p. 81; Smith *et al.*, 2021, p. 106; SBTi, 2022e, p. 11; Teske, 2022, p. 213).

Maersk plans to invest in 'robust and third-party verified nature-based CDR projects, such as conservation and restoration projects (Maersk, 2022a, p. 22) but gives no further details on the integrity conditions it would impose on these projects. Although nature-based CDR projects need financial support, issues related to permanence and scarcity make such projects unsuitable to claim the neutralisation of own GHG emissions (see Section 4.4.2).

Maersk's disclosure of GHG emissions and other air pollutants is detailed but could be enhanced by reporting on the climate impact of black carbon emissions. Maersk provides a comprehensive overview of scope 1, 2 and 3 emissions. In its sustainability report over 2022, the company reported for the first time on black carbon emissions, which enhances the comprehensiveness of its disclosure (Maersk, 2023a, p. 36. 2023b). However, the company does not yet report on the climate impact of black carbon and other air pollutants. Black carbon is a climate forcer that warms the Earth through changes in surface albedo when it is deposited on snow and sea ice and by absorbing solar radiation in the atmosphere (CAT, 2022b). The International Maritime Organization estimates that black carbon accounted for about 7% of international shipping's emissions in 2018, making it the sector's second largest emission source (IMO, 2020, p. 110).

Maersk invests heavily in the development of various alternative fuels, but it is unclear if the company considers bio-based fuels only as an interim solution before making the full switch to more sustainable decarbonisation options. The company focuses its efforts on biodiesel from waste feedstocks, bio- and e-methanol, and e-ammonia, preferring not to use LNG and other transitional fuels (Maersk, 2022a, p. 21). Maersk recognises that the limited availability of sustainable feedstock and competing demand from other sectors means that bio-based fuels have limited potential. The company invests in ships that can sail on bio-based and e-fuels (Maersk, 2022d) and has signed various agreements with fuel suppliers to scale the production of e-methanol and bio-methanol (European Energy, 2022; Maersk, 2022c; Ørsted, 2022). The suppliers of e-fuels, including Ørsted and European Energy, develop new renewable energy installations to produce those fuels. While it is commendable that Maersk invests in a range of alternative fuels, most of which are not yet available at scale, overreliance on bio-based fuels risks hindering the transition in other sectors and may indirectly lead to negative sustainability impacts. Given that the shipping sector can make the full shift to zero-carbon technologies, including e-fuels, by 2040, biofuels should only be used as a transitional fuel until those e-fuels become available at scale (ICCT, 2018). Maersk could enhance its climate plans by committing to use bio-based fuels only as an interim solution before shifting to zero-carbon fuels that have no sustainability implications.

In addition to its investments in alternative fuels, which will drive down scope 1 emissions, Maersk invests in decarbonising land-side infrastructure and its air transport activities (Maersk, 2022g, 2022e, 2022h). For instance, the company makes the shift to electric trucks, increases its rail transport offering and purchases sustainable aviation fuels for a share of its air freight. Although there is large need for massive investments in decarbonisation technologies for the aviation sector, the potential of SAF is constrained by energy demand in other sectors. The production of synthetic fuels requires large amounts of renewable energy that is currently not available. Maersk commits to decarbonising its terminals, including through the installation of on-site renewable energy capacity, electric container handing equipment and zero-emission shore power for vessels at berth (Maersk, 2021, p. 24). However, more information would be needed to evaluate Maersk's approach to procuring renewable electricity.

Maersk set an ambitious target for green fuel usage in 2030 but could enhance its short-term ambition by also committing to absolute emission reductions. Maersk is committed to transport 25% of all ocean cargo with green fuels that have 'low or very low greenhouse gas emissions on a lifecycle basis' by 2030 (Maersk, 2022b). This likely goes beyond scientific benchmarks showing that 5-17% of maritime fuels need to be zero-emission fuels by 2030 (Smith *et al.*, 2021, p. 11; UNFCCC, 2021, p. 15; Boehm *et al.*, 2022, p. 74). Maersk could further elaborate on this target by specifying the expected share of bio-based fuels and assumptions underlying the calculation of fuels' lifecycle emissions. The shipping company is also committed to reduce the carbon intensity of its ocean activities by 50% compared to 2020 emissions, and has set separate targets for air cargo, terminals, logistic facilities and landside activities (see Annex II for a full overview) (Maersk, 2022a, p. 19). The company has not set absolute emission reduction targets for its scope 1 and 3 emissions. These would be needed to send a stronger signal for deep emission reductions in the next seven years.

Mercedes-Benz Group

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Automobiles	USD 198.6 bn (2021)	124.9 $MtCO_2e$ (2021)	New vehicle fleet CO_2-neutral across all stages of the value chain by 2039	Low	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

124.9 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Use phase of sold vehicles (80% in 2021, downstream s3), purchased goods and services (16% in 2021, upstream s3).

Disclosure: S3 emissions reported for 2021 only (no data prior to spin-off of Daimler Truck AG in 2021). Several s3 emissions categories not disclosed and third-party analysis calls integrity of downstream s3 disclosure into question.

TRANSPARENCY & INTEGRITY

Scope 1	0.7
Scope 2	1.1
Scope 3 upstream	23.1
Scope 3 downstream	100

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*New vehicle fleet CO_2-neutral across all stages of the value chain by 2039*		
Short- and medium-term targets (up to 2030)	*- 40% vehicle life-cycle emissions intensity reduction by 2030 (below 2018)* *- 50% absolute s1 & s2 emissions reduction by 2030 (below 2018)*	Half-circle	Dashed circle
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2030		
	No 1.5°C-aligned phaseout dates for ICEs. 2030 targets cannot be quantifed across the entire value chain due to lack of historical emission data.		
Long-term vision (beyond 2030)	*New vehicle fleet CO_2-neutral across all stages of the value chain by 2039*	Dashed circle	Dashed circle
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2039		
	All emission scopes covered. No emission reduction commitment alongside carbon neutrality pledge. No 1.5°C-aligned phaseout dates for ICEs.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Relevant measures for key emission sources, including investments in vehicle electrification and low-carbon steel production. Limited details on timeline and expected impact.	Half-circle	Half-circle
Renewable electricity procurement	Detailed information disclosed for German production plants only. On-site generation and PPAs (solar, wind, hydro) with combined storage to match consumption and generation.	Half-circle	Half-circle

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Offsetting claim for production plants worldwide as of 2022 with uncertain impact.	Dashed circle	Dashed circle
Climate contributions	*No climate contributions identified.*	N/A	Dashed circle
Offsetting claims today	Use of offsets to claim 'CO_2-neutral' production plants worldwide as of 2022. No information disclosed on volume and project types.	Dashed circle	Dashed circle
Offsetting plans for the future	The carbon neutrality target for 2039 target may depend on offsets, but no further details disclosed.	Dashed circle	?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Mercedes-Benz Group (2020a, 2020b, 2021a, 2021b, 2022a, 2022b, 2022c, 2022d, 2022e, 2022f) and Bonaccorsi *et al.* (2022)

See **Annex II** for more details on our assessments of companies' targets

Mercedes-Benz Group

Mercedes-Benz Group AG is a German automobile manufacturer. Most of Mercedes-Benz Group AG's emissions originate in the use phase of its sold vehicles, accounting for more than 80% of its 2021 emissions. The company pledges to make its entire vehicle fleet 'CO_2 neutral' across all stages of the value chain by 2039 but provides no clarity on what this means for *actual* emission reductions. Mercedes-Benz commits to a wide range of emission reduction measures across all scopes as part of its 'Ambition 2039' programme, and high-quality renewables procurement for its Germany-based operations. Its climate strategy for vehicle electrification and its short-term targets, however, fall short of emission pathways aligned with the Paris Agreement's 1.5°C global warming limit for the automobile industry.

Mercedes-Benz sets a carbon neutrality target for 2039 that covers its entire value chain, but provides no information on what this target means in terms of *actual* emission reductions. It remains unclear whether and to what extent Mercedes-Benz will rely on offsetting to meet its 2039 target (Mercedes-Benz Group, 2022e, p. 130, 2022a, p. 23). For example, the company neither explains how it defines 'CO_2-neutral production material' as part of its commitment to exclusively purchase such materials by 2039 nor specifies if its suppliers can rely on offsetting to label a given material as 'CO_2-neutral' (Mercedes-Benz Group, 2020b, 2022a, p. 35). Mercedes-Benz claims that it has been purchasing 'CO_2-neutral' battery cells from two suppliers since 2021 (Mercedes-Benz Group, 2022e, p. 146), but these claims are not supported by any clarification on the respective suppliers' production processes.

Mercedes-Benz commits to several interim targets for 2022, 2025 and 2030 that are not aligned with key decarbonisation milestones compatible with the Paris Agreement's 1.5°C temperature limit, especially for use phase emissions of its sold vehicles. Mercedes-Benz vaguely commits to sell only electric vehicles 'wherever market conditions allow' by 2030 (Mercedes-Benz Group, 2022e, p. 130, 2022a, p. 23). The company does not commit to specific phaseout dates for internal combustion engines as part of its electrification roadmap in key markets such as the European Union, the US, or China (Mercedes-Benz Group, 2022a, p. 18). For all these key markets, a 1.5°C compatible trajectory would require that electric vehicles account for 95-100% of all light-duty vehicle sales by 2030 (Climate Action Tracker, 2020b, p. 27; Teske *et al.*, 2022, p. 4). Recent analysis suggests that Mercedes-Benz currently underreports its disclosed life-cycle emissions of sold ICE vehicles by more than 60% due to potentially unrealistic assumptions on vehicle lifetimes (Bonaccorsi *et al.*, 2022, pp. 15–16).

In November 2021 at COP26, Mercedes-Benz was the only German automaker to sign a declaration committing to a fully electric new vehicle fleet in leading markets by 2035 (COP26 Presidency, 2021). Since then, the company has not incorporated specific phase-out dates into its climate strategy. The company's political lobbying supports positions for and against more stringent climate action through its own interactions with regulators and membership in regressive industry associations in the EU and US (InfluenceMap, 2021, 2022b).

Mercedes-Benz implements emission reduction measures for all key emission scopes as part of its 'Ambition 2039' programme, for example, forward-looking actions to facilitate the switch to low-carbon steel procurement in the future. Mercedes-Benz commits to large investments to electrify its vehicles, accelerate the roll-out of charging infrastructure, and support battery technology and low-carbon steel production (Mercedes-Benz Group, 2022e, pp. 132–153, 2022a, pp. 30–36, 2022c, 2022d). Mercedes-Benz outlines several measures to reduce its upstream supply chain emissions, which represent 19% of all emissions in 2021 (Mercedes-Benz Group, 2022e, pp. 145–147, 2022a, pp. 34–35). The company will procure low-carbon steel from suppliers such as Salzgitter Flachstahl GmbH and SSAB AB, and it purchased an equity stake in a the Swedish start-up H2 Green Steel (H2GS) in 2021 (Mercedes-Benz Group, 2021a, 2022a, p. 34, 2022e, pp. 169–170). H2GS is developing a technology to make steel using green hydrogen and renewable electricity, which will enable Mercedes-Benz as a preferential buyer to use low-carbon steel from 2025 onward. To enhance the transparency and accountability of its plans to procure low-carbon steel, Mercedes-Benz could communicate specific milestones to purchase low-carbon steel over time and the estimated emission reductions impact.

Mercedes-Benz provides limited information on the use of offset credits and renewable electricity procurement that form the basis for its contentious claim of 'carbon-neutral' production plants worldwide as of 2022. Mercedes-Benz uses a combination of site-specific emission reduction measures, procurement of renewable electricity, and offsetting to justify its claim of 'carbon-neutral' production processes (Mercedes-Benz Group, 2022a). The company neither specifies the extent to which it relies on offset credits, nor the type and prices for the credits purchased, making this claim highly ambiguous and contentious (Mercedes-Benz Group, 2022e, p. 150).

As for the procurement of renewable electricity at its production sites, the company installs own renewable electricity generation capacity at many of its sites and uses PPAs and RECs to procure all remaining electricity (Mercedes-Benz Group, 2022e, pp. 149–150, 2022b). In Germany, the Mercedes-Benz Group procures renewable electricity from solar, wind and hydro through PPAs and uses electricity storage facilities that match consumption and generation at all times (Mercedes-Benz Group, 2021b; Statkraft, 2021). The company provides limited information on renewable energy procurement for its production plants outside of Germany.

Microsoft

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Technology - Services	USD 168.09 bn (2021)	19.2 $MtCO_2e$ (2021)	Carbon negative by 2030	Reasonable	Moderate

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

19.2 $MtCO_2e$ in 2021

Subsidiaries are covered *(ZeniMax Media, acquired in Mar 2021, only included from start of 2022).*

Major emission sources: Emissions from electricity (25%; location-based s2), purchased goods and services (26%), and the construction of offices/datacentres (22%).

Disclosure: Comprehensive disclosure of all emission scopes, but market-based s2 estimates are used for aggregated disclosure and targets.

TRANSPARENCY & INTEGRITY

Scope 1	0.1
Scope 2	4.7
Scope 3 upstream	10.3
Scope 3 downstream	4.0

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Carbon negative by 2030*		
Short- and medium-term targets (up to 2030)	***Microsoft pledges to become carbon negative by 2030 and maintain its existing claim of carbon neutrality each year until 2030.***		
Scope coverage: S1 S2 S3 Own emission reductions (compared to full value chain in 2019): 38% by 2030	Commitment to reduce market-based emissions by 50% by 2030, which translates to a 38% reduction of location-based emissions.		
Long-term vision (beyond 2030)	***Pledge 'to remove by 2050 all the carbon the company has emitted either directly or by electrical consumption since it was founded in 1975'.***		
Scope coverage: ? Own emission reductions (compared to full value chain in 2019): ? by 2050	No clear plans to reduce emissions beyond 2030. We interpret the target as a commitment to offset historical s1 and s2 emissions since 1975.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Measures for most emission sources, but implementation scale unclear. Flagship projects test innovative new abatement technologies.		
Renewable electricity procurement	100% RE in 2021 through unbundled RECs and PPAs. Target of 100% local RE with 24/7 matching by 2030.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Microsoft offset less than 2% of its emissions in 2021.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	Mainly nature-based solutions (99%) with a 'contracted durability' of less than 100 years and an average credit price of 19.4 USD/tCO_2.		
Offsetting plans for the future	Microsoft aims to move away from its strong focus on nature-based solutions, towards an increased share of high durability removals.		

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Microsoft (2021, 2022a, 2022b, 2022c, 2022d, 2022e).

See **Annex II** for more details on our assessments of companies' targets

Microsoft

Microsoft Corporation is a technology company that develops hardware and software products. The company's main emissions stem from the purchase of goods and services (26%), its own electricity consumption (25%), purchased capital goods (22%), and the electricity consumed by the end user of Microsoft's products (21%). Microsoft sets a strong example in its transparency of emissions disclosure and offset credit use, and is proactive in testing innovative technologies for emission reductions. But Microsoft's targets lack integrity: the 'carbon neutral' since 2012 claim and 'carbon negative' by 2030 target are seriously undermined by a large reliance on contentious carbon dioxide removals. In reality, the company makes no commitment to reduce emissions by more than 38% of 2019 levels.

Microsoft's bold claims of 'carbon neutrality' and 'negative carbon' are heavily dependent on carbon dioxide removals that are unlikely permanent. To achieve its 'carbon negative' by 2030 target, Microsoft plans to simply offset half of its current emission footprint. The company has announced it will move away from using carbon credits based on reduced emissions – which it recognises are not aligned with the goals set out in the Paris Agreement (Smith, 2020, p. 8) – and aims to increase its share of what it terms 'high durability' carbon removal projects. However, the portfolio of carbon credits used to claim to offset its emissions in the fiscal year 2021 consists of 99% low-durability carbon dioxide removals with biological storage, such as reforestation projects in the US and soil sequestration projects in Australia. Microsoft reports that these have a 'contracted durability' of just 20-25 years (Microsoft, 2022b, 2022c, p. 13). These carbon removal measures do not definitively counterbalance the emissions released through Microsoft's activities, particularly due to a lack of robustness around the additionality, permanence, and risk of double claiming of the carbon credits used (for more information on Microsoft's offset strategy see Section 4.4.3).

Microsoft's 'carbon neutral' claims exclude most emission sources, and its 'carbon negative' target only entails a 38% emission reduction. Microsoft claims it is 'carbon neutral' since 2012 and pledges to become 'carbon negative' by 2030 while continuously committing to its 'neutrality' target each year. The 'carbon neutrality' claim might be misleading as it only covers around 7% of Microsoft's emissions in 2019; namely the company's direct emissions as well as indirect emissions from electricity, steam, cooling water, and business air travel (Microsoft, 2022a, p. 100). The commitment to become 'carbon negative' by 2030 is much broader, covering Microsoft's total supply and value chain emissions. However, Microsoft uses a GHG emission accounting method to make achieving this target easier without having to substantially decarbonise its purchased electricity. While Microsoft tracks both its location- and market-based electricity consumption emissions, only the market-based values are included in its aggregated emissions disclosure and target coverage (Microsoft, 2022a, p. 104). Microsoft's location-based emissions are almost six times higher than its market-based emissions. As a result, the 2030 target only covers around 76% of Microsoft's full emission footprint. With half of these emissions set be offset, Microsoft's 2030 target entails a commitment to an emission reduction of just 38% of its 2019 location-based emissions (50% of its market-based emissions).

Microsoft currently lacks any significant targets for further emission reductions beyond 2030. The 'carbon negative' terminology of the 2030 pledge may give the impression that this is the company's end-goal, despite only equating to a moderate reduction of the company's emissions. Indeed, Microsoft sets out no further emission reduction commitments beyond this date. Microsoft communicates a longer-term pledge to remove by 2050 all of its direct emissions as well as those from consumed electricity since its foundation in 1975 (Microsoft, 2022a, p. 104). However, this additional offsetting pledge does not commit Microsoft to any further emission reductions. Taking responsibility for historical emissions is good practice but it is far more important to take responsibility for future emissions, through robust and transparent plans for deep decarbonisation.

For its electricity emissions, Microsoft plans to improve on its currently contentious reliance on RECs, through a commitment to 100% local renewable energy with 24/7 matching. Microsoft acknowledges that unbundled RECs – which form the basis of its historical scope 2 emission reduction claims – have limited impact (Microsoft, 2022a, p. 23). The company plans to secure an increased share of high quality long-term PPAs, with the goal to cover 100% of Microsoft's operational electricity demand with additional renewable energy by 2025. Further, Microsoft pledges that by 2030 all of its consumed electricity will come from local renewable energy sources, and be matched on an hourly basis (Microsoft, 2022a, p. 23). This 24/7 matching approach was first applied by Microsoft in 2021 in its Swedish datacentre, where Vattenfall provides RECs to the datacentre on an hourly basis to match consumption (Walsh, 2020, pp. 1–3). This approach is currently being expanded to one of the datacentres in Amsterdam. Microsoft claims that 100% of its electricity consumption in the Amsterdam datacentre will be matched with renewable energy from the Borssele wind park going forward (Microsoft, 2022a, p. 24), though we could not identify how Microsoft intends to match its electricity consumption with renewable energy at times where the Borssele wind park produces little energy. Despite the increased focus on high-quality PPAs and 24/7 matching consumption with renewable energy production, Microsoft still plans to continue to purchase unbundled RECs until 2030 (Microsoft, 2022a, p. 23, 2022d, p. 69). In 2021 around 60% of Microsoft's total energy consumption was covered by higher quality renewable energy (Microsoft, 2022a, p. 101). Microsoft does not clarify what it does with the RECs generated through its PPAs, leaving the door open for double claiming of Microsoft's renewable energy. The share of on-site renewable energy generation has decreased over the last five years and accounts for less than 1% of its total consumed electricity in 2021 (Microsoft, 2022a, p. 101).

Microsoft demonstrates a proactive approach to test innovative solutions for complex emission sources and to engage suppliers, but provides insufficient details to allow us to understand their reduction impact. Emission reduction measures for direct emissions and indirect emissions through consumed electricity (scope 1 and 2) mainly focus on the procurement of renewable energy for its operations (Microsoft, 2022a, pp. 21–24). Yet, it remains unclear how Microsoft plans to reduce most of its scope 3 emissions. Location-based scope 3 emissions account for over 75% of Microsoft's total emissions in 2021. Most of these emissions stem from the extraction of raw materials and manufacturing of products used for datacentres and hardware products, as well as from the use of Microsoft's hard and software products (Microsoft, 2022a, p. 98). Increasing demand for data centre services may drive an increase in scope 3 emissions in the coming years. Microsoft plans to reduce its carbon footprint by engaging its suppliers to reduce their own operational emissions and by helping its customers to better understand their emission footprint from using Microsoft's services (Microsoft, 2021, pp. 11, 15). Microsoft's Supplier Code of Conduct requires all suppliers to commit to an emission reduction of at least 55% by 2030 (Microsoft, 2022e, p. 11). It remains unclear what emission scope that target covers, which base year is applied and if the supplier is allowed to rely on offsets and RECs to achieve its target. For other hard-to-abate emission sources, for instance, embodied emissions in buildings; back-up generators for datacentres; or air travel, Microsoft supports the development of pilot projects that are rolled out company-wide if proven successful. For example, Microsoft partners with CarbonCure to scale up the development low-carbon cement and has applied these new materials in the LinkedIn (a subsidiary of Microsoft) headquarters in both Silicon Valley and Dublin (Microsoft, 2022a, pp. 25, 26).

Nestlé

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Food, beverages & agriculture	USD 95.2 bn (2021)	118.7 $MtCO_2e$ (2021)	Net zero by 2050	Low	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

118.7 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Main emissions are from agricultural activities and other purchased goods and services (72%).

Disclosure: Annual disclosure of emissions, but with limited detail and no breakdown in public-facing reporting.

TRANSPARENCY & INTEGRITY

Scope 1	3.4
Scope 2	2.6
Scope 3 upstream	95.6
Scope 3 downstream	18.1

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net zero by 2050*		
Short- and medium-term targets (up to 2030)	*By 2025, reduce emissions by 20%. By 2030, reduce emissions by 50%.*		
Scope coverage: S1 S2 S3	Targets equate to 16-21% reduction of full emissions footprint in 2019, excluding 'insetting' measures to claim that emissions have been offset.		
Own emission reductions (compared to full value chain in 2019): 16-21% by 2030			
Long-term vision (beyond 2030)	*Net zero by 2050*		
Scope coverage: S1 S2 S3	Undefined role of 'insetting' measures to claim that emissions are offset; no assessment possible.		
Own emission reductions (compared to full value chain in 2019): ? by 2050			

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Reduction measures presented with limited detail and compared to BAU. Major emission sources are addressed, but no clear signs of transformation in agricultural activities.		
Renewable electricity procurement	Renewable electricity procurement constructs account for over 60% of consumption, mostly through PPAs. Disclosure of information only in CDP responses.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Untransparent offset claims through 'insetting'.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	Offsetting claims under the term 'insetting'. 9.7 $MtCO_2e$ removals claimed since 2018; no details provided. Some brands claim climate neutrality.		
Offsetting plans for the future	All targets depend on offsetting under the term 'insetting'. Limited details are provided.		

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Nestlé (2021a, 2021b).

See **Annex II** for more details on our assessments of companies' targets

Nestlé

Switzerland-based Nestlé S.A. (Nestlé) is the world's largest food and beverage company by revenue, with brands such as KitKat, Nesquik and Nespresso. The biggest share of Nestlé's emissions is related to agricultural activities. Nestlé's targets are potentially misleading and ambiguous: we interpret that the pledge to reduce emissions by 50% by 2030 translates to emission reductions of just 16–21%, while the meaning of the 2050 net zero pledge is unclear. The company does not have clear plans for the deep decarbonisation of agricultural emissions but rather plans to offset emissions under the guise of 'insetting'.

Key developments over the past year: We did not identify any improvements on the key issues that undermine Nestlé's climate strategy since we published the previous iteration of this analysis in February 2022 (Day *et al.*, 2022). Following the publication of the ***2022 Corporate Climate Responsibility Monitor***, Nestlé released a statement to clarify that its 2030 target is compared to 2018 levels rather than a business-as-usual trajectory, but the complex and untransparent accounting behind this target leads us to the interpretation that the target remains far weaker than it appears.

Nestlé's emission reduction pledges may be misleading. We interpret that the pledge to reduce emissions by 50% by 2030 translates to only 16–21% emission reductions compared to the company's emissions in 2019. Nestlé's SBTi-certified targets include emission reduction targets for 20% by 2025 and 50% by 2030, compared to a 2018 base year (Nestlé, 2021b, p. 4). In its *Net Zero Roadmap*, Nestlé presents its interim emission reduction targets for each emission source compared to a business-as-usual scenario, showing the targeted emission levels for each emission source for 2030 (Nestlé, 2021b, p. 4). We calculate from the figures presented in the company's *Net Zero Roadmap* that the company's commitments translate to just a 16% reduction of the company's full value chain emissions in 2019, or a maximum of 21% under the most optimistic interpretation (see further details on the target and this calculation in the *Integrity assessment for short- and medium-term target(s) towards 2030* in Annex II).

Nestlé's 2050 net-zero pledge remains ambiguous and does not entail a clear emission reduction commitment. As for the 2025 and 2030 targets, Nestlé's 2050 net-zero pledge covers only 80% of Nestlé's 2018 emissions footprint; emissions related to use of sold products and purchased services, leased assets, capital goods and investments are excluded (Nestlé, 2021b, p. 7). The pledge does not include any specific emission reduction commitment, while Nestlé states that it plans to claim the neutralisation of emissions. Further clarification is needed to understand whether the 2050 pledge represents a commitment that is credible and comprehensive.

Nestlé claims that it will 'not allow' offsetting to achieve its targets, but the company actually claims that a significant portion of emissions are offset under the guise of 'insetting', while some of Nestlé's brands already claim carbon neutrality through offsets. The measures that contribute towards Nestlé's 2030 pledge include biological carbon removal and storage which will offset 12.3 $MtCO_2e$ of Nestlé's 2030 emissions, as well as further so-called 'insetting' measures to offset another 13 $MtCO_2e$ of its 2030 emissions. 'Insetting' is a business-driven concept with no universally accepted definition. The approach facilitates offsetting claims, under the guise of a different terminology. 'Insetting' is a potentially misleading terminology that can lead to low credibility GHG emission offsetting claims and the double counting of emission reductions (see section 4.4.1). Moreover, individual, consumer-facing Nestlé brands are already claiming 'carbon neutrality', based on carbon offsets (see Day *et al.*, 2022 Box B5).

Nestlé's emissions reporting focuses on a share of emissions and reports progress towards its targets compared to a potentially misleading business-as-usual scenario. In its main sustainability reports, Creating Shared Value, Nestlé reports on emissions without a breakdown (Nestlé, 2021a). Moreover, the company presents its progress towards target realisation compared to a business-as-usual scenario and uses language around cumulative and annual emission reductions and removals interchangeably (Nestlé, 2021a, p. 21). The reporting style does not allow for a thorough understanding of emission sources and trends, and presenting progress as such can be highly misleading.

Nestlé's plans do not include sufficiently transformational measures to achieve deep decarbonisation of agricultural emissions in the long run. The majority of Nestlé's GHG emissions derive from upstream agricultural activities upstream. The agriculture sector faces major challenges for decarbonisation; existing technologies and measures to mitigate the emissions intensity of many agricultural products have limited potential, especially for the livestock sector, which accounts for approximately 30% of Nestlé's emissions. Although Nestlé's range of emission reduction measures are expected to lead to a respectable 48% reduction of manufacturing emissions by 2030, they will reduce emissions from dairy, livestock, soil and forests, which are far more significant emission sources, by just 6% between 2018 and 2030, excluding measures to claim that emissions are offset through non-permanent carbon capture (Nestlé, 2021b, p. 9,12,14,17). These emission sources represent the most significant challenge for agri-businesses. It is not credible for agri-businesses to claim that they are on a path to deep decarbonisation, without major innovations to drastically reduce the emissions footprint of livestock agriculture, or diversifying away from this highly GHG emissions intensive industry.

PepsiCo

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Food, beverages & agriculture	USD 79.5 bn (2021)	63.8 $MtCO_2e$ (2021)	Net-zero emissions across value chain by 2040	Low	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

63.8 $MtCO_2e$ in 2021

Subsidiaries appear to be covered, but it remains unclear whether PepsiCo includes brands that are co-owned by other companies.

Major emission sources: Major emissions sources are agricultural practices (33%), packaging (26%) and up- and downstream transportation and distribution (20%).

Disclosure: Disclosure in public-facing documentation has limited detail. PepsiCo publishes its CDP disclosures, with a full breakdown of emission scopes and sources.

TRANSPARENCY & INTEGRITY

Scope 1	3.6
Scope 2	1.8
Scope 3 upstream	44.6
Scope 3 downstream	13.8

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero emissions across value chain by 2040*		
Short- and medium-term targets (up to 2030)	*By 2030: s1 and s2 emissions -75% & s3 emissions -40% (2015 baseline). Includes unspecified role for offsetting under the term 'insetting'.*	Very low	?
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2030 — Targets translate to 48% emission reductions, but includes offsets claimed through 'insetting'. Emission reductions will be lower in reality; unclear by how much.		
Long-term vision (beyond 2030)	*Net-zero emissions across value chain by 2040*	Very low	Very low
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	? by 2040 — PepsiCo does not specify the share of emissions that it will reduce under its net-zero target.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Various measures described, but their collective role in the strategy remains unclear. No clear signs of transformation in agricultural activities for deep emission reductions.	Moderate	?
Renewable electricity procurement	Overview of energy procurement in public CDP disclosure and summary on webpage. 72% of energy consumption is from RE sources; large share of RE based on unbundled RECs.	Moderate	Very low

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Offsetting claim for business travel.	Very low	Very low
Climate contributions	*No climate contributions identified.*	N/A	Very low
Offsetting claims today	Carbon price for business travel. Invested in regenerative agriculture in the supply chain to claim that travel emissions are offset.	Very low	Very low
Offsetting plans for the future	2030 and 2040 targets reliant on offsets, partly under the guise of 'insetting'. Insufficient information on projects.	Very low	Very low

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from PepsiCo (2021, 2022a, 2022b, 2022c, 2022d, 2022e).

See **Annex II** for more details on our assessments of companies' targets

PepsiCo

PepsiCo, Ltd. (PepsiCo) is a US-based food and beverages company, known for brands such as Pepsi, Lay's, Quaker and Gatorade. Major emissions are from agriculture, packaging, and distribution (all scope 3). PepsiCo has a target to reach net-zero emissions across its value chain by 2040 and says it will need to neutralise residual emissions with carbon offsets, without making any clear emission reduction commitments for the target year. PepsiCo's short- to mid-term climate targets translate to emission reductions of 48% by 2030, but these also depend on an unspecified role for offsetting under the guise of 'insetting'. Although the company wants to increase the share of regenerative agriculture, PepsiCo only describes these and other measures in vague terms. We found limited evidence for transformations that would be necessary for a 1.5°C-aligned food and agriculture sector.

PepsiCo does not specify what share of emissions it will reduce under its 2040 net-zero target. In its Climate Action Strategy, PepsiCo illustrates that it wants to use carbon removals to reach its net-zero targets (PepsiCo, 2021). However, the company does not specify the volume of carbon that it aims to remove and store. To improve the integrity of its net-zero emissions target, it is crucial that PepsiCo specifies which share of emissions will be reduced. Without committing to at least 90% emission reductions, the net-zero target is ambiguous and potentially misleading.

Although PepsiCo explicitly states that the purchase of offset credits does not contribute to realising its 2030 targets, the company partially depends on neutralisation through 'insetting'. PepsiCo aims to reduce its scope 1 and 2 emissions by 75% and its scope 3 emissions by 40% by 2030, compared to 2015 emission levels. These targets translate to 48% emission reductions compared to its 2019 value chain emissions. Although PepsiCo explicitly states that these targets do not depend on the purchase of offset credits (PepsiCo, 2022b), the target realisation partially depends on offsetting emissions under the term 'insetting', as illustrated in PepsiCo's Climate Action Strategy (PepsiCo, 2021). PepsiCo does not specify what kind of 'insetting' practices it will use. The company mentions regenerative agriculture practices but does not specify further. We interpret that 'insetting' is an offsetting claim related to the use of biological carbon storage with low permanence. See Section 4.4.4 for an elaboration on the issues related to 'insetting'. As PepsiCo does not communicate any clear emission reduction commitment for 2030, it is unclear what proportion of its target depends on this form of offsetting. PepsiCo does not commit to emission reductions beyond its interim 2030 targets either.

Although PepsiCo takes several innovative decarbonisation approaches, it remains unclear how these measures will lead to necessary deep emission reductions and the realisation of targets. PepsiCo presents its emission reduction strategy in thematic areas, covering major emission sources such as deforestation, agriculture, transport, energy consumption, and packaging. However, the company shows the current climate impact of only a few of these issues. PepsiCo's agriculture-related emissions accounted for a third of its 2021 emissions footprint (PepsiCo, 2022b). The company's main strategy to reduce agricultural emissions is implementing regenerative agriculture, though without specifying the actual measures related to this. PepsiCo estimates that regenerative agriculture will lead to a reduction of 3 $MtCO_2e$ by 2030, which would lead to an emissions reduction of only 5% compared to 2021 levels (PepsiCo, 2022a). This falls far short of the radical transformation of the global agriculture sector that would be necessary to align with 1.5°C-compatible decarbonisation trajectories (Boehm *et al.*, 2022, p. 127). For other major emission sources, PepsiCo does not provide estimates of the emission reduction potentials. Since the company's emissions have only further increased from 2015 (PepsiCo, 2022b) and since PepsiCo categorises many of its proposed measures as not yet scalable (PepsiCo, 2021), it seems unlikely that the company's climate strategy is sufficient to bring its emissions in line with what is needed to realise the deep emission reductions that are implied by its mid- and long-term targets.

PepsiCo makes bold claims regarding its renewable electricity consumption, but the lion's share of renewable electricity is procured through RECs. PepsiCo claims that 70% of its 2021 electricity consumption was from renewable sources, and that PepsiCo's operations in 13 of 200 countries were 100% based on renewable electricity (PepsiCo, 2022d, 2022e). However, less than 20% of its electricity consumption is from higher-quality procurement constructs, such as PPAs, or self-generation (PepsiCo, 2022c, pp. 78; 100–131, 2022d). The lion's share of its renewable electricity is procured with unbundled EACs and GOs, both also known as RECs. RECs do not guarantee that the consumed electricity truly stems from additional renewable energy sources (see Box 1, Section 3.2.2). Claiming that its electricity consumption is 70% renewable is therefore highly contentious. Although the company says it wants to finance the development of new wind and solar installations with PPAs, it does not specify the volume of finance or the size of these installations (PepsiCo, 2022d). Stronger commitments to increase the share of renewable power procured with high-quality PPAs or generated on site would make PepsiCo's claims more credible and would have a more meaningful impact in reducing the company's scope 2 emissions.

Samsung Electronics

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Technology - Electronics	USD 244.4 bn (2021)	143.4 $MtCO_2e$ (2021)	Net-zero carbon emissions by 2050	Low	Very low

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

143.4 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Product use (70%, s3) and energy consumption (9%, s2).

Disclosure: S1 and s2 emissions are reported in public documentation. S3 emissions (86%) are broken down but only disclosed to CDP.

Scope 1	7.6
Scope 2	12.6
Scope 3 upstream	20.2
Scope 3 downstream	103.0

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Net-zero carbon emissions by 2050*		
Short- and medium-term targets (up to 2030)	*Net-zero carbon emissions (s1 & s2) for all operations in the DX Division by 2030.*		
Scope coverage	S1 S2 S3 — The target covers s1 and s2 of the DX division and excludes all other emissions.		
Own emission reductions (compared to full value chain in 2019)	2% by 2030		
Long-term vision (beyond 2030)	*Net-zero direct and indirect carbon emissions by 2050 across all global operations*		
Scope coverage	S1 S2 S3 — Commitment to reduce ~17 $MtCO_2e$ by 2050 (i.e., 100% reduction of s1 and market-based s2 in 2021). Scope 3 is not included.		
Own emission reductions (compared to full value chain in 2019)	20% by 2050		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Measures target most emission sources but are described superficially and often set to be implemented by 2030 or beyond, with limited clarity on short-term action.		?
Renewable electricity procurement	RE accounts for 20% of electricity use, sourced through PPAs, on-site installations, and RECs. 100% RE in the US and China, with 100% goal in all markets except Korea by 2027.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	No information identified.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	Unspecified use of 'emission permits' from CDM projects in Kenya and India; no carbon neutrality claim made.		?
Offsetting plans for the future	Net-zero targets set for 2030 and 2050; no clarity on the extent to which the company will rely on offsetting to achieve the targets.		?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Samsung (2022a, 2022b, 2022c).

See **Annex II** for more details on our assessments of companies' targets

Samsung Electronics

Samsung Electronics Co., Ltd., (Samsung) is a South Korean multinational corporation that manufactures electronic devices such as smartphones and TVs, and electronic parts such as display panels and semiconductors. Samsung's net-zero target for 2050 represents a commitment to reduce just 20% of its 2019 emission footprint. The company's climate strategy currently amounts to medium- and long-term commitments and measures for the decarbonisation of only selected emission sources and product lines, while plans for short-term action remain less clear.

Samsung set a net-zero carbon emissions target by 2050, but it only commits to reduce 20% of its 2019 emissions footprint. Samsung commits to achieve net-zero carbon emissions across all global operations by 2050 and across the company's 'Device Experience (DX) Division' by 2030 (Samsung, 2022b). However, these targets only include scope 1 and 2 emissions, which accounted for just 14% of the company's 2021 emission footprint. Samsung reports that it will set emission reduction targets for its scope 3 emissions in the future (Samsung, 2022b). For the 2050 target, Samsung 'expects to reduce' ~17 $MtCO_2e$, which correspond to scope 1 and market-based scope 2 emissions in 2021 (Samsung, 2022c, p. 100). A reduction of 17 $MtCO_2e$ would translate to a reduction across the entire value chain of 20% below 2019 levels (Samsung, 2022a). For the 2030 target, the company does not specify the share of scope 1 and 2 emissions that it aims to reduce in the DX Division, but this emission source accounted for only 2% of Samsung's full value-chain emissions footprint in 2019. Samsung's 2030 and 2050 net-zero targets can lead consumers and investors to believe that the company aims for deep decarbonisation of its business, while the company has only committed to the decarbonisation of a minor share of its emissions footprint.

Samsung emitted 143 $MtCO_2e$ in 2021, but the company does not share a complete emissions footprint estimate in its public-facing documentation. In its 2022 sustainability report, Samsung discloses emission estimates for scopes 1 and 2, including different GHGs and years, but excludes scope 3 emissions (Samsung, 2022c, p. 94). These account for 86% of the company's 2021 emissions footprint, as we identified in its disclosure to CDP, a document that is only accessible with limitations through registration on the CDP website. Samsung would be more transparent if it shared its complete emissions footprint in its public sustainability strategy. Information on emission sources is highly relevant for Samsung's consumers and investors to understand the meaning and credibility of the company's targets and emission reduction measures.

Samsung presents emission reduction measures for most of its emission sources, but many of these are embodied in medium-term targets, while the company's plans for short-term action remain less clear. To reduce emissions in company processes (scope 1), the company will invest in new technologies, including treatment facilities for gases produced in semiconductor manufacturing (Samsung, 2022c, p. 27) and carbon capture in semiconductor lines (Samsung, 2022b). Within its supply chain (scope 3), Samsung aims to improve material recycling by expanding the global presence of its electronic waste collection system, reusing minerals from collected batteries, and using recycled resins (Samsung, 2022b). However, many of these measures lack details on their coverage and expected emission reductions and are set to be implemented by 2030 or beyond, while short-term plans are vaguer. Although the company participates in the CDP Supply Chain programme, it does not disclose concrete examples of technical or financial support for suppliers' emission reduction efforts beyond CDP training seminars (Samsung, 2022c, p. 82). Samsung plans to reduce product use emissions (which account for 70% of its emissions footprint) by improving energy efficiency in semiconductor memories, used in data centres and mobile devices, and reducing power consumption in seven consumer electronic products by 30% by 2025, compared to equivalent products in 2019 (Samsung, 2022c, 2022b). But it is not clear what proportion of Samsung's product sales would be accounted for under these seven products, nor whether there is a target for the remainder of Samsung's product offering.

Samsung does not plan to shift its electricity consumption to 100% renewable energy until 2050 but takes proactive steps towards addressing system-level issues for renewable electricity supply in Asia. Samsung currently has a low share of renewable electricity consumption (15-20%) (Samsung, 2022c, p. 94) and only aims to transition its global operations to 100% renewable electricity by 2050 (Samsung, 2022b). The company claims to procure 100% renewable electricity in the US, China, and Europe, where it aims to replace RECs with higher-quality PPAs (Samsung, 2022b). But the company still relies heavily on RECs in other countries, including Mexico, and plans to do so in the coming years (Samsung, 2022b). Samsung reports to face procurement challenges in other countries including South Korea. To increase procurement options in Asia, Samsung founded the Asia Clean Energy Coalition in 2022 with the objective to bring together influential industry actors in dialogue to address system-level issues in renewable electricity development (ACEC, 2022).

Stellantis

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Automobiles	USD 176.6 bn (2021)	138.5 $MtCO_2e$ (2021)	Carbon net zero by 2038	Moderate	Moderate

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

138.5 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Use phase of sold vehicles (85% in 2021, downstream s3), purchased goods and services (11% in 2021, upstream s3).

Disclosure: s3 disclosed only in relative terms for Europe and third-party analysis calls integrity of downstream s3 disclosure into question. Only market-based estimate provided for s2.

Scope 1	1.6
Scope 2	2.2
Scope 3 upstream	15.5
Scope 3 downstream	119.1

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	***Carbon net zero by 2038***		
Short- and medium-term targets (up to 2030)	***50% absolute reduction by 2030 across s1, s2, and s3 (below 2021) supported by:*** *- s1 & s2: 50% absolute reduction by 2025 and 75% by 2030,* *- s3: 50% intensity reduction by 2030,* *- EVs: 100% BEVs in Europe and 50% BEVs in US by 2030,* *- Purchased parts: 40% intensity reduction by 2030.*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2021)	50% by 2030 — Overarching 2030 target to reduce full value chain emissions by 50%, compared to 2021. 1.5°C-aligned ICE phaseout date for EU.		
Long-term vision (beyond 2030)	***Carbon net zero by 2038***		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2021)	>90% by 2030 — All emission scopes covered. Deep emission reductions comittment of at least 90% by 2038, compared to 2021. 1.5°C-aligned ICE phaseout date for EU.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Relevant measures for accelerated transition to electric mobility, but unclear whether measures are sufficient to align with a 1.5°C-aligned decarbonisation pathway.		
Renewable electricity procurement	RE accounts for <20% of electricity consumption, mainly from RECs alongside some on-site installations and PPAs.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Offsetting claims and contributions in Latin America with uncertain climate impact.		
Climate contributions	Biodiversity and reforestation projects in Brazil. Details regarding the volume of finance not identified.		?
Offsetting claims today	Claims of 'carbon neutral' operations in South American plants based on low-quality offset credits.		
Offsetting plans for the future	9% of its 2021 emissions may be offset to achieve net zero carbon emissions by 2038. No information on criteria for use of offset credits identified.		?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Stellantis (2022a, 2022b, 2022c) and Bonaccorsi *et al.* (2022)

See **Annex II** for more details on our assessments of companies' targets

Stellantis

Stellantis is an automotive company headquartered in the Netherlands. Most of Stellantis' emissions originate in the use phase of its vehicles (85% of 2021 emissions in Europe). The company commits to reach 'carbon net zero' in 2038 by reducing at least 90% of its current CO_2 emissions and plans to offset all remaining emissions. Stellantis' targets for 2025 and 2030 put a distinct focus on short-term emission reductions and vehicle electrification in key markets, but they only partially align with 1.5°C-aligned sectoral pathways for the automobile industry.

Stellantis aims to be 'carbon net zero' by 2038 while limiting the use of offsets to less than 10% of its 2021 emissions. The company set the goal to become carbon net zero by 2038 in 2021 and commits to reduce its own emissions by at least 90% compared to 2021 (Stellantis, 2022a, pp. 39–40). Stellantis plans to compensate the remaining emissions with carbon dioxide removals and other offsetting solutions, but it does not yet provide details on removal technologies or the quality criteria that it would use when procuring offset credits in the future (Stellantis, 2022a, p. 39).

Stellantis commits to an ambitious overarching 2030 target to reduce its emissions by 50% along the entire value chain compared to 2021 levels, but only the 2030 phaseout date for internal combustion engine vehicle sales for the European market meets 1.5°C-aligned sectoral pathways for the automobile industry. The company plans to achieve its overarching 2030 target based on several sub-targets for different emission sources: vehicle production, the vehicle use phase, and its supply chain (Stellantis, 2022a, pp. 34, 37–39). For emissions from the vehicles' use phase, the company aims to sell 100% battery electric vehicles (BEVs) for passenger cars in Europe and 50% BEVs for passenger cars and light-duty trucks in the US by 2030. Whereas Stellantis' target for the EU market is in line with 1.5°C-aligned decarbonisation milestones, its targets for the US market and aspirational sales shares for Brazil, India and China, as outlined in its strategic blueprint *Dare Forward 2030* (Stellantis, 2022c), are not (see detailed assessment in the Annex). Across all scope 3 emissions, the company expects a 50% emission intensity reduction by 2030 compared to 2021 levels. Recent analysis also suggests that Stellantis currently underreports its disclosed life-cycle emissions of sold vehicles by more than 60% due to optimistic assumptions on vehicle lifetimes ((Bonaccorsi *et al.*, 2022, pp. 15–16).

Stellantis has not signed the clean-vehicle pledge announced at COP26 in November 2021, in which competing automakers from several countries, including the US and Germany, committed to exclusively produce electric vehicles by 2035, or earlier, to support limiting global warming to 1.5°C (COP26 Presidency, 2021). Stellantis further takes mixed and contradictory positions in its political lobbying efforts in the US, UK and EU, both supporting and opposing regulations for stronger climate action (InfluenceMap, 2022c).

Stellantis' range of reduction measures put distinct focus on the rapid transition towards electric mobility, but the company also invests in the development of other technologies, such as e-fuels, hydrogen-based fuel cells, and biofuels of highly uncertain efficiency and sustainability. To support the electrification of its vehicle fleet as part of its effort to reduce downstream scope 3 emissions, Stellantis deploys several vehicle charging solutions such as supporting a public fast charging network that will have 36,000 fast chargers by 2030 across Europe and North America (Stellantis, 2022a, pp. 63–64). The company also investigates measures to reduce emissions in the vehicle use phase, such as fuel efficiency innovations in existing combustion-engine vehicle lines, alternative fuels such as e-fuel produced with hydrogen energy, and hydrogen-based fuel cells for vehicle propulsion. The latter two drive technologies, however, would require much greater amounts of renewable electricity production than BEVs (Transport & Environment, 2018).

Stellantis further considers biofuels a key measure for emission reductions of its non-electric fleet. In Brazil, for example, the company has deployed bioethanol-compatible vehicles and considers to launch an electric-bioethanol hybrid vehicle model in 2025 (Alerigi Jr., 2022; Stellantis, 2022a, p. 55). However, biofuel production at scale faces the high likelihood of competing with other environmental and social interests, such as food production, biodiversity, and forest protection (Clarke *et al.*, 2022, p. 42). This is especially relevant for the automobile sector for which technological alternatives to biofuel are readily available (see Section 3 of the methodology). None of Stellantis' research into biofuels or alternative fuels should cause a delay in the complete phaseout of ICE vehicles.

Stellantis remains vague on specific measures to decarbonise its upstream scope 3 emissions. For 2021, the company claims that 'more than 55% of our most important suppliers […] commit to a CO_2 trend which complies with the Paris Agreement'; the company aims to increase this share to 95% by 2030 (Stellantis, 2022a, p. 332). The company does not disclose any further information on which particular measures Stellantis requires from its upstream suppliers beside these vague commitments and whether it takes an active approach in reducing upstream supply chain emissions, for example, through setting procurement targets for low-carbon steel (Stellantis, 2022a, pp. 79–81).

Stellantis plans to rely on offset credits to meet its carbon net zero target but provides no details on the criteria it would set for those credits. Stellantis' 2038 carbon net zero pledge includes a share of carbon offsetting of less than 10% of 2021 emissions (Stellantis, 2022a, p. 39). The company does not disclose what type of offset credits it plans to procure and whether corresponding adjustments would be applied (see Section 4 in the methodology). For 2021, Stellantis claims that 55% of its plants in South America have used offset credits to 'neutralise' their scope 1 and 2 emissions in 2021 (Stellantis, 2022a, p. 22). Stellantis has sourced offset credits from projects such as energy generation from landfill waste, reforestation, and recovering environmentally degraded areas (Stellantis, 2022a, p. 73). Offset credits from such projects are unlikely to represent the high-hanging fruit of mitigation projects that can reasonably be considered additional in the context of the Paris Agreement, and are unsuitable to claim neutralisation of the company's own emissions (see Section 4.4.1). Stellantis could instead adopt a climate contribution approach, providing financial support to climate change action beyond the company's own value chain without claiming to neutralise its own emissions.

Stellantis currently procures predominantly lower-quality RECs to claim that 18% of its electricity consumption is from renewables. The company does not disclose information on how it aims to reach its 50% renewable target in 2025. Renewable electricity and other electricity labelled decarbonised accounted for only 18% and 27% of the company's electricity consumption in 2021 respectively (Stellantis, 2022a, p. 73). The company procures most of its renewable electricity through lower quality RECs with likely very limited impact to foster additional new renewable generation capacity (Stellantis, 2022a, p. 72). Alongside RECs, the company also procures some renewable electricity through higher-quality PPAs and own on-site generation capacity (Stellantis, 2022a, pp. 72–74). The company does not further disclose information on the procurement constructs it plans to rely on to meet its renewable targets of 50% in 2025 and 100% in 2030 (Stellantis, 2022a, p. 38).

Thyssenkrupp

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Steel and cement	USD 40.2 bn (2021)	60.5 $MtCO_2e$ (2021)	Climate neutral by 2050	Moderate	Moderate

1 TRACKING AND DISCLOSURE OF EMISSIONS

TRANSPARENCY & INTEGRITY

Tracking and disclosure

60.5 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: S1 emissions from with steelmaking represent around 38% of the disclosed emission footprint. Most s3 emissions are fromwith purchased goods and services.

Disclosure: Specific sources or accounting methods for s1 and s2 not disclosed. Only fuel- and energy-related S3 publicly reported. Full s3 emissions reported only to CDP.

Scope 1	23.2
Scope 2	1.5
Scope 3 upstream	34.0
Scope 3 downstream	1.8

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Climate neutral by 2050*		
Short- and medium-term targets (up to 2030)	*- To reduce s1&2 emissions by 30% below 2018 levels by 2030* *- To reduce s3 emissions by 16% below 2017 levels by 2030*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	12% by 2030 — Target equals a 12% reduction across the value chain. Supporting measures indicate alignment with some 1.5°C-aligned sectoral benchmarks.		
Long-term vision (beyond 2030)	*To reduce s1&2 by at least 90% below 2018 level and s3 by at least 90% below 2017 levels by 2050*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	89% by 2050 — Potentially significant omission in target scope. Supporting measures indicate alignment with some 1.5°C aligned sectoral benchmarks		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Plans to phase-out its carbon intensive assets for steel production and to reduce scope 3 emissions, but emission reduction plans are unclear for other divisions.		
Renewable electricity procurement	Very limited information on renewable energy procurement.		?

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	No information on contributions or offsetting claims.		
Climate contributions	*No climate contributions identified.*	N/A	
Offsetting claims today	Offsets are being procured to claim carbon neutrality of Krefeld service centre from 2024. Details unclear.		?
Offsetting plans for the future	Max. 11% of 2019 emissions will be offset toward the 2050 pledge. Details on offsetting plans unclear.		?

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Thyssenkrupp (2018, 2021, 2022a, 2022b, 2022c, 2023).

See **Annex II** for more details on our assessments of companies' targets

Thyssenkrupp

Thyssenkrupp, based in Germany, is a multinational industrial business group with activities in steelmaking, material logistics, industrial services, and others. 38% of its reported emission footprint are scope 1 emissions related to steelmaking. Thyssenkrupp has pledged to reach climate neutrality by 2050, including a commitment to reduce scope 1, 2 and 3 emissions by at least 89% compared to 2019 levels. To achieve its goal, the company set out a decarbonisation roadmap for its steelmaking operations, transitioning out of coal-based steelmaking by 2045. Uncertainties remain relating to the coverage and relevance of downstream scope 3 emissions in the company's climate strategy.

Thyssenkrupp's targets of reaching climate neutrality by 2050 and climate neutrality for its steelmaking division in 2045 are likely aligned with relevant 1.5°C-compatible benchmarks for the steel sector, although uncertainty remains on scope 3 relevance. The company presents its carbon neutrality pledge for 2050 alongside a commitment to reduce its scope 1 and 2 emissions by 90% below 2018 values, and scope 3 emissions by 90% below 2017 values (Thyssenkrupp, 2023). Compared to Thyssenkrupp's disclosed 2019 whole value chain emissions, this target means a 89% reduction by 2050. The company does not yet provide clear information on how it plans to address or offset the remaining 11% of emissions towards its carbon neutrality claim. The company commits to the same target including the same baselines for its steelmaking division for 2045, alongside clear plans for developing their own near-zero emissions steelmaking facilities, which are planned to reach 100% "climate neutral steel production without coal-based blast furnace" (Thyssenkrupp, 2022b, p. 60). This target appears likely to be in line with 1.5°C compatible benchmarks for steelmaking (see Annex II for further details on comparison to steelmaking benchmarks). However, uncertainty remains on the coverage and relevance of downstream scope 3 emissions. There remains a lack of guidance on the appropriate reporting boundaries for scope 3 emissions for steelmaking companies, and Thyssenkrupp's targets do not provide full clarity on this issue. Even if it is determined that scope 3 category 11 emissions are not a relevant emission source for steelmaking companies, and thus for Thyssenkrupp's steelmaking division, Thyssenkrupp is a diversified company and this emission category is likely to be relevant for the other company divisions.

Thyssenkrupp's 2030 interim targets only represent a 12% reduction of its whole value chain GHG emissions below 2019 levels. Without further clarification, it remains unclear whether the 2030 scope 3 target represents a commitment to further emission reductions. The company set out two targets for 2030: a target to reduce scope 1 and 2 emissions by 30% below 2018 levels and a target to reduce scope 3 emissions by 16% below 2017 levels (Thyssenkrupp, 2022a, p. 92). While these two targets cover all of Thyssenkrupp emissions across the value chain, they only translate to a 12% reduction by 2030 compared to 2019 levels. The company has recently adjusted their scope 3 emissions reporting, and subsequently modified their scope 3 target. Previously, Thyssenkrupp reported around 780 $MtCO_2e$ scope 3 emissions in 2017 from the use phase of sold products and committed to reduce them by 16% by 2030 (Thyssenkrupp, 2021, pp. 41–42). However, in its latest documents, Thyssenkrupp stopped reporting on this specific scope 3 category, and adjusted its scope 3 target to cover most of its remaining scope 3 emissions, which in 2017 were around 49 $MtCO_2e$ (Thyssenkrupp, 2018, pp. 48–54). Thyssenkrupp's original target implied an absolute emission reduction of 125 $MtCO_2e$ and its new target implies a reduction of 8 $MtCO_2e$. Moreover, based on Thyssenkrupp's CDP emissions disclosures both from 2018 and 2022, we estimate that the company's new scope 3 target was already overachieved by 2021 (Thyssenkrupp, 2018, 2022c). However, due to the changes in the scope of Thyssenkrupp's reported emissions in 2022, it remains unclear whether retroactive changes in target baselines would apply, and whether they would affect the absolute emission levels targeted.

Thyssenkrupp provides a clear transition plan for its steelmaking operations, including a transition to 100% hydrogen-based steelmaking in 2045. For the steelmaking division, Thyssenkrupp has set out a clear plan to phase out its carbon-intensive infrastructure, with interim targets showing how the transition will impact overall steel production over time and how emissions will be reduced in the process (Thyssenkrupp, 2022b, p. 60). The plan includes the use of carbon capture, utilization, or storage (CCUS) to reduce emissions in the short term, but clearly identifies this technology as an interim solution before shifting to more reliable and 1.5°C-compatible decarbonisation technologies such as hydrogen-based direct reduction with electricity-powered melting units. While the use of CCUS in blast furnaces may help reduce emissions in the short term, literature suggests that retrofitting current infrastructure will not be enough to reach net zero due to several challenges and potential associated risks (de Villafranca *et al.*, 2022). Hydrogen-based steelmaking on the other hand, can lead to zero-emissions steel when powered by renewables and green hydrogen, and it is potentially scalable without significant risks of adverse effects on other areas for example related to sustainable biomass sourcing (de Villafranca *et al.*, 2022).

Thyssenkrupp is not clear about its procurement of renewable electricity. Based on its publicly available information, we were unable to identify if Thyssenkrupp uses renewable electricity and how the company procures it. When reporting their scope 2 emissions, the company does not specify whether its accounting methodology is location- or market-based.

Volkswagen Group

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Automobiles	USD 295.7 bn (2021)	371.3 $MtCO_2e$ (2021)	Carbon neutral by 2050	Moderate	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

371.3 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Use phase of sold vehicles (downstream s3, 75%); purchased goods and services (upstream s3, 16%)

Disclosure: Volkswagen comprehensively discloses emissions across all relevant scopes but third-party analysis calls integrity of downstream s3 disclosure into question.

TRANSPARENCY & INTEGRITY

Scope 1	4.7
Scope 2	2.4
Scope 3 upstream	71.8
Scope 3 downstream	292.3

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Carbon neutral by 2050*		
Short- and medium-term targets (up to 2030)	***s1&s2*** *- 50% absolute reduction by 2030 (below 2018, no offsets)* ***s3 - vehicle life-cycle emissions intensity*** *- 30% reduction by 2025 (below 2015, allowing offsets)* *- 30% reduction by 2030 (below 2018, no offsets)*	Moderate	Very low
Scope coverage: S1 S2 S3 / Own emission reductions (compared to full value chain in 2019): ? by 2030	No 1.5°C-aligned phaseout dates for ICEs. Target for s1 & s2 equals a 3% reduction across the value chain, S3 intensity target not quantifiable.		
Long-term vision (beyond 2030)	*Carbon neutral by 2050*	Very low	Very low
Scope coverage: S1 S2 S3 / Own emission reductions (compared to full value chain in 2019): ? by 2050	All emission scopes covered. No emission reduction commitment alongside carbon neutrality pledge. No 1.5°C-aligned phaseout dates for ICEs.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Relevant measures for key emission sources, including investments in vehicle electrification and low-carbon steel production. Limited details on timeline and expected impact.	Moderate	Moderate
Renewable electricity procurement	Extensive use of lower-quality RECs to claim 96% of renewable electricty procured in Europe in 2021. Plans to use more PPAs in the future but limited information provided.	Moderate	Very low

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Offsetting claims with limited detail.	Very low	Very low
Climate contributions	*No climate contributions identified.*	N/A	Very low
Offsetting claims today	6.1 $MtCO_2e$ offset credits purchased in 2021. No complete information provided on type of offsets but nature-based projects mentioned.	Moderate	Very low
Offsetting plans for the future	2025 & 2050 targets depend on offsets to unclear extent. A joint venture with ClimatePartner will develop nature-based carbon offset projects.	Very low	Very low

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Volkswagen (2019, 2021, 2022a, 2022b, 2022c), Volkswagen ClimatePartner (2022), VW Kraftwerk (2021) and Bonaccorsi *et al.* (2022)

See **Annex II** for more details on our assessments of companies' targets

Volkswagen Group

Volkswagen AG (hereafter: Volkswagen Group) is the world's second-largest and Europe's largest manufacturer of motor vehicles. Most of the company's emissions originate in the use phase of its sold cars and vans (75% of 2021 emissions) and from purchased goods such as steel (16%). The company aims to become carbon neutral by 2050 but remains non-transparent on how many offsets it intends to use to achieve this pledge. Volkswagen launched a joint venture in 2022 to develop its own nature-based carbon offset credits. Despite a wide range of emission reduction measures across all scopes, Volkswagen's climate strategy for vehicle electrification and its 2030 targets fall way short of decarbonisation milestones for the automobile industry to be in line with the Paris Agreement's 1.5°C global warming limit.

Key developments over the past year: We identified few significant changes to Volkswagen's climate strategy since the previous iteration of this analysis was published in February 2022 (Day *et al.*, 2022). In 2022, Volkswagen announced a new target for scope 1 and 2 emission reductions by 2030 and entered a joint venture with ClimatePartner to develop and finance nature-based offset credits from forest conservation and afforestation projects. Volkswagen has neither provided further clarity on its 2050 carbon neutrality target nor committed to specific phaseout dates for internal combustion engines.

The Volkswagen Group's headline carbon neutrality target remains unsubstantiated as the company provides no information on the extent to which it will reduce its own emissions. Apart from its loosely defined intention to comply with the Paris Agreement, the company does not explain how its 2050 carbon neutrality pledge aligns with key 1.5°C-compatible decarbonisation milestones for the automobile industry (see detailed assessment in Annex II). Since announcing its 2050 carbon neutrality pledge in 2019, the company has not disclosed any further information on the extent to which it will *actually* reduce its own emissions by 2050 as part of this pledge. Volkswagen only vaguely communicates its intention to rely on carbon offsets by an undefined amount to meet its 2050 target (Volkswagen, 2022c, pp. 26, 46).

Volkswagen's interim targets for 2025 and 2030 do not include a commitment to phase out internal combustion engines in key markets by 2030, falling way short of 1.5°C-aligned climate action in the automobile sector. Volkswagen's 2030 target to reduce the CO_2 emission intensity per kilometre by 30% by 2030 below 2018 levels for new vehicles is insufficient to limit global warming to 1.5°C (see detailed assessment in Annex II). The company implicitly acknowledges this by committing 'to increase the level of its ambition to 1.5 degrees Celsius' (Volkswagen, 2022c, p. 46), but has yet to present any updated scope 3 emission targets. Recent analysis suggests that Volkswagen currently underreports its disclosed life-cycle emissions of sold vehicles by more than 50% due to unrealistic assumptions on vehicle lifetimes (Bonaccorsi *et al.*, 2022, pp.15-16).

At COP26 in November 2021, Volkswagen opted out of a declaration committing to a totally electric fleet by 2035 to support achieving the 1.5°C target of the Paris Agreement, despite competing manufacturers in the US and Germany signing up to it (COP26 Presidency, 2021). Volkswagen's lobbying efforts through direct interactions with regulators and membership in regressive industry associations in the EU and US represent contradictory positions on supporting the phase out ICE vehicles and CO_2 targets for cars and vans (InfluenceMap, 2021, 2022d).

The Volkswagen Group implements a far-reaching investment programme aiming at the company's transformation towards electric mobility. Volkswagen commits to large investments to electrify its vehicles, accelerate the rollout of charging infrastructure, and support battery technology development and low-carbon steel production (Volkswagen, 2022c, pp. 41–49). Group-wide investments for the transition to electric vehicles alone will account for a total of EUR 52 billion (ca. USD 61.5 billion) towards 2026. These measures are important to effectively decarbonise the automobile industry's value chain and have significant potential for replication and wider roll-out. The lack of detailed information on their scale, implementation timelines, and projected reduction impacts, however, does not allow us to evaluate their sufficiency to meet the Group's emission reduction targets. Volkswagen continues to use an internal shadow carbon price of EUR 20 (ca USD 22.5) per tonne subject to annual revision (Volkswagen, 2022c, p. 49). this is significantly below a carbon price level that would give a clear incentive for embarking on a 1.5°C-compatible decarbonisation trajectory.

The Volkswagen Group's claim that it operates carbon neutral production lines—as well as its plans for offsetting in the future—are highly contentious. The company used offset credits to claim neutralisation of 6.1 $MtCO_2e$ in 2021 (Volkswagen, 2022c, p. 43), equivalent to around 85% of its scope 1 and 2 emissions in that year. Volkswagen uses these offset credits, among others, to claim neutrality for two vehicle production lines and nine production sites (Volkswagen, 2019, 2021, 2022c, pp. 42–43). The contentious practice of claiming neutrality only for certain business areas and products can mislead consumers and other stakeholders on the vehicles' actual emissions footprint. Volkswagen also intends to achieve its 2025 interim target by using an unspecified amount of offset credits (Volkswagen, 2022c, pp. 26, 46).

The company entered a joint venture with ClimatePartner in 2022 to develop and finance nature-based offset credits from forest conservation and afforestation projects (Volkswagen ClimatePartner, 2022). According to the limited information available, Volkswagen intends to use these offsets to support its climate strategy and meet its 2050 climate neutrality target. ClimatePartner will also sell credits from this joint venture to other companies to claim neutralisation of emissions. While scaling up biological carbon removals requires more financial support, these removals are unlikely permanent and therefore unsuitable to claim the *neutralisation* of the company's own emissions (see Box 3 in Section 4.2.2).

The Volkswagen Group continues to predominately rely on low-quality RECs to claim the company almost entirely procures renewable electricity for its European operations. The company reports to have achieved a 96% and 49% share of externally procured renewable electricity in Europe and worldwide, respectively, in 2021 (Volkswagen, 2022c, p. 42). For Europe, however, the company procured more than 3.5 TWh of renewable electricity through low-quality RECs (Volkswagen, 2022a). RECs generally provide no effective incentives for *additional* renewable energy installations and remain prone to double counting (see Table 3-2, Section 3.2.2). The company aims to accelerate direct investments in new solar and wind capacity across Europe through PPAs, aiming to generate 7 TWh by 2025, up from 1 TWh in 2021 (RWE, 2021; Volkswagen, 2022c, p. 42). The Volkswagen Group's own electricity generation remains highly depended on fossil fuels. The Group's subsidiary VW Kraftwerke GmbH, which is responsible for the electricity and heat supply for German and Czech production plants, reports a share of around 35% of coal and fossil gas in its 2020 electricity mix (VW Kraftwerk, 2021; Volkswagen, 2022c, p. 42). Overall, the Volkswagen Group discloses little information on its renewable electricity procurement strategy.

Walmart

SECTOR	REVENUE	EMISSIONS	PLEDGE	TRANSPARENCY	INTEGRITY
Food, beverages & agriculture	USD 572.8 bn (2021)	187.7 $MtCO_2e$ (2021)	Zero emissions in operations by 2040	Moderate	Low

1 TRACKING AND DISCLOSURE OF EMISSIONS

Tracking and disclosure

187.7 $MtCO_2e$ in 2021

Subsidiaries are covered.

Major emission sources: Major emission sources are related to purchased goods and services (upstream s3, 71%).

Disclosure: In public-facing documentation, Walmart only reports on s1 and s2 emissions. S3 emissions are only reported in CDP disclosure.

TRANSPARENCY & INTEGRITY

Scope 1	6.9
Scope 2	10.4
Scope 3 upstream	148.6
Scope 3 downstream	35.9

2 SETTING EMISSION REDUCTION TARGETS

		TRANSPARENCY	INTEGRITY
Headline target or pledge	*Zero emissions in operations by 2040*		
Short- and medium-term targets (up to 2030)	*Reduce s1&2 emissions by 35% by 2025 and 65% by 2030, compared to 2015 levels*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	5% by 2030 — Short- to medium-term targets translate to 5% emission reductions compared to 2019 value chain emissions: not in line with 1.5°C-benchmarks.		
Long-term vision (beyond 2030)	*Zero emissions in operations by 2040*		
Scope coverage	S1 S2 S3		
Own emission reductions (compared to full value chain in 2019)	9% by 2050 — Long-term target translates to 9% emission reductions, compared to 2019 value chain emissions. This is not in line with 1.5°C-benchmarks.		

3 REDUCING OWN EMISSIONS

		TRANSPARENCY	INTEGRITY
Emission reduction measures	Significant portion of upstream s3 emissions addressed through supplier engagement programme. Measures to reduce s1&2 emissions presented, but only in vague terms.		
Renewable electricity procurement	Aims for higher-quality RE constructs to reach 100% RE by 2035, but RE share remains low.		

4 CLIMATE CONTRIBUTIONS AND OFFSETTING

		TRANSPARENCY	INTEGRITY
Responsibility for unabated emissions	Climate contributions with limited detail.		?
Climate contributions	Commits to protect/restore 50 million acres of land by 2030, without neutralisation claim. Very limited detail provided.		?
Offsetting claims today	*No offsetting claims today identified.*	N/A	N/A
Offsetting plans for the future	Explicitly states that it will achieve its targets without carbon offsets, but does not have a target that covers scope 3 emissions.	N/A	N/A

RATINGS

Overall 5-point scale High Reasonable Moderate Low Very low. Average of sections 1-4.
Sections 1-4 5-point scale High Reasonable Moderate Low Very low. Average of the criteria in each section.
Rating criteria 3-point scale High Moderate Poor. See methodology document for rating criteria.
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: Authors' interpretation of identified public documentation from Walmart (2020a, 2020b, 2021a, 2021b, 2022a, 2022b).

See **Annex II** for more details on our assessments of companies' targets

Walmart

Walmart Inc. (Walmart) is a USA-based retail cooperation that operates grocery stores, department stores and hypermarkets. Most of Walmart's emissions (71% of 2019 emissions) originate from the procurement of goods (upstream scope 3). Walmart has set credible targets to take responsibility for its operational scope 1 and 2 emissions. However, its strategy for upstream scope 3 emissions, which account for most of the company's overall climate impact, lacks a clear reduction commitment. Walmart sets no emissions reduction target for scope 3 emissions, but rather builds on a programme to engage with suppliers to voluntarily reduce emissions themselves.

Key developments over the past year: We could identify only minor changes to Walmart's sustainability strategy since our previous analysis of the case study in the ***2022 Corporate Climate Responsibility Monitor*** (Day *et al.*, 2022), including the continued expansion of the supplier engagement programme to reduce upstream scope 3 emissions. Accordingly, only minor modifications were made to this case study.

Walmart's headline target is to reduce its scope 1 and 2 emissions to zero by 2040, complemented by interim targets for 2025 and 2030. Walmart is committed to reducing its scope 1 and 2 emissions (referred to as 'operational emissions') to zero by 2040 (Walmart, 2022a, p. 28) and does not seek to offset emissions. The company has set interim emission reduction targets for its scope 1 and 2 emissions: reductions of 35% by 2025 and 65% by 2030, compared to a 2015 baseline (Walmart, 2022a, p. 28). The targets translate to approximately a 25% emission reduction from scopes 1 and 2 by 2025 and 60% by 2030, from a 2019 baseline. Including scope 3 emissions, the targets translate to only 5% emission reduction by 2030 and 9% by 2050, compared to 2019 levels (Walmart, 2021b, pp. 19–24).

In 2017, Walmart launched *Project Gigaton* to address scope 3 emissions, which account for 91% of the company's emissions footprint, but the potential impact of the measures remains unclear. Walmart's emission reduction targets only cover scope 1 and 2 emissions, which represented 9% of the company's total GHG emission footprint in 2019 (Walmart, 2020b, pp. 38–47). To address scope 3 emissions, the company launched its Project Gigaton in 2017. Through *Project Gigaton*, Walmart wants to engage suppliers, offering them guidance to reduce their emissions in six areas: energy, product use and design, waste, forestry, agriculture, and packaging (Walmart, 2022b). Suppliers can sign up to the programme and receive access to resources and training that help them setting their own targets and design strategies to tackle their emissions. To increase the share of renewable electricity in its supply chain, Walmart gives suppliers access to collaborative PPAs (Schneider Electric, 2022) – see Box 1, Section 3.2.2. Since 2017, around 4,500 suppliers have joined the programme (Walmart, 2022b); while these suppliers account for 5% of all suppliers, they count for roughly 50% of Walmart's revenue. The reported number of suppliers has almost doubled since the last iteration of our analysis (Day *et al.*, 2022). With *Project Gigaton*, Walmart aims to reduce 1 $GtCO_2e$ in *cumulative* scope 3 emissions in the period between 2017 and 2030, which is a significant contribution to reducing Walmart's emissions footprint. Although *Project Gigaton* is presented as a central element of Walmart's sustainability strategy, the company did not commit to any targets for scope 3. It remains unclear how the cumulative emission reductions are aligned with a 1.5°C trajectory.

Walmart's public-facing reporting neglects a large share of emissions; Walmart can improve its GHG emissions reporting to ensure transparency and accountability. In its public climate change strategy, the company does not disclose its scope 3 emissions, which account for 91% of the company's total emissions in 2020 (Walmart, 2021b, pp. 19–24). Furthermore, its main reporting of emissions from energy procurement (scope 2) uses a market-based accounting approach. This reduces energy procurement emissions by around 1 $MtCO_2e$ in 2020 compared to a location-based accounting approach. Scope 3 and location-based scope 2 emission estimates are only included in Walmart's disclosure to CDP, which the company publishes on its website (Walmart, 2021b, pp. 19–24); not in its public-facing sustainability documentation.

Walmart commits not to use offsets to reach its target for zero operational emissions, while pledging to make a climate contribution to support nature-based solutions without claiming to neutralise its emissions. Walmart explicitly plans to reduce scope 1 and 2 emissions to zero by 2040, without the use of offsets (Walmart, 2021a). In parallel, Walmart and Walmart Foundation have committed to protect or restore 50 million acres of land by 2030, without linking this contribution to a neutralisation claim (Walmart, 2020a). This could be a credible approach to supporting nature-based solutions for climate change mitigation outside of its value chain. Walmart could improve their transparency on these contributions by disclosing further information on how it determines the volume of support. It remains unclear whether this is linked to assuming responsibility for unabated emissions, particularly given that scope 3 emissions are not included in Walmart's main climate targets.

Glossary and abbreviations

Additional potential (of CDR)	*See "Scarcity (of CDR)"*
BECCS	Bioenergy with carbon capture and storage
BEV	Battery electric vehicles
Biological capture and storage	*See "Nature-based solutions"*
CAR	Climate Action Reserve
CCS	Carbon capture and storage
CCU	Carbon capture and utilisation
Climate contribution	We define climate contributions as the financial support provided by a company to support climate change action beyond the company's own value chain, without claiming the neutralisation of its own emissions in return.
Carbon dioxide removals (CDR)	All scenarios consistent with a 1.5°C temperature increase include a major role for carbon dioxide removals.(Rogelj *et al.*, 2018) This includes nature-based solutions for carbon sequestration in forests, soils, peatlands and mangroves, technological solutions such as BECCS and DACCS with underground storage, and solutions with mineral storage.
Carbon offset credit	A carbon offset credit is a certified unit of a reduction of GHG emissions, or a removal of carbon dioxide (*see Carbon dioxide removals*), which is used to balance out GHG emissions elsewhere. The practice of offsetting is often contentious (see section 4.1.2).
CDM	Clean Development Mechanism
CDP	Formerly the Carbon Disclosure Project: Many companies report emissions as well as other details of their climate strategies to CDP. CDP provide companies with a certified rating of their level of climate transparency, which is often used in company's marketing materials.
CEO	Chief Executive Officer
CO_2	Carbon dioxide
COP	Conference of the Parties (*see UNFCCC*).
DACCS	Direct Air Carbon Capture and Storage, see also "Carbon dioxide removals (CDR)"
DRI-EAF	Direct reduced iron – Electric arc furnace
ESG	Environmental Social Governance
EU	European Union

EV	Electric vehicle
FLAG	Forest, Land and Agriculture Science Based Target Setting Guidance (a standard by the Science Based Targets initiative for land-based emissions disclosure and target setting).
GHG Protocol	The GHG Protocol is an initiative driven by the World Resources Institute and World Business Council for Sustainable Development, that provides international guidance and standards for GHG emissions accounting.
GHG	Greenhouse gas
Guarantees of origin (GOs)	Other terminology for Renewable Energy Certificates (REC), see "Renewable Energy Certificates (REC)"
High-hanging fruit	The high-hanging fruit of mitigation potential refers to the technologies and measures to decarbonise emission sources that remain otherwise entirely inaccessible to host country governments in the near- and mid-term future, on account of high costs or other insurmountable barriers that cannot reasonably be overcome.
HLEG	The United Nations' High-Level Expert Group on the Net-Zero Emissions Commitments of Non-State Entities
ICT	Information and communications technology
IEA	International Energy Agency
Insetting	'Insetting' is a business-driven concept used by a limited number of actors with no universally accepted definition. Insetting is often described as offsetting within the value chain. The approach can lead to low credibility GHG emission offsetting claims and presents a significant risk of double counting the same emission reductions (*see section 4.4.4*).
Integrity (rating)	The Corporate Climate Responsibility Monitor assesses the transparency and integrity of companies' climate pledges. Integrity, in this context, is a measure of the quality, credibility and comprehensiveness of a company's approaches towards the various elements of corporate climate responsibility.
IPCC	Intergovernmental Panel on Climate Change
ISO	*International Organisation for Standardisation*
LEV	Low-emission vehicles
LNG	Liquified natural gas
Location-based method (for scope 2 emissions accounting)	The location-based method for scope 2 emissions accounting reflects the average emission intensity of the electricity grid from which the consumer's energy is delivered.
Market-based method (for scope 2 emissions accounting)	The market-based method for scope 2 emissions accounting reflects the emissions from electricity generation specifically procured by the consumer (which may not reflect the electricity they actually consume from a grid that features multiple buyers and sellers). It derives emission factors from contractual renewable electricity procurement instruments.

Nationally determined contributions (NDCs)	Nationally determined contributions (NDCs) are the pledges made by national governments to the United Nations Framework Convention on Climate Change to mitigate climate change. The Paris Agreement requires all Parties to submit and regularly update their NDCs to represent their possible highest level of ambition. Recognising the insufficiency of climate change mitigation commitments in existing NDCs, the Glasgow Pact from COP26 urged all Parties to update their NDCs again ahead of COP27.
Nature-based solutions	Nature-based solutions refer to measures for carbon dioxide removal that involve biological carbon capture and storage in natural ecosystems, such as soils, forests, peatland and mangroves.
Neutralisation	Neutralisation of emissions is usually a term that is synonymous with offsetting and refers to the balancing out of emissions released into the atmosphere with the avoidance, or removal from the atmosphere, of an equivalent volume of emissions elsewhere. Many actors now avoid the term offsetting entirely; companies and initiatives more often refer to "neutralisation", "netting-out", "compensation", "reducing the footprint", while some actors use multiple terminologies to distinguish between offsetting in different circumstances and at different times. We define all claims that unabated GHG emissions within the value chain are offset as *offsetting claims*, including all synonymous terminologies and all project types.
Non-GHG climate forcers	Non-GHG climate forcers include the emission of gases and aerosols, and processes that change cloud abundance, leading to radiative forcing. Radiative forcing is a change in the balance of radiation in the atmosphere, which contributes to global warming. For example, the non-GHG climate forcers are estimated to increase the climate impact of GHG emissions from the aviation industry by a factor of approximately 3 (Atmosfair, 2016).
Offsetting	*See carbon offset.*
Permanence (of CDR)	The *permanence* of a CDR outcome refers to the timescale and degree to which sequestered carbon remains stored and not released into the atmosphere.
Power purchase agreement (PPA)	A PPA is a long-term contract between an electricity provider and an electricity consumer, usually spanning 10-20 years. The consumer agrees to purchase a certain amount of electricity from a specific asset under a pre-determined pricing arrangement. PPAs are generally signed with new renewable energy installations and form part of the project investment decision (NewClimate Institute and Data-Driven EnviroLab, 2020). PPAs can also be signed for existing installations, in which case it is less likely the PPA results in additional renewable electricity capacity. However, it may be that existing installations would cease operations if the operator cannot sign a new PPA.
PV	Photovoltaics
R&D	Research & development

Renewable energy certificate (REC)	Renewable Energy Certificates (RECs) are also known under various names, such as Guarantees of Origin (GOs) or Energy Attribute Certificates (EACs). RECs can be bundled or unbundled with the electricity that a company consumes: • *Unbundled RECs* – the consumer purchases RECs from a third party, separately from their procurement of electricity from another supplier. • *Bundled RECs* – third-party generated: the consumer purchases electricity and RECs from the same supplier, but this supplier has procured the RECs from a third party. In this situation, the supplier may sell electricity generated using fossil fuels but market it as 'low-carbon' electricity by bundling an equivalent volume of RECs into the sale. • *Bundled RECs* – supplier generated: the consumer purchases renewable electricity and associated RECs from the same supplier.
Residual emissions	Residual emissions are the remaining GHG emissions from hard-to-abate emission sources where no known feasible options remain for further decarbonisation. (See also *unabated emissions*)
Scarcity (of CDR)	The maximum potential of most carbon dioxide removal measures is technically limited, and even further restricted by environmental constraints. Due to issues such as land requirements, high water consumption, high energy consumption, land degradation and pollution, among other environmental costs, carbon dioxide removal technologies can only be scaled-up so far without significantly endangering sustainable development goals, including food security. The scarcity of carbon dioxide removals measures – in terms of their maximum absolute or annual technical potential – is an important consideration when evaluating the feasibility of net-zero claims at the level of individual actors. Robust future use of scarce carbon dioxide removal options must be consistent with achieving net-zero and eventually net-negative emissions at the global level, which is required to avoid the most damaging effects of climate change over the coming decades.
Science Based Targets initiative (SBTi)	SBTi reviews and certifies the climate targets of companies who join the initiative as members. Companies' climate targets are certified as 1.5°C or 2°C compatible if they align with SBTi's own methodology and benchmarks.
Scope (of GHG emissions)	The GHG Protocol Corporate Standard classifies a company's GHG emissions into three 'scopes' (WBCSD and WRI, 2004):
Scope 1 emissions	Scope 1 emissions are direct emissions from owned or controlled sources.
Scope 2 emissions	Scope 2 emissions are indirect emissions from the generation of purchased energy (see also *location-based method* and *market-based method*).
Scope 3 emissions	Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions (WRI and WBCSD, 2013).
Upstream scope 3 emission sources	Upstream emissions are indirect GHG emissions related to purchased or acquired goods and services (WRI and WBCSD, 2013).
Downstream scope 3 emission sources	Downstream emissions are indirect GHG emissions related to sold goods and services (WRI and WBCSD, 2013).
Normal scope 3 emission sources	The GHG Protocol's Scope 3 Standard identifies 15 distinct reporting categories for scope 3 emission sources, and requires companies to quantify and report scope 3 emissions from each category (WRI and WBCSD, 2013).

Optional scope 3 emission sources (indirect use-phase emissions)	Indirect use-phase emissions are described by the GHG Protocol Scope 3 Standard (WRI and WBCSD, 2013) as an optional reporting component. In contrast to direct use-phase emissions from products, such as the energy consumption of vehicles and appliances, indirect use-phase emissions refer to the emissions that occur indirectly from the use of a product. For example, apparel requires washing and drying; soaps and detergents are often used with heated water.
Sustainable aviation fuels (SAF)	Sustainable aviation fuels are aviation fuels derived from renewables or waste considering certain sustainability criteria.
Transparency (rating)	The *Corporate Climate Responsibility Monitor* assesses the transparency and integrity of companies' climate pledges. Transparency ratings refer to the extent to which a company publicly discloses the information necessary to fully understand the integrity of that company's approaches towards the various elements of corporate climate responsibility.
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
Unabated emissions	Unabated emissions are GHG emissions from emission sources for which further emission reductions are technically feasible at that point in time. (See also *residual emissions*)
Value chain emissions	A company's full value chain emissions refers to the entirety of scope 1, scope 2, and scope 3 emissions.
US	United States
Value chain emissions	A company's full value chain emissions refers to the entirety of scope 1, scope 2, and scope 3 emissions.

Annex I

Companies assessed in this report

We assess 24 companies in this report. We refer to them using shortened names (see left column) but assess the company and all subsidiaries covered by the full name (see right column).

Shortened name	Full name
Ahold Delhaize	Koninklijke Ahold Delhaize N.V.
Amazon	Amazon.com, Inc.
American Airlines	American Airlines Group Inc.
Apple	Apple Inc.
ArcelorMittal	ArcelorMittal S.A.
Carrefour	Carrefour S.A.
Deutsche Post DHL	Deutsche Post AG (Deutsche Post DHL Group)
Fast Retailing	Fast Retailing Co., Ltd.
Foxconn	Hon Hai Precision Industry Co., Ltd.
Google	Alphabet Inc.
H&M	H & M Hennes & Mauritz AB (H&M Group)
Holcim	Holcim Limited
Inditex	Industria de Diseño Textil, S.A.
JBS	JBS S. A.
Maersk	A.P Møller - Mærsk A/S
Mercedes-Benz	Mercedes-Benz Group AG
Microsoft	Microsoft Corporation
Nestlé	Nestlé S.A.
PepsiCo	PepsiCo, Ltd.
Samsung Electronics /Samsung	Samsung Electronics Co., Ltd.
Stellantis	Stellantis N.V.
Thyssenkrupp	Thyssenkrupp AG
Volkswagen Group	Volkswagen AG
Walmart	Walmart Inc.

Selection criteria

This analysis assesses only companies that have committed to high-profile climate change mitigation pledges under one of the main corporate climate action networks and initiatives. The key objective of the analysis is to identify replicable good practice while assessing the integrity of the most influential global corporate actors that are putting themselves forwards as climate leaders and role models for other companies. Scrutiny of their plans is also necessary to identify whether these influential leaders really are setting the right examples, and whether the guidance and frameworks upon which they are making their plans are sufficient.

We assess the top three global companies for each of the eight following sectors, according to their annual revenue in 2021 (Forbes, 2022): Automotive manufacturers; electronics; fashion retail; food and agriculture; information and communication technology; shipping and aviation; steel and cement, supermarket retail. Our analysis excludes state-owned companies due to our perception that fundamental differences in management structures and decision-making structures for climate change strategy may significantly detract from the comparability of these companies' plans, and the insights that we can draw from the company sample.

The 24 companies covered by this monitor account for approximately USD 3.16 trillion of revenue in 2021[3], approximately 10% of revenue from the world's largest 500 companies (Forbes, 2022). Their total self-reported GHG emission footprints in 2019, including scope 3 emissions, amount to approximately 2.2 $GtCO_2e$. This is equivalent to roughly 4% of global GHG emissions. [4]10 of the 24 companies selected through the process described above were also assessed in the 2022 Corporate Climate Responsibility Monitor. The repeat analysis of this small sub-set of companies offers insights into what progress has been made over the past year.

3 The currency conversions in this document are based on the yearly average currency exchange rates published by the U.S. Internal Revenue Service (IRS 2023).

4 Some overlap in emission statistics is likely in the cases that one company's scope 3 emissions are included in the scope 1 or 2 emissions of another company in this analysis. We anticipate that any overlap is marginal and of limited significance to the key insights derived from this report. The companies' combined emission footprint may also be higher than this estimate, due to some companies' incomplete emission disclosure. We use 2019 as a base year for analytical purposes, as the most recent year with complete GHG reporting before the COVID-19 pandemic distorted emission trends.

Annex II

Target integrity assessments

Ahold Delhaize

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

Scope 1 and scope 2 emissions:

- 29% emission reduction by 2025 (2018 baseline)
- 50% emission reduction by 2030 (2018 baseline)

Scope 3:

- 37% emission reduction by 2030 (2020 baseline)

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

We estimate that Ahold Delhaize's short- and mid-term emission reduction targets translate to emission reductions of 33–34% by 2030, compared to 2019 levels.

Ahold Delhaize has not reported on scope 3 emissions for 2019. We estimated a range for these emissions based on the following assumptions:

- The lower part of the range assumes that Ahold Delhaize's 2019 scope 3 emissions over revenue are proportional to the company's emissions over revenue in 2018. Using this method, a 37% reduction below 2020 levels equals a 33% reduction below 2019 levels.
- The upper part of the range assumes that the average of reported scope 3 emissions for 2018 and 2020. Using this method, a 37% reduction below 2020 levels equals a 34% reduction below 2019 levels.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?

Ahold Delhaize sets one target covering scope 1 and 2 within a five-year timeframe that uses the same metric as its longer-term targets.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

We find that Ahold Delhaize's 2030 targets almost align with global cross-sectoral and sector-specific 1.5°C Paris Agreement-aligned decarbonisation milestones. Ahold Delhaize's scope 3 emissions account for 95% if its emission footprint. In the absence of available benchmarks from the scientific literature for mixed-good retailers, we compare Ahold Delhaize's scope 3 target to available 1.5°C-aligned benchmarks for agriculture (Dietz, Harvey, *et al.*, 2022, p. 14; Teske, 2022, p. 328), and its reduction across all scopes to cross-sector global benchmarks (IPCC, 2022).

Teske (2022, p. 328) identifies 1.5°C-aligned absolute emission reduction milestones for various emission sources of agricultural activities, which represent the majority of upstream scope 3 emissions for Ahold Delhaize. Emissions from fuel use on farms, heat used for food processing and -packaging need to reduce by 48%, emissions from purchased electricity on a farm-level or used for food processing and -packaging need to reduce 67%, and emissions AFOLU, non-CO_2 GHGs need to reduce by 34% by 2030. In sum, these required reductions mean a reduction of 38% across all scopes, below 2019 levels. Ahold Delhaize's emission reduction target for scope 3 emissions aligns with the latter. However, the company should also reduce scope 3 emission sources that are not covered by these benchmarks , such as upstream transportation and distribution and upstream emissions from non-food products.

The Transition Pathways Initiative (TPI) derives an emission intensity per tonne of agricultural input aligned with '1.5°C' trajectories by 2030: 1.3 tCO_2/tonne agricultural input (Dietz, Harvey, *et al.*, 2022, p. 14). This represents a 52% reduction in intensity compared to 2.8 tCO_2/tonne agricultural input in the 2020 base year. Due to lack of information on intensity and volumes of agricultural input, we cannot directly assess whether Ahold Delhaize's scope 3 target meets these intensity benchmarks. However, the company's targets and measures contribute to the shift that is signalled by the required change in intensities.

Global cross-sectoral benchmarks require GHG and CO_2 emissions to reduce by 43% and 48% between 2019 and 2030, respectively (IPCC, 2022). In the same period, global methane emissions must decrease by 34%. Ahold Delhaize's targeted emission reductions of 33–34% by 2030 across all scopes by 2030 come close to meet these global benchmarks.

Moderate

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

Scope 1 and scope 2 emissions:

- Net zero by 2040, including a 90% emission reduction target (2018 baseline)

Scope 3:

- Net zero by 2050, including an 83% emission reduction target (2020 baseline)

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

We estimate that Ahold Delhaize's long-term emission reduction targets translate to emission reductions of 82% by 2050, compared to 2019 levels.

Ahold Delhaize commits to emission reductions of at least 90% by 2040 below 2018 levels for its scope 1 and 2 emissions and at least 83% by 2050 below 2020 levels for its scope 3 emissions. These reduction targets substantiate its net-zero pledges for 2040 and 2050. Since the net-zero pledges entail a commitment to deep decarbonisation but with varying levels of ambition, we consider that the net-zero terminology is unlikely to be misleading but can be improved to fully understand aggregate emission reduction impact across the entire value chain by 2040 and 2050 respectively. Net-zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which Ahold Delhaize has largely committed itself to do.

Ahold Delhaize has not reported on scope 3 emissions for 2019. We estimated a range for these emissions:

- The lower part of the range assumes that Ahold Delhaize's 2019 scope 3 emissions over revenue are proportional to the company's emissions over revenue in 2018. Using this method, an 83% reduction below 2020 levels equals a 82.2% reduction below 2019 levels.
- The upper part of the range assumes the average of reported scope 3 emissions for 2018 and 2020. Using this method, an 83% reduction below 2020 levels equals an 82.3% reduction below 2019 levels.

We assumed scope 1 and 2 emissions to stay constant after target realisation in 2040. The emission reduction target alongside the net zero pledge for scope 1 and 2 (90%, 2018 baseline) translates to emission reductions of 89% compared to a 2019 baseline.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We find that Ahold Delhaize's 2050 targets almost align with global cross-sectoral and sector-specific 1.5°C Paris Agreement-aligned decarbonisation milestones. Ahold Delhaize's scope 3 emissions account for 95% if its emission footprint. In the absence of available benchmarks from the scientific literature for mixed-good retailers, we compare Ahold Delhaize's scope 3 target to available 1.5°C-aligned benchmarks for agriculture (Dietz, Harvey, *et al.*, 2022, p. 14; Teske, 2022, p. 328) , and its reduction across all scopes to cross-sector global benchmarks (IPCC, 2022).

Teske (2022, p. 328) identifies 1.5°C-aligned absolute emission reduction milestones for various emission sources of agricultural activities, which represent upstream scope 3 emissions for Ahold Delhaize. Emissions from fuel use on farms, heat used for food processing and -packaging, purchased electricity on a farm-level or used for food processing and -packaging need to reduce by 100% by 2050, whereas AFOLU emissions and non-CO_2 emissions need to reduce by 42% by 2050 below 2019 levels. In sum, these required reductions mean a reduction of 51% across all scopes, below 2019 levels. Ahold Delhaize's emission reduction target for scope 3 emissions aligns with the latter.

The Transition Pathways Initiative (TPI) derives an emission intensity per tonne of agricultural input aligned with '1.5°C' trajectories by 2050: 0.4 tCO_2/tonne agricultural input (Dietz, Harvey, *et al.*, 2022, p. 14). This represents an 85% reduction in intensity compared to 2.8 tCO_2/tonne agricultural input in the 2020 base year. Due to lack of information on intensity and volumes of agricultural input, we cannot directly assess whether Ahold Delhaize's scope 3 target meets these intensity benchmarks. However, the company's targets and measures contribute to the shift that is signalled by the required change in intensities.

Global cross-sectoral benchmarks require GHG emissions to reduce by 84% between 2019 and 2050 (IPCC, 2022). Ahold Delhaize's targeted emission reductions of 82% across all scopes by 2050 come close to meet these global benchmarks.

We evaluate the Ahold Delhaize's 2040 and 2050 targets as 'moderate' integrity rather than 'high' because of the use of a net-zero target rather than a long-term emissions reduction target, as well as the fact that not every scope target is fully aligned with available benchmarks.

Amazon

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short- to medium term?
Amazon commits to the following two short- and medium-term targets:

- 100% share of renewable electricity across all operations by 2025
- 50% of its shipments to be 'net zero' by 2030

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
We estimate that both targets can jointly result in a **maximum of 16% emission reduction by 2030** below 2019 levels across Amazon's value chain.

The 2025 target on renewable electricity translates into emission reduction of maximum 11% across the value chain by 2030 below 2019 levels. This 11% is based on Amazon's market-based scope 2 emissions in 2019; a location-based estimate is not available. Amazon does not commit to a specific emission reduction target alongside its pledge to make 50% of its shipment 'net zero' by 2030. In 2019, Amazon's scope 1 emissions made up about 10% of the total emission disclosure. If we assume that these scope 1 emissions are entirely attributable to shipments and 'net zero' means reducing to zero, this 2030 target could lead to an additional emission reduction of 5% by 2030 below 2019 emission levels. However, this would be a most optimistic interpretation possible.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?
Amazon sets a 100% renewable energy target within a five-year timeframe. The company communicates no interim target within a five-year timeframe for its 50% 'net-zero shipment' by 2030 target.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

We are unable to compare Amazon's 2025 and 2030 targets to sectoral 1.5°C Paris Agreement-aligned benchmarks as existing literature provides few specific milestones for the technology service industry. Due to this gap in existing literature, we are not able to assess Amazon's decarbonisation efforts within its value chain against sectoral benchmarks aligned with the Paris Agreement's 1.5°C temperature limit.

Amazon's emission reduction commitment does not comply with global cross-sectoral 1.5°C Paris Agreement-aligned emission trajectories. Amazon commits to no more than 16% emission reduction by 2030 from 2019 levels across the entire value chain, thus falling short of the need to reduce global GHG and CO_2 emissions by 43% and 48% respectively to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022). Given that Amazon is active in a sector with readily accessible decarbonisation options, we consider that Amazon's target for 2030 should meet at least the global benchmark of a 43% GHG reduction below 2019 levels.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long-term beyond 2030?
Amazon commits to a 'net-zero' carbon by 2040 target.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Amazon neither commits to any emission reduction target alongside its 'net-zero' carbon by 2040 pledge nor specifies the pledge's emission coverage along the company's value chain. Since Amazon's 'net-zero' carbon pledge does not entail any commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). 'Net -zero' targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which Amazon does not commit to.

Is this emission reduction commitment in line with 1.5°C compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside Amazon's 'net-zero' carbon by 2040 pledge as highly insufficient. To stand a reasonable chance of limiting global warming to 1.5°C, deep and credible emission reductions in all economic sectors towards mid-century are necessary (IPCC, 2022). A global 1.5°C-aligned pathway across all sectors would require a 100% reduction in CO_2 emissions from 2010 levels by 2050 (2045–2055 interquartile range) and an 84% (73–98%) reduction below 2019 levels of all GHGs by 2050 (IPCC, 2018, 2022). The absence of a long-term reduction commitment in Amazon's climate strategy does not reflect a sense of urgency to decarbonise the company's business.

American Airlines

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short- to medium term?

- Achieve an absolute reduction of 50 million gallons of jet fuel from fuel-efficiency initiatives by 2025, using 2019 aircraft as a baseline.
- Source 2.5 million gigajoules of cost-competitive renewable energy by 2025.
- Replace 10% of jet fuel with SAF by 2030.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

The company does not commit to any emission reduction target for 2030, whether in intensity or absolute terms. Its commitments to use SAF and reduce jet fuel consumption may bring no emission reductions at all if an increase in activity outweigh any efficiency improvements.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Literature provides that CO_2 emissions from aviation should decrease by at least 23% by 2030 to be in line with 1.5°C-aligned trajectories (IEA, 2021b, p. 199; CAT, 2022a). American Airlines does not meet these reduction benchmarks, as it has not set any emission reduction target for 2030. The company also does not commit to reduce the non-GHG radiative forcing impact from its business activities.

The TPI's 1.5°C benchmark for airlines provides that companies should have a carbon intensity of 616 gCO_2/RTK by 2030 (Dietz, Byrne and Sheer, 2021, p. 14). To meet this benchmark, American Airlines would need to reduce its carbon intensity by 39% by 2030, compared to 2019. American Airlines' commitment to reduce carbon intensity by 45% by 2035, does not suggest the company is planning – or on track – to achieve a 39% reduction five years earlier.

American Airlines' commitment to use 10% of SAF by 2030 meets the minimum level that various studies show is necessary to bring the aviation sector on a 1.5°C-compatible trajectory. Benchmarks for the share of sustainable aviation fuel by 2030 start at 9%-10 by 2030 (UNFCCC, 2021, p. 12; Teske, 2022, p. 212), while other estimates point to higher shares of 13-18% by 2030 (IEA, 2021b, p. 138; Boehm *et al.*, 2022, p. 74).

Given that American Airlines' SAF target meets only the least ambitious benchmarks, and the company has not committed to any emission reduction targets by 2030, we consider its commitments not aligned with a 1.5°C trajectory.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long-term beyond 2030?

- Reduce the intensity of GHG emissions associated with jet fuel by 45% per revenue tonne kilometre (RTK) operations by 2035, compared to 2019.
- Net-zero GHG emissions by 2050

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Due to uncertainty about how the aviation sector recovers from the COVID-19 pandemic and expected emissions in 2035, we are unable to calculate what American Airlines' intensity target means for emissions across its value chain.

American Airlines' net-zero pledge does not entail any commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain). We consider that the terminology of the net-zero target may be misleading. Net-zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which American Airlines does not commit to. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b).

Is this emission reduction commitment in line with 1.5°C compatible trajectories or benchmarks for the sector?

American Airlines' commitment to reduce the intensity of GHG emissions from jet fuel by 45% per RTK by 2035 meets the SBTi's benchmark for "well below 2°C" but misses TPI's benchmarks that are compatible with global warming of 'below 2°C' and '1.5°C' (Dietz, Byrne and Sheer, 2021; SBTi, 2021b, 2021d). The latest TPI assessment does not yet include American Airlines 45% intensity reduction commitment: using a carbon intensity of 1016 gCO_2/RTK in 2019 as the baseline, a 45% reduction would bring American Airlines to an emissions intensity of 559 gCO_2/RTK by 2035. This is above the TPI's benchmarks for both 'well below 2°C' and '1.5°C', which are set at 542 gCO_2/RTK and 463 gCO_2/RTK by 2035, respectively.

Both the SBTi's and TPI's benchmarks focus exclusively on jet fuel, not taking into consideration GHG emissions that take place elsewhere in airlines' value chains. The TPI benchmarks also exclude non-CO_2 emissions and radiative forcing impacts; although the TPI notes that its benchmarks 'would almost certainly be tighter' if the non-CO_2 impacts of aviation were taken into account (Dietz, Byrne and Sheer, 2021, p. 14).

In the absence of a commitment to real emission reductions within the value chain, American Airlines' net-zero pledge for 2050 does not meet 1.5°C Paris Agreement aligned milestones for the aviation sector. The IEA Net Zero report shows a reduction of 80% by 2050, compared to 2019; the CAT a reduction of 90%, and Teske a reduction of 100% (IEA, 2021b, p. 199; CAT, 2022a; Teske, 2022, p. 216) as Paris aligned . In addition, the ICCT shows that reducing emissions in the aviation sector by 94% between 2019 and 2050 is compatible with a 1.75°C target (Graver *et al.*, 2022, p. i).

Apple

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?
Apple pledges to become **carbon neutral by 2030**. Alongside this pledge, Apple commits to an emissions **reduction target of 75% by 2030** below 2015 levels across the entire value chain.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
The emission reduction target equates to a **63% emission reduction by 2030 below 2019 levels across the entire value chain**. The company will offset all remaining emissions in 2030.

Since this reduction target alongside the carbon neutrality pledge falls short of a commitment to deep emission reductions (i.e., at least 90% below 2019 levels), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Net Zero Guidelines and the SBTi's Net Zero Standard (SBTi, 2021c; ISO, 2022b). Carbon neutrality targets can give consumers and investors the impression that the company will reach deep emission reductions by 2030, although the 2030 emission reduction target will only bring Apple part way along a trajectory towards deep decarbonisation, and the company does not currently commit to going further.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?
Apple does not commit to earlier interim targets within a five-year time horizon.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

We are unable to compare Apple's targets towards 2030 to sectoral 1.5°C-aligned benchmarks as existing literature provides few specific milestones for the electronics industry. This gap in existing literature allows no conclusive assessment of sector-specific decarbonisation efforts across the entire value chain in line with the Paris Agreement's 1.5°C temperature, especially for scope 3 emissions in the electronics industry (representing 96% of Apple's total emissions in 2019).

Apple's absolute emission reduction target for 2030 aligns with 1.5°C-aligned cross-sectoral trajectories. Apple's targeted emission reduction of 63% across its entire value chain by 2030 aligns with the need to reduce global GHG and CO_2 emissions by 43% and 48% respectively to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022). Given that CO_2 is the most relevant GHG in Apple's emission profile and the company operates in a sector with readily accessible decarbonisation options, we consider that Apple's target for 2030 should meet at least the global benchmark of a 48% reduction below 2019 levels.

We evaluate Apple's 2030 target to have 'moderate' rather than 'high' integrity because of the lack of a corresponding short-term target within a five-year timeframe to substantiate it. Such a target represents corporate good practice as it requires immediate action from corporate leadership and makes it easier to hold them accountable.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?
Apple does not commit to any long-term target beyond 2030.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Apple does not commit to any emission reduction targets after 2030.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target to be highly insufficient considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

ArcelorMittal

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short- to medium term?

ArcelorMittal commits to the following 2030 targets:

- 25% emissions intensity reduction by 2030 for global scope 1 and 2 emissions below 2018 levels (equal to intensity of 1.54 tCO_2/tonne steel in 2030)
- 5% emissions intensity reduction by 2030 for European scope 1 and 2 emissions below 2018 levels (equal to intensity of 1.11 tCO_2/tonne steel in 2030)

How does these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

We cannot independently quantify ArcelorMittal's 2030 emission intensity targets in terms of absolute emission reductions across the value chain compared to a 2019 baseline.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?

ArcelorMittal does not commit to earlier interim targets within a five-year time horizon.

Do the short- and medium-term targets align with a 1.5°C trajectory for the sector according to available literature?

We cannot independently assess ArcelorMittal's 2030 intensity targets against existing 1.5°C Paris Agreement-aligned global benchmarks for the steel sector. Existing literature identifies several 2030 benchmarks for steelmakers, focusing mostly on scope 1 and 2 emissions. The carbon intensity of global steel production must reach around 1.13–1.35 tCO_2e/tonne steel (CAT, 2020b; Boehm *et al.*, 2021; Boehm *et al.*, 2022; Dietz, Gardiner, and Scheer, 2022). The Transition Pathways Initiative evaluates ArcelorMittal's global 2030 targets as only aligned with its 'below 2°C' benchmark (TPI, 2022b). However, TPI does not provide any further information on the assumptions underlying its evaluation of ArcelorMittal's 2030 target.

Applying global benchmarks for the steel sector to individual companies requires a significant level of detail on the specific targets. This includes information about the expected share of primary versus secondary steel production in the target year compared to the base year, and the emission boundaries used to calculate baselines. For example, ArcelorMittal's 2030 target for scope 1 and 2 emissions includes some emissions from mining (ArcelorMittal, 2021a, p. 49). Such emissions from mining are possibly not considered in the benchmarks' boundaries. To estimate whether a certain benchmark is compatible with ArcelorMittal's targets in terms of their emission boundaries, we would require more specific information on how the company calculates its emissions intensity baseline.

ArcelorMittal might be sufficiently contributing towards the achievement of other 1.5°C-aligned milestones for the global steel sector's low-carbon technology roadmap. Identified benchmarks in the literature imply that 20 low or near-zero carbon facilities become operational by 2030 (UNFCCC, 2021, p. 15), 70 near-zero emissions primary steel mills by 2030 (Delasalle *et al.*, 2022, p. 69), and most new clean technologies in heavy industry have been demonstrated at scale (IEA, 2021b, pp. 20; 129). ArcelorMittal plans to develop their own near-zero emissions steelmaking facilities, including a zero carbon emissions and green hydrogen powered steel plant in Spain and other zero or near-zero carbon plants in Germany, France and Canada (ArcelorMittal, 2021a, pp. 13–27). Although the company does not provide details on the overall technology split by 2030, we consider they are likely sufficiently contributing to the achievement of these sector-wide benchmarks.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long-term beyond 2030?

ArcelorMittal commits to net-zero by 2050.

How does these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

ArcelorMittal does **not firmly commit to a deep emission reduction target** alongside its net zero pledge but estimates its own emission reduction across the entire value chain to be around 95% by 2050 compared to 2018 emission levels (ArcelorMittal, 2021a). This indicative estimate translates to emission reductions of maximum 84% by 2050 across the full value chain compared to 2019 emission levels; however, 84% represents the most optimistic interpretation as ArcelorMittal currently does not fully report on its scope 3 emissions (ArcelorMittal, 2022, p. 15).

Since the company's net-zero pledge does not entail any specific commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Net-zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which ArcelorMittal does not firmly commit to.

Is the emission reduction commitment as part of the long-term vision in line with 1.5°C compatible trajectories or benchmarks for the sector?

We consider the lack of a firm post-2030 emission reduction target alongside ArcelorMittal's net-zero pledge as highly insufficient. To stand a reasonable chance of limiting global warming to 1.5°C, deep and credible emission reductions towards mid-century are necessary (IPCC, 2022). The lack of a reduction commitment does not signal this sense of urgency.
If ArcelorMittal were to adopt its indicative emission reduction estimate as an official target alongside its net zero pledge, the company would likely come close to meet 1.5°C-aligned sectoral benchmarks identified in the literature. Global steel production must reach around zero to 0.13 tCO_2e/tonne steel by 2050 globally (CAT, 2020b; Boehm *et al.*, 2021; Dietz, Hastreiter, and Scheer, 2021; Boehm *et al.*, 2022), representing a reduction in intensity of ar ound 90% compared to 2015 or 2020 levels. Identified benchmarks in the literature also imply all steel facilities in operation by 2050 to be low-carbon (Boehm *et al.*, 2021).

Further assumptions for aggregate analysis in Section A

For our aggregate analysis across all 24 companies in Section A of this report, we make the simplified most optimistic assumption that companies' *intensity* targets equal *absolute* emission reduction targets. For this purpose, we interpret ArcelorMittal's *intensity* targets for 2030 (25% by 2030 below 2018 for scope 1 and 2) to be an *absolute* target assuming constant activity levels. Under this assumption, the target translates to a 20% reduction by 2030 below 2019 levels across the entire value chain. We do not use this estimate for the company-specific integrity assessment of ArcelorMittal in Section B.

Carrefour

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?
By 2030, Carrefour pledges to reduce scope 1 and 2 emissions by 50%, and scope 3 emissions by 29%, compared to 2019 levels.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
We estimate that Carrefour's targets are equivalent to a commitment to reduce emissions across the value chain by 6–15% by 2030, compared to 2019 levels.

Due to scope 3 emissions accounting for 98% of the company's footprint (Carrefour, 2022c, p. 74), a combination of the targets for a 50% reduction of scope 1 and 2 emissions and a 29% reduction of scope 3 would imply emission reductions of 29% across the full value chain. However, due to the exclusion of the majority of Carrefour locations from its targets, we interpret that these reduction targets only apply to 20–50% of Carrefour output. Carrefour's emission reporting includes only 'integrated stores in integrated countries' (Carrefour, 2022c, p. 163). Stores that Carrefour identifies as 'integrated stores' account for less than 11% of Carrefour's 5,799 stores in France, and less than 20% of Carrefour's 13,894 stores worldwide. Other administrative buildings, warehouses, and supply chain emissions associated with the remaining more than 80% of Carrefour stores worldwide appear to be excluded.

The 6–15% should be understood as an indicative estimate, since we cannot tell what proportion of Carrefour output is covered by the targets. Although the target covers less than 20% of Carrefour's stores worldwide, it is very likely that these stores account for more than 20% of the company's output, since the proportion of hypermarkets covered is considerably higher than the proportion of smaller community stores covered. Accordingly, we offer an indicative estimate that 20-50% of company output is covered by the target. Reducing this 20–50% of the company's emissions footprint by 29% would lead to overall emission reductions in the range of 6–15% compared to the full value chain emissions.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?
Carrefour sets a range of short-term targets that use the same metrics as its 2030 medium-term targets (absolute GHG emission reductions) for scope 1 and 2. For scope 3, the 2025 targets focus on non-GHG indicators for specific emission sources within the value chain.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Carrefour's 2030 medium-term targets neither meet cross-sectoral nor sector-specific 1.5°C Paris Agreement-aligned decarbonisation milestones. Carrefour's scope 3 emissions account for 98% if its emission footprint. In the absence of available benchmarks from the scientific literature for mixed-good retailers, we compare Carrefour's 6–15% emission reductions by 2030 to available 1.5°C-aligned benchmarks for agriculture, and cross-sector global benchmarks. Global cross-sectoral benchmarks require GHG and CO_2 emissions to reduce by 43% and 48% between 2019 and 2030, respectively (IPCC, 2022). Pathways for global agriculture and food sector in Teske (2022, p. 328) indicate that scope 3 emissions should reduce by at least 34% between 2019 and 2030. The exclusion of most stores from Carrefour's targets means that its overall emission reduction commitment falls far short of any of these benchmarks.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?
Carrefour pledges to be carbon neutral by 2040. This includes a commitment to 70% reduction of scope 1 and 2 emissions only.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
We estimate that Carrefour's emission reduction target is equivalent to a commitment to reduce less than 1% of its emissions across the value chain by 2040, compared to 2019 levels.

Carrefour's 2040 target covers only scope 1 and scope 2 emissions, which account for approximately 2% of the company's GHG emission footprint in 2019. We interpret that these targets only apply to 20-50% of Carrefour scope 1 and 2 emissions, due to the exclusion of the majority of Carrefour locations from the targets (see assessment of short- and medium-term targets above). These exclusions would mean that, overall, less than 1% of Carrefour's full value chain emissions are covered by the target.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction commitments for scope 3 alongside Carrefour's carbon neutrality pledge as highly insufficient, considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

Deutsche Post DHL

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short- to medium term?

Deutsche Post committed to the following 2030 targets:

- Reduce scope 1 and 2 emissions by 42% below a 2021 baseline; and
- Reduce scope 3 emissions from fuel- and energy-related activities by 25% below a 2021 baseline.

Deutsche Post DHL also committed to earmark EUR 7 billion (USD 8.3 billion) for sustainable fuels and technologies by 2030. This will be used to achieve:

- At least a 30% share of sustainable fuels in air and ocean freight, and road transport;
- 60% e-vehicles in pick-up and delivery; and
- All newly owned buildings are to be climate neutral (we could not identify a definition of 'climate neutral').

How does these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Deutsche Post DHL's targets equal a **12% emission reduction by 2030 below 2019 levels** across its value chain. Non-logistics-related emissions are excluded from Deutsche Post DHL's 2030 targets. These emissions account for about 6 $MtCO_2e$ every year, or 14% of total emissions. Compared to 2021, the committed reductions equal a reduction of 25% across the entire value chain (i.e., including non-logistics-related emissions). Deutsche Post DHL's emissions across the value chain increased by 18% between 2019 and 2021 (from 38.8 $MtCO_2e$ to 45.7 $MtCO_2e$). Accordingly, the committed reduction compared to 2019 is lower, namely 12%.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?

Deutsche Post DHL does not commit to earlier interim targets within a five-year time horizon.

Do the short- and medium-term targets align with a 1.5°C trajectory for the sector according to available literature?

Deutsche Post DHL's 2030 targets for sustainable aviation and maritime fuels meet 1.5°C Paris Agreement-aligned decarbonisation milestones. However, its commitment to absolute emission reductions falls short of most sectoral benchmarks for the aviation and shipping sectors.

The majority of Deutsche Post DHL's emissions are from own and subcontracted transport. Air freight accounts for 70% of logistics-related emissions, ground transport for 22%, shipping for 7%, and buildings for 1% (Deutsche Post DHL, 2022d). We could not identify emission reduction targets for the separate business sections, so have compared the 12% reduction commitment by 2030 to sectoral benchmarks for air freight, ocean freight and road transport.

While emission reduction benchmarks for the aviation and shipping sectors vary, most indicate a decline in CO_2 emissions of at least 20% in these sectors between 2019 and 2030. For instance, the IEA Net Zero by 2050 report shows a reduction in aviation's CO_2 emissions of 23% and the CAT of 54% (IEA, 2021b, p. 199; CAT, 2022a). For th e shipping sector, the SBTi maritime guidance shows that sectoral emissions decrease by 36% between 2020 and 2030, the IEA Net Zero by 2050 report shows a decrease in CO_2 emissions of 20% between 2019 and 2030, IRENA's decarbonisation pathway provides that CO_2 emissions from the sector are to decrease by about 25% between 2019 and 2030 to be aligned with a 1.5°C trajectory, and the CAT shows a decrease in CO_2 emissions of 51% between 2019 and 2030 (IEA, 2021b, p. 199; IRENA, 2021, p. 81; CAT, 2022b; SBTi, 2022e, p. 11).

Deutsche Post DHL's commitment to use at least 30% sustainable fuels in ocean and air freight by 2030 goes beyond what sectoral benchmarks require. The UNFCCC (2021, p. 15) provides that zero emission fuels make up 5% of international shipping fuels and 15% of national shipping fuels by 2030, Boehm *et al.* (2022, p. 74) outline that 5-17% of maritime fuels need to be zero-emission fuels by 2030 for the shipping sector to be aligned with 1.5°C-aligned pathways, the IEA (2021b, p. 138) finds that ammonia, hydrogen and biofuels will account for 17% of all maritime fuel by 2030, and Teske (2022, p. 213) provides that renewable and synthetic fuels needs to increase rapidly and reach a 30% share by 2030 in shipping freight fuel use by 2030.

Benchmarks for the share of sustainable aviation fuel by 2030 start at 9%–10% by 2030 (UNFCCC, 2021, p. 12; Teske, 2022, p. 212), while other estimates point to higher shares of 13–18% by 2030 (IEA, 2021b, p. 138; Boehm *et al.*, 2022, p. 74).

Deutsche Post DHL's 12% reduction commitment does not meet sectoral benchmarks for road transport. The IEA provides that a 34% reduction is needed for all road transport, and a 12% reduction for trucks between 2019 and 2030 (IEA, 2021b, p. 199). Teske (2022, pp. 214, 333) shows a decrease in road transport emissions of 34%; and a 10% share of renewable fuels for road freight.

The SBTi labelled Deutsche Post DHL's interim targets as '1.5°C compatible' but we could not verify what assumptions went into this assessment and how SBTi came to its conclusion. The SBTi's sectoral guidance for the transport sector is based on an emissions trajectory consistent with a 50% chance of limiting global warming of 1.75°C (SBTi, 2018c, pp. 6, 27–28).

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long-term beyond 2030?

Deutsche Post DHL commits to net-zero logistics-related emissions by 2050.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

We are unable to estimate what emission reductions across the value chain Deutsche Post DHL commits to. While the company states that it will reduce its emissions to an 'unavoidable minimum' (Deutsche Post DHL, 2022a, p. 18), it does not specify what this means in terms of a specific emission reduction target alongside the net-zero target. We consider the terminology 'net zero' as potentially misleading if it is not accompanied by a clear commitment to deep decarbonisation. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Deutsche Post DHL could enhance clarity of its net-zero pledge by indicating what order of magnitude it expects its residual emissions to be in 2050. The company could further set reduction targets between 2030 and 2050 to chart the pathway to deep decarbonisation.

Is the emission reduction commitment as part of the long-term vision in line with 1.5°C compatible trajectories or benchmarks for the sector?

We consider the lack of a specific post-2030 emission reduction target alongside Deutsche Post DHL's net-zero pledge insufficient, considering the need for deep emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

Sectoral benchmarks show that the shipping sector should be close to fully decarbonised between 2040 and 2050, with very limited room for offsetting unabated emissions (IEA, 2021b, p. 199; Smith *et al.*, 2021, p. 106; SBTi, 2022e, p. 11; Teske *et al.*, 2022, p. 213). Emissions from road transport should decrease by 94% (IEA, 2021b, p. 199; Teske, 2022, p. 216). The benchmarks for CO_2 emissions from aviation are more equivocal. The IEA Net Zero for 2050 report shows a reduction of 80% by 2050, compared to 2019; the CAT a reduction of 90%, and Teske a reduction of 100% (IEA, 2021b, p. 199; CAT, 2022a; Teske, 2022, p. 216). The ICCT shows that reducing emissions in the aviation sector by 94% between 2019 and 2050 is compatible with a 1.75°C target (Graver *et al.*, 2022).

Fast Retailing

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?
Fast Retailing's headline pledge is a commitment to reduce **absolute emissions from its own operations (such as stores and main offices) by 90% and emissions from raw materials, fabric, and garment production for the Uniqlo and GU brands by 20% by 2030**, both from a 2019 base year.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
These targets equate to a **commitment to reduce Fast Retailing's complete value chain emissions footprint by 19% by 2030, compared to 2019 levels**.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?
Fast Retailing does not commit to earlier interim targets within a five-year time horizon that entail short-term accountability.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Fast Retailing's 2030 medium-term targets do not meet cross-sectoral and sector-specific 1.5°C Paris Agreement-aligned milestones identified in existing literature. According to the IPCC's global economy-wide benchmarks to keep warming below 1.5°C, GHG emissions should reduce by 43% by 2030 compared to 2019 levels (IPCC, 2022). Given that emissions in the fashion industry occur in various sectors, including agriculture and energy, we expect the industry to decarbonise at the same speed as this global trajectory. Fast Retailing's targets fall short of this global benchmark.

The company's target also misses sectoral benchmarks. Teske (2022, pp. 322; 327) considers that between 2019 and 2030, the *textile and leather industry* and the *manufactured fibres and synthetic rubber industry* should reduce their GHG emissions by 41% and 46%, respectively. This covers all emissions associated with producing fabrics and other materials and manufacturing the clothes. To be in line with these sectoral benchmarks, Fast Retailing's target for *upstream* scope 3 emissions should be set at a level of *at least* 41%. However, its target for upstream scope 3 emissions represents a 16% reduction below 2019.

Assuming that emissions reduce linearly in the 2019–2030 period, Fast Retailing is currently committed to annual emission reductions of 8.2% for scopes 1 and 2 and 1.3% for scope 3, by 2030. The SBTi guidance requires companies in the apparel industry to commit to annual reductions in their scope 1, 2 and 3 emissions of at least 2.5% to comply with the 'well below 2°C' benchmark and 4.2% to comply with the SBTi's 1.5°C benchmark (SBTi, 2018a, pp. 22; 27). While Fast Retailing's reduction target for scope 1 and 2 emissions is likely aligned with the SBTi's 1.5°C, its target for scope 3 does not even meet the 'well below 2°C' benchmark.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?
Fast Retailing pledges **net-zero emissions by 2050.**

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Fast Retailing does not commit to a deep emissions reduction target alongside its net-zero pledge by 2050. Since Fast Retailing's net-zero pledge does not entail any commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Net-zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which the company does not commit to.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside Fast Retailing's net-zero pledge as highly insufficient considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

Foxconn

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?
Foxconn commits to the following short- and medium-term targets:

- To reduce carbon emissions by 21% by 2025, from a 2020 baseline
- To reduce carbon emissions by 42% by 2030, from a 2020 baseline
- To achieve net-zero emissions in the offices of its Taiwanese campuses in 2030.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
We cannot independently estimate the intended emission reductions compared to a 2019 baseline because of the incomplete emissions disclosure for 2019. For this reason, we can only use Foxconn's target of 42% carbon emission reductions by 2030 compared to a 2020 baseline. We assume that Foxconn's targets apply to the company's full value-chain emissions unless stated otherwise.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?
Foxconn sets a target within a five-year timeframe that uses the same metric as its 2030 medium-term emissions reduction target.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

We are unable to compare Foxconn's targets to sectoral 1.5°C-aligned benchmarks as existing literature provides few specific milestones for the electronics industry. This gap in existing literature allows no conclusive assessment of sector-specific decarbonisation efforts across the entire value chain in line with the Paris Agreement's 1.5°C temperature, especially for scope 3 emissions in the electronics industry.

Foxconn's 2030 medium-term target comes close to meeting 1.5°C Paris Agreement-aligned cross-sectoral global milestones identified in existing literature. Given that CO_2 is the most relevant GHG in Foxconn's emission profile, we consider that Foxconn's target of 42% carbon emission reductions by 2030 from 2020 levels does not fully reach the 48% reduction from 2019 levels required to limit global warming to 1.5°C (IPCC, 2022).

Moderate

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?
Foxconn does not commit to any emission reduction target alongside its pledge to achieve **net-zero emissions across its value chain by 2050**. However, the company commits to a **63% emissions reduction target by 2035, compared to a 2020 baseline**.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
We are not able to estimate the emission reductions from a 2019 baseline because of the incomplete emissions disclosure for 2019. For this reason, we can only use Foxconn's target of 63% carbon emission reductions by 2035 compared to a 2020 baseline. We assume that Foxconn's targets apply to the company's full value-chain emissions unless stated otherwise.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

Foxconn's targeted emission reductions towards 2035 may be aligned with global 1.5°C-compatible trajectories up to 2035, but the company does not specify any further emission reduction targets alongside its 2050 net-zero pledge. The IPCC finds that global 1.5°C-aligned pathways across all sectors require an 80% reduction in CO_2 emissions below 2019 levels by 2040 and an 84% reduction below 2019 levels of all GHGs by 2050 (IPCC, 2022). Foxconn's target to reduce 63% of its carbon emissions by 2035 likely aligns with this 1.5°C-compatible trajectory for global CO_2 emissions. As Foxconn sets no emission reduction targets alongside its 2050 net-zero pledge, we evaluate the integrity of Foxconn's long-term vision only as 'moderate'.

Google

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short- to medium term?
Google commits to the following three short-and medium-term targets:

- 'Staying carbon neutral' each year going forward
- 24/7 renewable electricity across all operations sourced by 2030
- Achieving 'net-zero emissions' by 2030

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Alongside its 'net-zero emissions' pledge, Google commits to an **emission reduction target of 50% from its market-based emissions** below 2019 levels across the entire value chain. This translates into a **37% reduction of its location-based emissions** by 2030 below 2019 levels across all scopes. Since this reduction target alongside the net-zero pledge falls well short of a commitment to deep emission reductions (i.e., at least 90% below 2019 levels), we consider that the terminology 'net-zero emissions' may be misleading. Our position is in line with the ISO Guidelines for Net Zero and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Net -zero targets can give consumers and investors the impression that the company aims to reach deep level of emission reductions, which Google does not commit to.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?
Google does not commit to earlier interim targets within a five-year time horizon. Google's pledge to be 'carbon neutral' each year is not a target but rather a 'neutralisation' claim, that is not related to its target of 'net-zero emissions' by 2030.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

We are unable to compare Google's targets towards 2030 to sectoral 1.5°C-aligned benchmarks as existing literature provides few specific milestones for the technology services industry. Due to this gap in existing literature, we are not able to assess Google's decarbonisation efforts within its value chain against sectoral benchmarks aligned with the Paris Agreement's 1.5°C temperature limit.

Google's emission reduction commitment does not comply with global cross-sectoral 1.5°C Paris Agreement-aligned emission trajectories. Google's goal to reduce 37% of its location-based emissions across its entire value chain by 2030 falls short of the need to reduce global GHG and CO_2 emissions by 43% and 48%, respectively, to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022). Given that CO_2 is the most relevant GHG in Google's emission profile and the company operates in a sector with readily accessible decarbonisation options, we consider that Google's target for 2030 should meet at least the global benchmark of a 48% reduction below 2019 levels.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long-term beyond 2030?
Google does not commit to any long-term target beyond 2030.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Google does not commit to any emission reduction targets after 2030.

Is this emission reduction commitment in line with 1.5°C compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside Google's medium-term 'net-zero' emissions target by 2030—accompanied by an emission reduction of only 37% by 2030 compared to 2019—as highly insufficient. To stand a reasonable chance of limiting global warming to 1.5°C, deep and credible emission reductions in all economic sectors towards mid-century are necessary (IPCC, 2022). A global 1.5°C-aligned pathway across all sectors would require a 100% reduction in CO_2 emissions from 2010 levels by 2050 (2045–2055 interquartile range) and an 84% (73–98%) reduction below 2019 levels of all GHGs by 2050 (IPCC, 2018, 2022). The absence of any long-term reduction commitment in Google's climate strategy does not reflect a sense of urgency to decarbonise the company's business.

H&M Group

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term? How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

H&M Group commits to reducing GHG emissions across the entire value chain by **56% by 2030**, compared to 2019.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?

Although H&M Group commits to several targets related to sustainable materials and renewable energy for 2030, the company does not commit to earlier GHG emission reduction targets within a five-year time horizon that entail short-term accountability.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

H&M Group's GHG emission reduction target for 2030 meets global cross-sectoral and sector-specific 1.5°C Paris Agreement-aligned benchmarks. Given that emissions in the fashion industry occur in various sectors, including agriculture and energy, we consider this target aligned with global benchmarks that require GHG and CO_2 emissions to reduce by 43% and 48% by 2030, respectively (IPCC, 2022).

Teske (2022, pp. 322; 327) considers that between 2019 and 2030, the textile and leather industry and the manufactured fibres and synthetic rubber industry should reduce their GHG emissions in absolute terms by 41% and 46%, respectively. This covers all emissions associated with producing fabrics and other materials and manufacturing the clothes. To be in line with these sectoral benchmarks, H&M Group's target for upstream scope 3 emissions should be set at a level of at least 41%. The company's target goes beyond this reduction level.

We evaluate H&M Group's 2030 target to have 'moderate' integrity rather than 'high' because of the lack of a corresponding short-term target within a five-year timeframe to substantiate it. Specific short-term interim targets requiring immediate action and accountability are of primary importance for credible corporate commitments to fight climate change (UN HLEG, 2022).

High

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030? How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

H&M Group commits to an emissions reduction target of **90% by 2040 below 2019 levels** across the entire value chain, alongside its net-zero pledge.

Is this emission reduction commitment in line with 1.5°C compatible trajectories or benchmarks for the sector?

H&M Group's 2040 emission reduction target meets global cross-sectoral and sector-specific 1.5°C Paris Agreement-aligned benchmarks. Given that emissions in the fashion industry occur in various sectors, including agriculture and energy, we consider this target aligned with global benchmarks that require a deep emission reduction of 84% reduction below 2019 levels of all GHG by 2050 (IPCC, 2022). The target also meets benchmarks for fashion retailers' upstream scope 3 emissions. According to Teske (2022, pp. 322; 327), emissions in the manufactured fibres and synthetic rubber industry need to reduce by 76% and emissions in the textile and leather sector by 74% by 2040, below 2019 levels. These emissions form part of H&M Group's upstream scope 3 emissions.

Holcim

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short- to medium term?

Holcim commits to emissions intensity targets by 2030 for all its reported emissions:

- **Scope 1:** reduce the carbon intensity of cement (expressed in $kgCO_2$/tonne cement) to 520 $kgCO_2$/tonne of cement by 2025.
- **Scope 1:** reduce the carbon intensity of cement (expressed in $kgCO_2$/tonne cement) by 22.5% below 2018 levels by 2030.
- **Scope 2:** reduce the carbon intensity of cement (expressed in $kgCO_2$/tonne cement) by 65% below 2018 levels by 2030.
- **Scope 3 purchased goods:** reduce the carbon intensity of clinker and cement bought (expressed in $kgCO_2$/tonne of clinker and cement bought) by 20% below 2020 levels by 2030.
- **Scope 3 fuel and energy:** reduce carbon intensity of bought fuel (expressed in $kgCO_2$/tonne of fuel bought) by 20% below 2020 levels by 2030.
- **Scope 3 downstream transport and distribution:** reduce carbon intensity of sold products (expressed in $kgCO_2$/tonne of product sold) by 24% below 2020 levels by 2030.

How does these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

We cannot quantify Holcim's intensity targets in terms of absolute emission reductions below 2019 levels due to a lack of publicly available information.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?

Holcim sets a short-term target within a five-year timeframe that uses the same metric as its 2030 medium-term targets for scope 1 emissions.

Do the short- and medium-term targets align with a 1.5°C trajectory for the sector according to available literature?

Holcim's 2030 targets come close to meet 1.5°C Paris Agreement-aligned decarbonisation milestones for the cement industry identified in existing literature. For 2030, existing 1.5°C-aligned benchmarks for scope 1 and 2 emissions identify a range of 360–463 $kgCO_2$/tonne cement (CAT, 2020b; Boehm *et al.*, 2022; SBTi, 2022a, 2022d). Holcim's 2030 target to reach an emissions intensity of 454 $kgCO_2$/tonne cement across its scope 1 and 2 emissions meets the benchmarks at the upper end (SBTi, 2022a, 2022d), but clearly misses those at the lower end of the range (CAT, 2020b; Boehm *et al.*, 2022).

Holcim sets a separate 2025 target targeting its scope 1 emissions (520 $kgCO_2$/tonne) within a five-year timeframe that use the same metric as its 2030 target (441 $kgCO_2$/tonne). The TPI found that both targets are compatible with its 'below 2°C' benchmarks, falling short of their '1.5°C' benchmarks (Dietz, Hastreiter and Jahn, 2021, p. 9; TPI, 2022c).

We cannot independently compare Holcim's range of scope 3 intensity reduction targets to 1.5°C-aligned sectoral benchmarks as literature provides few specific milestones for the cement industry's scope 3 emissions.

Moderate

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long-term beyond 2030?

Holcim commits to the following emission reduction targets alongside its pledge to reach **net zero by 2050** across its entire value chain emissions:

- **Scope 1:** reduce the carbon intensity of cement (expressed in $kgCO_2$/tonne cement) by 95% below 2018 levels by 2050
- **Scope 2:** reduce the carbon intensity of cement (expressed in $kgCO_2$/tonne cement) by 95% below 2018 levels by 2050
- **Scope 3:** reduce emissions by 90% below 2020 levels by 2050.

How does these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Holcim substantiates its net-zero pledge by committing to an absolute reduction of scope 3 emissions of 90% by 2050 below 2019 levels; and to reduce the carbon intensity of scope 1 and 2 emissions by 95%. Given that this is an intensity target – and that the target comprises not only emission reductions but through claims to have neutralised emissions through CCUS – it is not clear what the absolute emission reduction impact of these targets would be. This uncertainty makes the appropriateness of the net zero terminology contentious, since we interpret that it is unlikely that the targets would lead to at least 90% emission reductions, excluding measures to neutralise emissions.

We cannot quantify Holcim's scope 1 and 2 *intensity* targets in terms of *absolute* emission reductions along Holcim's value chain compared to 2019 levels due to a lack of publicly available information. Holcim's scope 3 target is equivalent to an absolute reduction of 26.2 $MtCO_2e$. We cannot estimate what share of Holcim's 2019 emissions this represents as the company updated their scope 3 emissions accounting methodology in 2020 without providing updated emission disclosures for previous years, leading to substantially higher year-on-year emissions in 2020 compared to previous years (Holcim, 2021, p. 16).

Is the emission reduction commitment as part of the long-term vision in line with 1.5°C compatible trajectories or benchmarks for the sector?

Holcim's 2050 intensity reduction targets for scope 1 and 2 emissions meet 1.5°C-aligned milestones for cement producers. For scope 1 and 2 emissions, existing literature identifies a 1.5°C-compatible benchmarks range of 30-90 $kgCO_2$/tonne cement (CAT, 2020b; SBTi, 2021a, 2021c, 2022c; Boehm *et al.*, 2022). Holcim's intensity reduction target of 30.7 $kgCO_2$/tonne cement for scope 1 and 2 emissions meets the most ambitious end of this benchmark range. The TPI also evaluates the company's intensity reduction targets for scope 1 emissions as compatible with their interpretation of a 1.5°C benchmark (Dietz, Hastreiter and Jahn, 2021, p. 9; TPI, 2022c).

Holcim's absolute 90% emission reduction target for scope 3 emissions by 2050, below 2020 levels, comes close to aligning with the range of available sectoral benchmarks. For scope 3 emissions, available literature suggests an absolute emissions reduction of more than 90% (SBTi, 2021c, p. 27) and 100% (Teske, 2022, p. 323) of all scope 3 emissions by 2050, compared to a 2019 or 2020 base year respectively.

Further assumptions for aggregate analysis in Section A

For our aggregate analysis across all 24 companies in Section A of this report, we make the simplified most optimistic assumption that companies' intensity targets equal absolute emission reduction targets. For this purpose, we interpret Holcim's multiple intensity targets for 2030 to be absolute targets assuming constant activity levels. Under this assumption, these targets jointly translate into a 11% absolute reduction by 2030 below 2019 levels across the entire value chain. We do not use this estimate for the company-specific integrity assessment of Holcim in Section B.

Inditex

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

Inditex has set out two interim GHG emissions targets: first, to reduce scope 1 and 2 emissions by 90% below 2018 levels by 2030, and second, to reduce scope 3 emissions from purchased goods and services by 20% below 2018 levels by 2030.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

These targets jointly represent a reduction of **10–12% by 2030 across the entire value chain** below 2019 levels. To calculate this value, we have assumed that the distribution of scope 3 emissions between different sub-categories in 2018 and 2019 have remained constant. This is because Inditex does not provide detailed information on its full scope 3 emissions for 2018, which is the baseline year for its SBTi target. The range provided comes from the existing uncertainty regarding how Inditex plans to reduce its scope 2 emissions. If the company would reduce its scope 2 emissions largely or exclusively through the purchase of low-quality renewable energy certificates, we would not consider those emissions reduced. This would mean the total targeted reduction would amount to 10% of Inditex's total emissions. If instead it would reduce its emissions largely or exclusively through energy efficiency measures that reduce electricity demand alongside higher quality renewable energy procurement constructs, the emission reductions would represent 12% of the total value chain emissions in 2019.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?

Inditex does not commit to earlier interim emission reduction targets within a five-year time horizon that require immediate action. The company has a 2022 renewable energy target which it is on track to meet, although it does not provide details as to the procurement constructs it uses to reach its target (Inditex, 2022a).

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Inditex's reduction commitment for reductions across the value chain does not meet cross-sectoral and sector-specific 1.5°C-aligned milestones identified in existing literature. According to the IPCC's global economy-wide benchmarks to keep warming below 1.5°C, GHG emissions should reduce by 43% by 2030, compared to 2019 (IPCC, 2022). Given that emissions in the fashion industry occur in various sectors, including agriculture and energy, we expect the industry to decarbonise at the same speed as this global trajectory. Inditex's targets falls short of this global benchmark.

The company's 2030 target for scope 1 and 2 emissions meets sectoral benchmarks. The SBTi guidance for the apparel and footwear sector requires companies to commit to annual reductions of at least 2.5% to comply with the 'well below 2°C' benchmark and 4.2% to comply with the SBTi's '1.5°C' benchmark (SBTi, 2018a, pp. 22; 27). These reductions are based on global trajectories consistent with limiting global warming to well below 2°C and 1.5°C, respectively. Inditex meets the SBTi's 1.5°C benchmark for its target for scopes 1 and 2, which represent less than 3% of Inditex's total emissions in 2019.

Inditex's 2030 target for scope 3 emissions is not aligned with SBTi's 'well below 2°C' and '1.5°C' benchmarks for the apparel sector. The SBTi guidance requires companies in the apparel industry to commit to annual reductions of at least 2.5% to comply with the 'well below 2°C' benchmark and 4.2% to comply with the SBTi's '1.5°C' benchmark (SBTi, 2018a). Assuming a constant emissions reduction rate from the base year to the target year, Inditex's target for scope 3 translates to a 1.7% annual reduction.

The company's scope 3 2030 target is also not aligned with other 1.5°C-compatible sectoral benchmarks. Teske (2022, pp. 322; 327) considers that between 2019 and 2030, the *textile and leather industry* and the *manufactured fibres and synthetic rubber industry* should reduce their GHG emissions by 41% and 46%, respectively. This covers all emissions associated with producing fabrics and other materials and manufacturing the clothes. To be in line with these sectoral benchmarks, Inditex's target for upstream scope 3 emissions should be set at a level of at least 41%. However, its target for upstream and downstream scope 3 emissions represents a 10% reduction below 2019. Scope 3 emissions represented 97% of Inditex's total emissions in 2021.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

Inditex's headline pledge includes a commitment to **reach net zero GHG emissions by 2040**.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Inditex neither commits to a deep emissions reduction target alongside its 2050 net-zero pledge nor specifies emission scopes covered. Since the company's net-zero pledge does not entail any commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Guidelines for Net Zero and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Net -zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which Inditex does not commit to.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside Inditex's net-zero pledge as highly insufficient considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

JBS

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?
JBS has a target to reduce its scope 1 and 2 emission intensity by 30% by 2030 from a 2019 baseline.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
We cannot quantify JBS's intensity target in terms of absolute emission reductions below 2019 levels due to a lack of publicly available information.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?
JBS does not commit to earlier interim targets within a five-year time horizon.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

JBS's 2030 targets are not aligned with any of the few 1.5°C Paris Agreement-aligned milestones for the livestock sector available in the literature.

Agricultural emissions, including those from enteric fermentation and manure management, need to reduce significantly before 2030 (Boehm *et al.*, 2022, p. 120). Teske (2022, p. 328) identifies 1.5°C-aligned absolute emission reduction milestones for various emission sources of agricultural activities. Emissions from fuel use on farms, heat used for food processing and -packaging need to reduce by 48%, emissions from purchased electricity on a farm-level or used for food processing and -packaging need to reduce 67%, and emissions AFOLU, non-CO_2 GHGs need to reduce by 34% by 2030. In sum, these required reductions mean a reduction of 38% across all scopes, below 2019 levels. We did not identify any information indicating that JBS's emission intensity target aligns with the latter.

We did not identify any targets for a reduction of scope 3 emissions in the short- and medium-term in JBS' public communications.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?
JBS pledges to have net-zero emissions by 2040.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
JBS does not commit to a deep emissions reduction target alongside its 2040 net-zero pledge. The company only makes a vague statement that it intends to offset residual emissions in the target year to achieve the target. Since the company's net-zero pledge does not entail any commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. This position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Net-zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which JBS does not commit to.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside JBS's net-zero pledge as highly insufficient considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

Further assumptions for aggregate analysis in Section A

For our aggregate analysis across all 24 companies in Section A of this report, we make the simplified most optimistic assumption that companies' *intensity* targets equal *absolute* emission reduction targets. For this purpose, we interpret JBS's *intensity* target (50% by 2030 below 2019 levels for scope 1 and 2) to be an *absolute* target assuming constant activity levels. Under this assumption, the target translates to a 3% reduction by 2030 below 2019 levels across the entire value chain. We do not use this estimate for the company-specific integrity assessment of JBS in Section B.

Maersk

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

Maersk committed to the following targets for 2030 (Maersk, 2022f, p. 12):

- Ocean: reduce the intensity of its ocean activities b y 50% per transported container, compared to 2020.
- Ocean: transport 25% of its ocean cargo by green fuels.
- Air: transport minimum 30% of cargo with SAF.
- Logistics facilities: minimum 90% of green operations ('green operations' are defined as operated on renewable energy and/or green fuels).
- Landside: minimum 20% of moves of customers' cargo on low/zero emissions technology.
- Terminals: reduce scope 1 and 2 emissions of own terminals by about 70%, compared to 2020.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Maersk's intensity target for ocean activities is in line with sectoral intensity benchmarks. However, depending on the increase of the company's activities in the next decade, it is possible that the company's absolute emissions could increase towards 2030 if growth in activity outpaces reductions in emissions.

Maersk's target for emission reductions at its terminals covers about 0.03% of 2020 emissions and will not lead to substantial reductions across the entire value chain. The company's commitments to use lower- and zero-carbon fuels for 25% of its ocean activities and SAF for 30% of air cargo by 2030 could substantially reduce the company's emissions footprint, but only if they are not outpaced by a substantial increase in the total amount of fuel used.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?

Maersk does not commit to earlier interim targets within a five-year time horizon.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Maersk's 2030 interim targets meet some 1.5°C Paris Agreement-aligned milestones for the shipping sector. The company's emissions intensity goal for ocean activities by 2030 is in line with TPI's 1.5°C-aligned intensity benchmarks for the sector (Dietz, Byrne, Hastreiter *et al.*, 2021), but meeting the Paris Agreement's temperature goal requires absolute emission reductions . The CAT shows that a decrease of 51% would be necessary between 2019 and 2030; the SBTi guidance for the maritime sector indicates a necessary emission reduction of 36% below 2020 levels; IRENA's decarbonisation pathway provides that CO_2 emissions from the sector are to decrease by about 25% between 2019 and 2030 to be aligned with a 1.5°C trajectory; and the IEA Net Zero report shows a decrease in CO_2 emissions of 20% (IEA, 2021b, p. 199; IRENA, 2021, p. 81; CAT, 2022b; SBTi, 2022e, p. 11).

Maersk committed to transport 25% of its ocean cargo by green fuels by 2030. These are fuels with 'low or very low greenhouse gas emissions on a lifecycle basis' (Maersk, 2022b). This likely goes beyond benchmarks showing that 5-17% of maritime fuels need to be zero-emission fuels by 2030 for the shipping sector to be aligned with 1.5°C-aligned pathways (IEA, 2021a, p. 138; Smith *et al.*, 2021, p. 11; UNFCCC, 2021, p. 15; Boehm *et al.*, 2022, p. 74) . Teske (2022, p. 212) provides that renewable and synthetic fuels needs to increase rapidly and reach a 30% share in fuel use by 2030. *We cannot fully evaluate how Maersk's target aligns with these benchmarks given the little information disclosed by Maersk on the fuels' lifecycle emission calculations and the share of bio-based fuels vis-à-vis e-fuels.*

High

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

Maersk commits to **net-zero emissions by 2040**.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Alongside its net-zero pledge, Maersk commits to reduce emissions across scopes 1, 2 and 3 by 90% below 2020 levels. This equals a 91% reduction from 2019 emission levels.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

A commitment to reduce emissions by 90% below 2020 levels by 2040 is in line with Paris Agreement-aligned milestones for the shipping sector. Various studies show that the sector should be fully decarbonised between 2040 and 2050 with no room for offsetting unabated emissions (IRENA, 2021, p. 81; Smith *et al.*, 2021, p. 106; SBTi, 2022e, p. 11; Teske, 2022, p. 213).

Further assumptions for aggregate analysis in Section A

For our aggregate analysis across all 24 companies in Section A of this report, we make the simplified most optimistic assumption that companies' *intensity* targets equal *absolute* emission reduction targets. For this purpose, we interpret Maersk's *intensity* target for ocean activities (50% per transported container below 2020 levels) to be an *absolute* target assuming constant activity levels. Under this assumption, the target translates to a maximum 50% reduction by 2030 below 2019 levels across the entire value chain. We did not account for emissions related to other transport modes due to limited data availability. We do not use this estimate for the company-specific integrity assessment of Maersk in Section B.

Mercedes-Benz

Update 28 March 2023: *Please note that the originally published version of this report did not refer to Mercedes-Benz's 2030 target to reduce the carbon footprint of its passenger cars by at least 50% compared to 2020 levels, as published by the company in a press release in April 2022. An additional paragraph has been added to this Annex using all information identified by the authors as of 28 March 2023.*

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

Mercedes-Benz commits to the following two emission reduction targets by 2030, both below 2018 levels:

- >40% CO_2 emissions intensity reduction per kilometre for new vehicles ('well-to-wheel' use phase, scope 3 category 11)
- 50% absolute emissions reduction across scope 1 and scope 2 emissions

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

We are unable to quantify the extent to which the interim targets reduce emissions across the value chain compared to a 2019 baseline, due to a lack of emissions reporting for Mercedes-Benz before 2021. The company provides emissions data for the year 2019, this includes emissions from Daimler Truck AG, which spun off from Mercedes-Benz Group AG in December 2021.

The company further announced its intention to reduce the carbon footprint of its passenger cars by at least 50% compared to 2020 levels in a press release in April 2022 (Mercedes-Benz, 2022f) . As of February 2023, we could not identify any official information on whether this target covers all emission scopes across the entire value chain of the passenger car division, and to what extent it relies on the use of offsets. For this reason, we cannot evaluate the emissions reduction impact of this announced target. The company has also not communicated any further specific phaseout date for internal combustion engines for specific sale markets alongside this 2030 target.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?

Mercedes-Benz does not commit to earlier emission reduction targets within a five-year time horizon.

Do the short- and medium-term targets align with a 1.5°C trajectory for the sector according to available literature?

Mercedes-Benz's range of 2030 interim targets do not meet 1.5°C Paris Agreement-aligned milestones for automobile manufacturers' downstream scope 3 emissions (SBTi, 2018b, 2018c; CAT, 2020b; Dietz *et al.*, 2020; IEA, 2021b; UNFCCC, 2021; Boehm *et al.*, 2022; Teske *et al.*, 2022). Sixty to ninety-five percent of all light-duty vehicle (LDVs) sales globally should be electric—that is, have zero tailpipe emissions—by 2030 to stay below the Paris Agreement's temperature limit of 1.5°C (CAT, 2020b; IEA, 2021b). Ninety-five to one-hundred percent of LDV sales should be electric in Mercedes-Benz's main markets, such as the European Union, China and the US (CAT, 2020b; Teske *et al.*, 2022) , and reach 100% by 2035 in all leading markets (IEA, 2021b, pp. 20; 138; UNFCCC, 2021, pp. 10–11). Mercede s-Benz would not meet these benchmarks by 2030, as it presently provides no market-specific phase-out dates for internal combustion engines. In this context, German NGO Deutsche Umwelthilfe filled a court action against Mercedes-Benz in 2021 to enforce a legally binding commitment to stop producing combustion-engine cars by November 2030 (Metz, Müller-Kraenner and Resch, 2021; Setzer and Higham, 2022; Waldersee, 2022).

Mercedes-Benz instead still refers to its SBTi 'well-below 2°C' verification of its scope 3 emissions intensity target (Mercedes-Benz Group, 2022e, p. 130, 2022a, p. 23). SBTi has indefinitely paused the use of its methodology for automakers, as the initiative states that the methodology does not reflect a 1.5°C-compatible definition (SBTi, 2022f).

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

The Mercedes-Benz Group commits to **CO_2-neutral new vehicle fleet along all stages of the value chain by 2039**.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

The Mercedes-Benz Group does **not commit to a deep emission reduction target** alongside its carbon neutrality pledge. Since the company's carbon neutrality pledge does not entail any commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Guidelines for Net Zero and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Carbon neutrality targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which the Mercedes-Benz Group does not commit to.

Is the emission reduction commitment as part of the long-term vision in line with 1.5°C compatible trajectories or benchmarks for the sector?

The Mercedes-Benz Group does not explain why it considers the 2039 carbon neutrality target aligned with 1.5°C-aligned decarbonisation milestones for the automobile sector. The automobile industry should sell only electric vehicles by 2030–2035 globally to comply with 1.5°C-compatible decarbonisation milestones (CAT, 2020b; IEA, 2021b; UNFCCC, 2021; Boehm *et al.*, 2022; Teske *et al.*, 2022) . Alongside its headline pledge, Mercedes-Benz aims to sell only electric vehicles by the end of the decade 'wherever market conditions allow' (Mercedes-Benz Group, 2022e, p. 130, 2022a, p. 23). The company, however, stops short of committing to specific phase-out dates for internal combustion engines in key markets such as the European Union, the US, or China. Accordingly, if Mercedes-Benz considers market conditions unsuitable for a phase-out of internal combustion engines, the company could potentially continue to sell combustion-engine vehicles in key markets way beyond 2030.

Further assumptions for aggregate analysis in Section A

For our aggregate analysis across all 24 companies in Section A of this report, we make the simplified most optimistic assumption that companies' *intensity* targets equal *absolute* emission reduction targets. For this purpose, we interpret Mercedes-Benz's *intensity* targets for 2030 (at least 40% by 2030 below 2018 for downstream scope 3 use phase emissions) to be an *absolute* target assuming constant activity levels. Together with Mercedes-Benz's absolute target for scope 1 and 2 (50% by 2030 below 2021), these targets jointly translate into a 32% absolute reduction by 2030 below 2021 levels across the entire value chain. We do not use this estimate for the company-specific integrity assessment of Mercedes-Benz in Section B.

Microsoft

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short- to medium term?
Microsoft commits to the following three short-and medium-term targets:

- 'Staying carbon neutral' each year since 2012
- 24/7 renewable electricity across all operations sourced by 2030
- Becoming 'carbon negative' across its entire value chain by 2030

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Microsoft's 'carbon negative' target for 2030 entails a commitment to reduce **50% of its market-based emissions, by 2030** across the entire value chain, compared to 2020 levels. This translates into a location-based **emission reduction of 38% by 2030** across the entire value chain, compared to 2019 levels. Since this reduction target alongside the 'carbon negative' pledge falls well short of a commitment to deep emission reductions (i.e., at least 90% below 2019 levels), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). 'Carbon negative' targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which the company does not commit to.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?
Microsoft does not commit to earlier interim targets within a five-year time horizon. Microsoft's pledge to be 'carbon neutral' each year is not a target but rather a neutralisation claim that is not related to its 'carbon negative' by 2030 target.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

We are unable to compare Microsoft's 2030 emission reduction target to sectoral 1.5°C Paris Agreement-aligned benchmarks as existing literature provides few specific milestones for the technology service industry. Microsoft's emission reduction targets for scope 1 and scope 2 market-based emissions, both of which are verified by SBTi as aligned with its interpretation of the 1.5°C temperature limit (SBTi, 2023a), only cover around 3% of Microsoft's total emissions in 2021. The main source of scope 1 and 2 emissions for information and communications technology (ICT) companies stems from consumed electricity (SBTi, 2020, p. 15). We could not identify any sectoral 1.5°C-aligned benchmark in the literature for the largest share of Microsoft's emissions, namely scope 3 emissions, which account for 75% of its 2021 location-based emissions. Due to this gap in existing literature, we are not able to assess Microsoft's decarbonisation efforts within its value chain against 1.5°C-aligned sectoral benchmarks.

Microsoft's emission reduction commitment does not comply with cross-sectoral 1.5°C Paris Agreement-aligned emission trajectories. Microsoft's commitment to reduce 38% of its location-based emissions across its entire value chain by 2030 falls short of the need to reduce global GHG and CO_2 emissions by 43% and 48%, respectively, to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022). Given that CO_2 is the most relevant GHG in Microsoft's emission profile and the company operates in a sector with readily accessible decarbonisation options, we consider that Microsoft's target for 2030 should meet at least the global benchmark of a 48% reduction below 2019 levels.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long-term beyond 2030?
Microsoft commits to remove all direct emissions or those from consumed electricity since its foundation in 1975 by 2050 (Microsoft, 2022a, p. 104).

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Microsoft does **not commit to any further emission reductions** target alongside its long-term pledge.

Is this emission reduction commitment in line with 1.5°C compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside Microsoft's medium-term 'carbon negative' by 2030 target—the latter accompanied by an emission reduction of only 38% by 2030 compared to 2019—as highly insufficient. To stand a reasonable chance of limiting global warming to 1.5°C, deep and credible emission reductions in all economic sectors towards mid-century are necessary (IPCC, 2022). A global 1.5°C-aligned pathway across all sectors would require a deep emission reduction of 100% CO_2 from 2010 levels by 2050 (2045–2055 interquartile range) and an 84% (73–98%) reduction below 2019 levels of all GHG by 2050 (IPCC, 2018, 2022). The absence of a long-term reduction commitment in Microsoft's climate strategy does not reflect a sense of urgency to decarbonise the company's business.

Nestlé

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?
Nestlé pledges to reduce its emissions by 20% by 2025 and 50% by 2030, compared to a 2018 baseline.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
We interpret that the pledge to reduce emissions by 50% by 2030 translates to only 16–21% emission reductions compared to the company's full value chain emissions in 2019.

In its *Net Zero Roadmap* (Nestlé, 2021b), Nestlé presents its interim emission reduction targets compared to a business-as-usual scenario and shows the targeted emission levels for each emission source for 2030. We calculate from the figures presented in the company's *Net Zero Roadmap* (Nestlé, 2021b) that the company actually commits to reduce its full emission footprint from 116 $MtCO_2e$ in 2019 to between 91-97 $MtCO_2e$ in 2030. This would represent a reduction of just 16-21% of the company's full value chain emissions. The stark difference between this range and the 50% target communicated by Nestlé lies in the company's exclusion of various emission sources from its pledge, as well as the inclusion of measures for biological and non-permanent carbon removal and storage which Nestlé accounts as negative emissions to claim that its real emissions are cancelled out.

The range of 16–21% is due to different potential interpretations of the poorly defined measures to 'transform the product portfolio', through which Nestlé states that it plans to 'reduce future emissions growth' by 6 $MtCO_2e$ (Nestlé, 2021b, p. 21). The upper end of the 16–21% range is based on the optimistic assumption that the 6 $MtCO_2e$ refers to further emission reductions across a number of emission sources and compared to 2019 levels. However, the ambiguous presentation of this measure in the *Net Zero Roadmap* could also refer to a 6 $MtCO_2e$ reduction compared to unspecified future emissions growth, which may not lead to any further emission reductions compared to 2019 levels.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?
Nestlé sets a target within a five-year timeframe that uses the same metric as its 2030 medium-term target.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Nestlé's 2030 medium-term targets neither meet cross-sectoral nor sector-specific 1.5°C Paris Agreement-aligned decarbonisation milestones. The majority of Nestlé's emission footprint derives from agricultural emissions. In the absence of available benchmarks from the scientific literature for food and beverage companies specifically, we compare Nestlé's 16–21% emission reductions by 2030 to available 1.5°C-aligned benchmarks for agriculture, and cross-sector global benchmarks. Global cross-sectoral benchmarks require GHG and CO_2 emissions to reduce by 43% and 48% between 2019 and 2030, respectively (IPCC, 2022). Pathways for global agriculture and food sector in Teske (2022, p. 328) indicate that scope 3 emissions should reduce by at least 34% between 2019 and 2030. Although the 50% reduction communicated by Nestlé would appear to align the company with these benchmarks, our interpretation Nestlé's target translates just a 16-21% reduction of the full value chain emissions in 2019 means that Nestlé's plans fall far short of any of these benchmarks.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?
Nestlé pledges to achieve net zero emissions by 2050 (Nestlé, 2021b, p. 3).

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Nestlé does not commit to an emissions reduction target alongside its 2050 net zero pledge. Since the company's net zero pledge does not entail any commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Guidelines for Net Zero and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Net-zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which Nestlé does not commit to.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside Nestlé's net-zero pledge as highly insufficient considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

PepsiCo

? Unclear — Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

PepsiCo has the following medium-term targets:

- To reduce scope 1 and 2 emissions by 75%, by 2030, compared to a 2015 baseline.
- To reduce scope 3 emissions by 40%, by 2030, compared to a 2015 baseline.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

PepsiCo explicitly states that its targets do not depend on carbon offsets, but its Climate Action Strategy includes 'insetting' to realise them. The targets translate to emission reductions of **maximum 48% by 2030 across the entire value chain**, compared to a 2019 baseline. However, it remains unclear what share of the targets would be realised through offsets under the term 'insetting'. **Emission reductions will be lower than 48% if neutralisation is claimed through 'insetting'.**

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?

PepsiCo does not commit to earlier interim targets within a five-year time horizon.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

We are unable to compare PepsiCo's medium-term targets to sectoral 1.5°C Paris Agreement-aligned benchmarks as it remains unclear what share of the targets will be met without offsetting practices such as 'insetting'. Global cross sector benchmarks require GHG and CO_2 emissions to reduce by 43% and 48% between 2019 and 2030, respectively (IPCC, 2022). Pathways for global agriculture and food sector in Teske (2022, p. 328) indicate that scope 3 emissions should reduce by at least 34% between 2019 and 2030. Without specifying what share of the target will be met through reducing emissions and what share will depend on offsets (termed 'insetting'), we cannot compare PepsiCo's targets to these benchmarks.

Poor — Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

PepsiCo commits to **net-zero emissions across its value chain by 2040.**

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

PepsiCo does not commit to a deep emissions reduction target alongside its 2040 net zero pledge. Since the company's net zero pledge does not entail any commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Net zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which PepsiCo does not commit to.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside PepsiCo's net zero pledge as highly insufficient considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

Samsung Electronics

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?
Samsung commits to a net-zero carbon emissions target by 2030 that covers scopes 1 and 2 of the Device Experience (DX) Division. The company does not specify an emissions reduction target alongside its net-zero pledge.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Samsung's net-zero target for its DX Division equates to an emissions reduction target of only 2% across the full value chain by 2030, under the assumption that the company will reduce scope 1 and 2 emissions from its DX Division by 100% by the target year. Since Samsung's net-zero pledge does not entail a commitment to deep decarbonisation (i.e., reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Net-zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which the company does not commit to.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?
Samsung does not commit to earlier interim targets within a five-year time horizon.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

We consider that Samsung's net-zero pledge, which entails a reduction of only 2% of emissions across its full value chain, is highly insufficient considering the need for deep and credible emission reductions towards 2030 to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?
Samsung commits to a net-zero carbon emissions target by 2050 that covers scopes 1 and 2. The company aims to reduce 17 $MtCO_2e$ by 2050, which correspond to its scope 1 and 2 emissions footprint in 2021.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?
Samsung's 2050 target of 17 $MtCO_2e$ of scope 1 and 2 emission reductions alongside its net-zero pledge equates to **20% emission reduction by 2030 along the entire value chain**, compared to its 2019 emissions footprint. Since this reduction target alongside the net-zero pledge falls well short of a commitment to deep emission reductions (i.e., at least 90% below 2019 levels), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Net Zero Guidelines and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b) . Net-zero targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which the company does not commit to.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

Samsung's targeted emission reductions of 20% by 2050, compared to 2019 levels, fall way short from global efforts required to limit global warming to 1.5°C. The IPCC finds that global 1.5°C-aligned pathways across all sectors require a 100% reduction in CO_2 emissions from 2010 levels by 2050 and an 84% reduction below 2019 levels of all GHGs by 2050 (IPCC, 2018, 2022). Samsung's 2050 target falls way short of these global efforts.

We evaluate the integrity of Samsung's emissions reduction target using global economy-wide benchmarks as we did not identify 1.5°C-aligned benchmarks for the electronics industry in existing literature. This gap in existing literature allows no conclusive assessment of sector-specific decarbonisation efforts across the entire value chain in line with the Paris Agreement's 1.5°C temperature, especially for scope 3 emissions in the electronics industry (representing 86% of Samsung's total emissions in 2019).

Stellantis

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

Stellantis commits to an overarching emission reduction target of 50% by 2030 across the entire value chain, compared to 2021 levels. The overarching interim target is supported by the following targets, all using a 2021 base year:

- To reduce absolute scope 1 and 2 emissions by 50% by 2025 and by 75% by 2030.
- To reduce scope 3 emission intensity by 50% by 2030.
- To sell 100% BEVs for passenger cars in Europe and 50% BEVs for passenger cars and light-duty trucks in the US by 2030.
- To reduce the emission intensity of purchased parts per EV by 40% by 2030.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Stellantis commits to an overarching interim emission reduction target of 50% by 2030 across the entire value chain, compared to 2021 levels. Due to the company's recent formation, we cannot recalculate the targeted emission reductions compared to a 2019 base year.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?

Stellantis sets a range of short-term targets within a five-year timeframe by 2025 that use the same metrics as its 2030 medium-term targets.

Do the short- and medium-term targets align with a 1.5°C trajectory for the sector according to available literature?

Stellantis' range of 2030 targets meet some of the 1.5°C Paris Agreement-aligned milestones for automobile manufacturers' downstream scope 3 emissions identified in existing literature (CAT, 2020b; Dietz *et al.*, 2020; IEA, 2021b; UNFCCC, 2021; Boehm *et al.*, 2022; Teske *et al.*, 2022). Sixty to ninety-five percent of all light-duty vehicle (LDVs) sales should be electric—that is, have zero tailpipe emissions—by 2030 globally to stay below the Paris Agreement's warming limit of 1.5°C (CAT, 2020b; IEA, 2021b). Ninety -five to one-hundred percent of LDV sales should be electric in Stellantis' main markets, including the European Union, China and the US by 2030 (CAT, 2020b; Teske *et al.*, 2022), and reach 100% by 2035 in all leading markets (IEA, 2021b, pp. 20; 138; UNFCCC, 2021, pp. 10–11). The company only meets these benchmarks for its target to sell 100% EVs in the EU by 2030, but not for its target to sell 50% in the US. In the latter market, Stellantis aims to reach 100% by 2038.

Apart from the core targets for the EU and US markets, the company has not committed to any further phaseout dates for internal combustion engines in other sales markets or other vehicle categories, such as light commercial vehicles. Stellantis presented aspirational EV sale shares by 2030 for the Middle East and Africa regions, Brazil, India and the Asia Pacific region, and China, as part of its strategic blueprint Dare Forward 2030 (Stellantis, 2022c). These indicative targets miss 1.5°C-compatible sectoral benchmarks for Brazil, India and China (CAT, 2020b). The targeted sale shares are:

- >25% share of LEVs in the Middle East and Africa regions.
- ~20% share of LEVs in Brazil *(compared to 45-95% for all LDV sales being electric by 2030 in 1.5°C-aligned scenarios).*
- ~50% share of BEVs in India and the Asia Pacific region *(compared to 80-95% for all LDV sales being electric by 2030 in 1.5°C-aligned scenarios, including two- and three-wheelers).*
- 60% of share of passenger car BEVs in China *(compared to 95-100% for all LDV sales being electric by 2030 in 1.5°C-aligned scenarios, including two- and three-wheelers).*

Stellantis claims that its 2030 interim targets align with the ' vParis Climate Agreement and [a] 1.5°C scenario, referring to the SBTi's guidance for the transport sector (Stellantis, 2022a, p. 39). However, the SBTi only provides benchmarks for downstream scope 3 emissions from the use of sold products as part of their interpretation of a 'well below 2°C' scenario as of February 2023 (SBTi, 2018b, 2018c), but it does not provide similar benchmarks for a 1.5°C scenario. SBTi has indefinitely paused the use of its methodology for automakers, as the initiative states that it does not reflect a 1.5°C-compatible definition (SBTi, 2022f) .

Moderate

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

Stellantis' headline pledge of **carbon net zero by 2038** includes a commitment to reduce emission by at least 90% across its entire value chain, compared to 2021 levels. Stellantis will offset less than 10% of its 2021 emissions by 2038. Due to the company's recent formation, we cannot recalculate the targeted emission reductions to a 2019 base year.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Stellantis commits to an emissions reduction target of at least 90% by 2038 below 2021 levels across the entire value chain alongside its carbon net-zero pledge. Since the net-zero pledge entails a commitment to deep decarbonisation across the entire value chain, we consider that the net-zero terminology is unlikely to be misleading.

Is the emission reduction commitment as part of the long-term vision in line with 1.5°C compatible trajectories or benchmarks for the sector?

Stellantis' 2038 targets meet some of the 1.5°C Paris Agreement-aligned milestones for automobile manufactures. The automobile industry should only sell electric vehicles by 2030–2035 globally to comply with 1.5°C-compatible decarbonisation milestones (CAT, 2020b; IEA, 2021b; UNFCCC, 2021; Boehm *et al.*, 2022; Teske *et al.*, 2022). Stellantis does not explicitly commit to this specific benchmark for its entire vehicle fleet sold globally by 2040, only for certain markets, such as the EU by 2030 and the US by 2038, responsible for 75% of all sales in 2021 (Stellantis, 2022b, pp. 29–39). In this context, Stellantis also announced its intention to 'refine emission reduction trajectories aligned with 1.5°C scenario per region' throughout 2022 (Stellantis, 2022a, p. 37).

Thyssenkrupp

Moderate

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short- to medium term?

Thyssenkrupp presents two targets for 2030: a 30% absolute reduction of its scope 1 and 2 emissions below 2018 levels, and a 16% absolute reduction of scope 3 emissions below 2017 levels.

Thyssenkrupp also sets out a target for the fiscal year 2022/23: to reduce its CO_2 emissions by 1 tCO_2/ EUR million in sales, excluding all steel-related activities.

How does these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

The two 2030 targets translate to a **12% emissions reduction by 2030** below 2019 emissions across the entire value chain.

To calculate what Thyssenkrupp's scope 3 target means compared to 2019 whole value chain emissions, we assumed a retroactive implementation of the company's latest emission reporting boundaries. In 2022, Thyssenkrupp stopped reporting on their processing of sold products and use of sold products emissions. Before this change, Thyssenkrupp's previously communicated scope 3 target only covered use of sold products emissions, which were reported at 780 $MtCO_2e$ in the target's 2017 base year. However, the company's new scope 3 target no longer covers this category and the company no longer reports emissions from it. Because of these reporting boundaries changes, emissions from the latest historical year and previous years are not directly comparable. For this reason, we assumed a similar reporting boundary as the one the company currently uses to estimate the share of 2019 emissions covered by Thyssenkrupp's 2030 targets.

Because the target scope is not clear, we are not able to assess what Thyssenkrupp's 2022/23 target means in terms of own emission reductions.

Do these targets cover both the short-term (within 5 years) and medium-term (up to 2030)?

Thyssenkrupp has set out an annual interim target of reducing its CO_2 emissions by 1 tCO_2 per EUR million in sales excluding its steel activities. We cannot evaluate whether the target requires any significant action by the company given its unclear scope.

Do the short- and medium-term targets align with a 1.5°C trajectory for the sector according to available literature?

We cannot independently assess Thyssenkrupp's cross-divisional 2030 targets against existing 1.5°C-aligned benchmarks for the steel sector. For scope 1 emissions, Teske (2022, p. 326) finds that a 54% reduction by 2030 below 2019 levels would be necessary to stay below the 1.5° temperature limit, while scope 2 and 3 emissions would need to be reduced by 66% and 38% respectively. Other literature finds that the carbon intensity of global steel production must reach around 1.13–1.35 tCO_2e/tonne steel (CAT, 2020b; Boehm *et al.*, 2021, 2022; Dietz, Gardiner and Scheer, 2022). We cannot independently evaluate the company's existing targets to these steel sector-specific benchmarks due to a lack of information on how Thyssenkrupp's different business divisions contribute to the cross-divisional 2030 targets.

The TPI evaluates Thyssenkrupp's targets in line with their interpretation of '1.5°C' benchmark by 2030 (TPI, 2022d). According to TPI, Thyssenkrupp's targets translate to carbon intensity of 1.10 tCO_2/tonne steel by 2030. TPI provides no further information on how it derives Thyssenkrupp's targeted emission intensity by 2030.

Thyssenkrupp might be sufficiently contributing towards the achievement of other 1.5°C-aligned milestones for the steel sector. Identified milestones for 1.5°C-compatible pathways in the literature would require that 20 low or near-zero carbon facilities and 70 near-zero emissions primary steel mills become operational by 2030 (UNFCCC, 2021, p. 15; Delasalle *et al.*, 2022, p. 69), and that most new clean technologies in heavy industry have been demonstrated at scale (IEA, 2021b, pp. 20; 129). Thyssenkrupp plans to transition to 100% hydrogen-based steelmaking by 2045 and presents clear plans in terms of developing its own near-zero emissions steelmaking facilities (Thyssenkrupp, 2022b, pp. 60–62).

Moderate

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long-term beyond 2030?

Thyssenkrupp pledges to become carbon neutral across all its business divisions by 2050, including at least a 90% reduction of scope 1 and 2 emissions (2018 baseline) and a 90% reduction of scope 3 emissions (2017 baseline).

The company commits to the same target including the same baselines for its steel division by 2045, alongside a plan to transition to 100% hydrogen-based steelmaking in 2045.

How does these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Thyssenkrupp commits to a 90% reduction of scope 1, 2 emissions (below 2018), and scope 3 emissions (below 2017) by 2050. Compared to the whole value chain emissions that the company discloses for 2019, these targets would mean an 89% reduction. Since the carbon neutrality pledge entails a commitment to deep decarbonisation across the entire value chain, we consider that the terminology is unlikely to be misleading. Carbon neutrality targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which the company has committed itself to do.

Uncertainty remains regarding the targets' scope 3 coverage. Thyssenkrupp only reported downstream scope 3 emissions from product use up to 2020, after which it has not done so further. There is a lack of definitive guidance from any major standard setting initiatives on whether scope 3 category 11 is a relevant emissions category for steelmaking companies. Most emission sources from the use of steel likely fall under the category of indirect product use phase emissions that may be considered an optional reporting scope, as opposed to the direct product use phase emissions which form part of the normal emissions reporting scope under scope 3 category 11. Thyssenkrupp indicates that they will defer to and comply with SBTi guidance on this issue once the SBTi's guidance for steelmaking companies has been published in 2023. Although this uncertainty arises partly due to a gap in the available guidance on this issue, the transparency of the company's communication could be improved by clearly specifying which scope 3 accounting approach the target covers. This would be especially relevant, given that the target base year is 2017, when the company was using a different accounting approach for its scope 3 emissions.

Is the emission reduction commitment as part of the long-term vision in line with 1.5°C compatible trajectories or benchmarks for the sector?

Thyssenkrupp's targets may align with 1.5°C Paris Agreement-aligned milestones for steelmaking, but the sufficiency of the target for other divisions cannot be confirmed due to uncertainties regarding the relevance of downstream scope 3 emissions. The target to reduce emissions from the steel making division by 90% by 2045 appears likely to be in line with available benchmarks from SBTi Net Zero Standard (SBTi, 2021c, pp. 18; 27). Version 1.0 of the SBTi Net Zero Standard specifies a reduction of 91% by 2050 (SBTi, 2021c, pp. 18; 27); the corresponding tool version 1.0.3 indicates a reduction of 93% by 2050 (SBTi, 2022c). Thyssenkrupp's targets are presented alongside clear plans for developing their own near-zero emissions steelmaking facilities, which are planned to reach 100% "climate neutral steel production without coal-based blast furnace" (Thyssenkrupp, 2022b, p. 60). This could be in line with global benchmarks of reducing the carbon intensity of steel production to around zero to 0.13 tCO_2e/tonne steel by 2050 globally (CAT, 2020b; Boehm *et al.*, 2021, 2022; Dietz, Hastreiter and Scheer, 2021). However, uncertainty remains on the relevance of downstream scope 3 emissions. Even if it is determined that scope 3 category 11 emissions are not a relevant emission source for a steelmaking companies, and thus for Thyssenkrupp's steelmaking division, this emission category is likely to be relevant for other company divisions of Thyssenkrupp as a diversified company. Due to this uncertainty and this potentially significant omission, we assess the long-term targets to be of moderate integrity despite the company's targets likely being in line with 1.5°C Paris Agreement-compatible milestones for steelmaking.

Volkswagen Group

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

Volkswagen Group commits to the following emission reduction targets by 2025 and 2030:

- 30% CO_2 emissions intensity reduction per kilometre for new passenger cars and light duty vehicles by 2025 (below 2015 levels, allowing for offsets to meet the target).
- 30% CO_2 emissions intensity reduction per kilometre for new passenger cars and light duty vehicles by 2030 (below 2018 levels, not allowing for offsets to meet the target).
- 50% absolute emissions reduction by 2030 across scope 1 and scope 2 emissions (below 2018 levels, not allowing for offsets to meet the target).

The Volkswagen Group states that these targets represent 'minimum requirements for the Group brands' (Volkswagen, 2022c, pp. 26, 46). Single brands of the Volkswagen Group, for instance Porsche AG and SCANIA AB, set additional targets for this timeframe.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Volkswagen's 2030 absolute emissions reduction target for scopes 1 and 2 is equivalent to 3% emission reductions by 2030 below 2019 levels across the entire value chain. We cannot independently quantify Volkswagen's interim intensity targets for scope 3 emissions.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?

The company sets a 2025 intensity reduction target for CO_2 emission of new vehicles. We do not consider this target clearly aligned with its 2030 intensity reduction target as the target for 2025 explicitly relies on an unspecified amount of offsets, while the company will not use offsets towards its 2030 target (Volkswagen, 2022c, pp. 26, 46).

Do the short- and medium-term targets align with a 1.5°C trajectory for the sector according to available literature?

Volkswagen's range of 2030 interim targets do not meet 1.5°C Paris Agreement-aligned milestones for automobile manufacturers' downstream scope 3 emissions identified in existing literature (SBTi, 2018b, 2018c; CAT, 2020b; Dietz *et al.*, 2020; IEA, 2021b; UNFCCC, 2021; Boehm *et al.*, 2022; Teske *et al.*, 2022) . Sixty to ninety-five percent of all light-duty vehicle (LDVs) sales should be electric—that is, have zero tailpipe emissions—by 2030 globally to stay below the Paris Agreement's warming limit of 1.5°C (CAT, 2020b; IEA, 2021b). Ninety-five to one-hundred percent of LDV sales should be electric in Volkswagen's main markets such as the European Union, China and the US by 2030 (CAT, 2020b; Teske *et al.*, 2022), and reach 100% by 2035 in all leading markets (IEA, 2021b, pp. 20; 138; UNFCCC, 2021, pp. 10–11).

The Volkswagen Group commits to reach at least a 50% electric vehicle share by 2030 in its three key markets (Volkswagen, 2022c, p. 41). These are the European Union, the US and China, which jointly represent 83% of all vehicles sales in 2021 (Volkswagen, 2022b, p. 109), For the EU, the Volkswagen Group intends to achieve a 60% share, while aiming to reach 70% for its Volkswagen Passenger Cars brand. The company significantly falls short to meet 1.5°C-aligned benchmarks by 2030 as it provides no market-specific phase-out dates for internal combustion engines. In this context, claimants associated with Greenpeace Germany and Fridays for Future Germany filled a court action against Volkswagen Group in 2021 to enforce a legally binding commitment to stop producing combustion-engine cars by the end of 2029 (Kaiser *et al.*, 2021; Setzer and Higham, 2022).

The Volkswagen Group still refers to the SBTi's 'well-below 2°C' verification of its scope 3 emissions intensity target (Volkswagen, 2022c, p. 46). However, SBTi has indefinitely paused the use of its methodology for automakers, as the initiative states that it does not reflect a 1.5°C-compatible definition (SBTi, 2022f). The Transition Pathway Initiative (TPI) considers the company's 2030 targets for downstream scope 3 emissions not aligned with its definition of a 2 Degrees Scenario (TPI, 2022e). The TPI's assessment compares its 2 Degree Scenario benchmark range of 40–77 gCO_2e /vkm to its interpretation of Volkswagen's 2030 target of 97 gCO_2e /vkm.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

The Volkswagen Group aims to achieve **carbon neutrality by 2050**.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

The Volkswagen Group does **not commit to a deep emissions reduction target** alongside its 2050 carbon neutrality pledge. Since the company's carbon neutrality pledge does not entail any commitment to deep decarbonisation (i.e., a reduction of at least 90% of 2019 emissions across the entire value chain), we consider that the terminology of this target may be misleading. Our position is in line with the ISO Guidelines for Net Zero and the SBTi Net Zero Standard (SBTi, 2021c; ISO, 2022b). Carbon neutrality targets can give consumers and investors the impression that the company aims to reach deep levels of emission reductions, which the Volkswagen Group does not commit to.

Is the emission reduction commitment as part of the long-term vision in line with 1.5°C compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction target alongside Volkswagen Group's carbon neutrality as highly insufficient, considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022). The automobile industry should sell only electric vehicles by 2030–2035 globally to comply with 1.5°C-compatible decarbonisation milestones (CAT, 2020b; IEA, 2021b; UNFCCC, 2021; Boehm *et al.*, 2022; Teske *et al.*, 2022) . Downstream emissions from the use of sold vehicles amounted to around 75% of the Volkswagen's emissions in 2021, but Volkswagen has not committed to any phase-out dates for internal combustion engines across its different brands in the context of its carbon neutrality pledge.

Further assumptions for aggregate analysis in Section A

For our aggregate analysis across all 24 companies in Section A of this report, we make the simplified most optimistic assumption that companies' *intensity* targets equal *absolute* emission reduction targets. For this purpose, we interpret Volkswagen's *intensity* targets for 2030 (30% by 2030 below 2018 for downstream scope 3 use phase emissions) to be an *absolute* target assuming constant activity levels. Together with Volkswagen's absolute target for scope 1 and 2 (50% by 2030 below 2018), these targets jointly translate into a 25% absolute reduction by 2030 below 2019 levels across the entire value chain. We do not use this estimate for the company-specific integrity assessment of Volkswagen in Section B.

Walmart

Poor

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

- Scope 1 and scope 2: 35% emission reduction by 2025 from 2015.
- Scope 1 and scope 2: 65% emission reduction by 2030 from 2015.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Walmart's short- and medium-targets translate to reducing emissions by **5% by 2030, compared to 2019 value chain emissions**.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?

Walmart sets a target within a five-year timeframe that use the same metric as its 2030 target and long-term target.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Walmart's 2030 medium-term targets neither meet cross-sectoral nor sector-specific 1.5°C Paris Agreement-aligned decarbonisation milestones. Walmart's scope 3 emissions account for 91% if its emission footprint. In the absence of available benchmarks from the scientific literature for mixed-good retailers, we compare Walmart's 5% emission reductions by 2030 to available 1.5°C-aligned benchmarks for agriculture, and cross-sector global benchmarks. Global cross-sector benchmarks require GHG and CO_2 emissions to reduce by 43% and 48% between 2019 and 2030, respectively (IPCC, 2022). Pathways for global agriculture and food sector in Teske (2022, p. 328) indicate that scope 3 emissions should reduce by at least 34% between 2019 and 2030. The exclusion of the lion's share of emissions from Walmart's targets means that its overall emission reduction commitment falls far short of any of these benchmarks.

Poor

Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

Walmart committed to **zero emissions in operations by 2040** (scope 1 and 2).

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

We estimate that Walmart's emission reduction target is equivalent to a commitment to reduce **around 9% of its emissions across the value chain by 2040,** compared to 2019 levels. Walmart's 2040 target covers only scope 1 and scope 2 emissions, which account for approximately 9% of the company's GHG emission footprint in 2019.

Is this emission reduction commitment in line with 1.5°C-compatible trajectories or benchmarks for the sector?

We consider the lack of any post-2030 emission reduction commitments for scope 3 alongside Walmart's targets for scope 1 and 2 as highly insufficient, considering the need for deep and credible emission reductions towards mid-century to stand a reasonable chance of limiting global warming to 1.5°C (IPCC, 2022).

Annex III

Comparison of SBTi verifications with CCRM assessment.

Table 19: Comparison between target verifications by the Science Based Targets initiative (SBTi) as of February 2023 and the integrity assessment as part of the Corporate Climate Responsibility Monitor (CCRM) 2023 for short- and medium-term targets towards 2030. Companies listed in alphabetical order.

COMPANY NAME	SBTI TEMPERATURE RATINGS (NEAR-TERM TARGETS)	CCRM INTEGRITY ASSESSMENT (SHORT- & MEDIUM-TERM TARGETS TOWARDS 2030)	KEY ISSUES EXPLAINING THE DIFFERENCE BETWEEN SBTI VERIFICATIONS AND CCRM ASSESSMENTS FOR CORPORATE TARGETS TOWARDS 2030 (E.G., DUE TO ISSUES THAT UNDERMINE THE TARGET INTEGRITY)
Ahold Delhaize	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Moderate integrity *covering the entire value chain emissions (s1, s2, s3)*	SBTi does not disclose which methods have been used to verify Ahold Delhaize's targets. The targets currently published on SBTi's website as of February 2023 are outdated; in November 2022, Ahold Delhaize published new targets. We found that these targets almost align with 1.5°C-aligned global cross-sector and sector-specific benchmarks.
American Airlines	Well-below 2°C *temperature alignment provided for s1 and s2 targets only, excluding non-GHG climate impacts* *Note: SBTi verifies American Airlines 2035 target as a near-term target.*	Poor integrity *covering the entire value chain emissions (s1, s2, s3) including non-GHG climate impacts* *Note: Integrity evaluation for 'long-term targets' beyond 2030 given SBTI's 2035 target verification.*	The SBTi methodology for aviation covers emissions from jet fuel but leaves out other emission sources and non-GHG climate effects from aviation. In addition, SBTi only provides 'well-below 2°C'-aligned certifications but does not provide '1.5°C'-aligned certifications. American Airlines' 2035 intensity target does not meet TPI's benchmarks that are compatible with global warming of 'below 2°C' and '1.5°C'.
Apple	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Moderate integrity *covering the entire value chain emissions (s1, s2, s3)*	Apple's 2030 emission reduction target aligns with 1.5°C-aligned cross-sectoral global emission trajectories while no sector-specific benchmarks have been identified in the literature. The company does not set a short-term target for within a five-year interval to substantiate its 2030 target.
Carrefour	Well-below 2°C *temperature alignment provided for s1 and s2 targets only* *(s3 target covering cat 1 purchased goods and services and cat 11 use of sold products emissions listed on SBTi webpage but **not** covered by provided temperature alignment for s1 & s2)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3)*	A footnote of the company's Annual Report reveals through potentially misleading language that the majority of Carrefour's stores and global activities are excluded from the company's emissions disclosure and targets. Accordingly, the 2030 targets equate to a commitment to reduce 2019 emissions by an estimated 6-14%, which falls way short of sector-specific and cross-sectoral 1.5°C Paris Agreement-aligned decarbonisation milestones.
Deutsche Post DHL	1.5°C *temperature alignment provided for s1 and s2 targets only excluding non-GHG climate impacts* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3) including non-GHG climate impacts*	SBTi does not communicate what assumptions and methodologies the verification is based on. 70% of Deutsche Post's emissions are from air transport, but SBTi does not have a 1.5°C methodology for airlines; the maritime guidance was released after SBTi verified Deutsche Post's target. The baseline year 2021 is much higher than previous years, making the target sound more ambitious than it is.
Fast Retailing	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target covering cat 1 purchased goods and services listed on SBTi webpage but **not** covered by provided temperature alignment for s1 & s2)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3)*	Targets verified by SBTi only cover 74% of the company's emissions 2019 footprint, excluding downstream scope 3 and a share of upstream scope 3 emissions. When taken together, the 2030 targets equate to a commitment to reduce 2019 full value-chain emissions by an estimated 19% and fall short of cross-sectoral and sector-specific 1.5°C-aligned benchmarks.
Holcim	1.5°C *temperature alignment provided for s1 and s2 targets. It remains unclear whether s3 target covering cat 1, cat 3, cat 4 and cat 9 emissions verified with the temperature alignment or not*	Moderate integrity *covering the entire value chain emissions (s1, s2, s3)*	Targets for scope 1 and 2 only meet the upper range of available 1.5°C-aligned benchmarks (SBTi), but clearly miss the lower range (CAT, State of Climate Action). Target for scope 1 only meet 'below 2°C' benchmarks by TPI. Substantial range of 2030 benchmarks due to underlying assumptions about the technical potential of some mitigation levers.

COMPANY NAME	SBTI TEMPERATURE RATINGS (NEAR-TERM TARGETS)	CCRM INTEGRITY ASSESSMENT (SHORT- & MEDIUM-TERM TARGETS TOWARDS 2030)	KEY ISSUES EXPLAINING THE DIFFERENCE BETWEEN SBTI VERIFICATIONS AND CCRM ASSESSMENTS FOR CORPORATE TARGETS TOWARDS 2030 (E.G., DUE TO ISSUES THAT UNDERMINE THE TARGET INTEGRITY)
H&M Group	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Moderate integrity *covering the entire value chain emissions (s1, s2, s3)*	The company does not set a short-term target for within a five-year interval to substantiate its 2030 target.
Inditex	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3)*	SBTi verification of scope 1 and 2 target as '1.5°C' covers only 3% of 2021 total emissions. Scope 3 target misses all 1.5°C-aligned benchmarks identified in the literature.
PepsiCo	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	*covering the entire value chain emissions (s1, s2, s3)*	SBTi does not disclose which methods have been used to verify PepsiCo's targets. SBTi allows offsetting under the guise of 'insetting' to realise targets as part of the FLAG guidance; we do not consider this an adequate approach to claim neutralisation of emissions, among other reasons, due to high uncertainties regarding permanence and potential. Since the role of insetting remains unknown, we cannot do an assessment of PepsiCo's reduction targets.
Mercedes-Benz	1.5°C *temperature alignment provided for s1 and s2 targets only* Well-below 2°C *temperature alignment provided for s3 target covering emissions from the use of sold products (cat 11)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3)*	Targets for 2030 do not meet 1.5°C-aligned phaseout dates for internal combustion engines for key markets. SBTi presents intensity target for scope 3 emissions from use of sold products of light duty vehicles as 'well-below 2°C compatible' on the website, but methodology for automobile manufactures has been paused indefinitely by SBTi. SBTi verification of scope 1 and 2 target as '1.5°C' covers only 1% of 2021 total emissions (verification method not disclosed).
Microsoft	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3)*	SBTi's 1.5°C verification for Microsoft's renewables target for 2030 only covers around 3% of Microsoft's 2021 emissions. Scope 3 intensity target announced by Microsoft in 2017 still verified by SBTi but covered under a more recent target to become carbon negative by 2030. 38% emission reduction by Microsoft across all scopes next to carbon negative target falls way short of global cross-sector 1.5°C-aligned benchmarks.
Nestlé	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3)*	The targets for 2025 and 2030 depend on offsetting under the guise of 'insetting'. SBTi FLAG methodologies allows companies to depend on 'insetting' as part of its '1.5°C' verification. We do not consider this an adequate approach to claim neutralisation of emissions, among other reasons, due to high uncertainties regarding permanence and potential.
Thyssenkrupp	Well-below 2°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Moderate integrity *covering the entire value chain emissions (s1, s2, s3)*	We cannot independently assess Thyssenkrupp's cross-divisional 2030 targets against existing 1.5°C benchmarks available in the literature for the steel sector (SBTi, TPI, CAT, SoCA). However, Thyssenkrupp might be sufficiently contributing towards the achievement of other 1.5°C-aligned milestones for the steel sector, namely the operationalisation of low or near-zero carbon facilities by 2030.
Volkswagen	1.5°C *temperature alignment provided for s1 and s2 targets only* 2°C *temperature alignment provided for s3 target covering emissions from the use of sold products (cat 11)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3)*	Targets for 2030 do not meet 1.5°C-aligned phaseout dates for internal combustion engines for key markets. SBTi presents intensity target for scope 3 emissions from use of sold products of light duty vehicles as '2°C compatible' on the website, but methodology for automobile manufactures has been paused indefinitely by SBTi. SBTi verification of scope 1 and 2 target as '1.5°C' covers only 2% of 2021 total emissions (verification method not disclosed).
Walmart	1.5°C *temperature alignment provided for s1 and s2 targets only* *(s3 target listed on SBTi webpage, but **not** covered by provided temperature alignment for s1 & s2)*	Poor integrity *covering the entire value chain emissions (s1, s2, s3)*	SBTi verification of scope 1 and 2 target as '1.5°C' covers only 9% of 2019 total emissions (verification method not disclosed). No 2030 target for scope 3 emissions.

LEGENDS: s1 : scope 1 s2 : scope 2 s3 : scope 3 cat : category

Annex IV

Assumptions for aggregated analysis

The aggregated impact analysis across the 24 companies' climate strategies assessed in Section A of the *Corporate Climate Responsibility Monitor 2023* contains several assumptions that are additional to the assumptions presented in the individual company assessments in Section B. These additional assumptions concern the interpretation of corporate intensity targets, the minimum emission reduction levels assumed for net-zero target years, and the overlap between companies' value chain emissions.

Intensity targets

Several companies commit to intensity targets for the period up to 2030 that cannot directly be translated into absolute emission reduction commitments. To give a most optimistic scenario of the emission reductions that companies' emission reductions could lead to, we present aggregated findings with the scenario that companies' *intensity* targets will lead to an equivalent emissions reduction in *absolute* terms. In other words, we present the scenario that activity levels remain constant until 2030. For example, Mercedes-Benz commits to at least 40% CO_2 emissions intensity reduction per kilometre for new vehicles by 2030 below 2018 levels ('well-to-wheel' use phase, scope 3 category 11). For the aggregate analysis in Section A, we present the optimistic scenario that this is an absolute reduction target for scope 3 category 11 emission of 40% by 2030 below 2018 levels assuming constant activity levels. We provide further explanation on the interpretation of these targets for all six companies (ArcelorMittal, Holcim, Maersk, Mercedes-Benz, JBS, and Volkswagen) in respective company sections in Annex II. We consider that this aggregated scenario is highly optimistic and unlikely in some cases; accordingly, we do not use this optimistic scenario for the company-specific integrity assessments in Section B, where we evaluate companies' real commitments.

Minimum emission reduction levels assumed for net-zero target years

Half of the companies do not commit to any emission reduction target next to their net-zero pledge; they do not specify what share of their net-zero pledge will be achieved through real reductions within the value chain and what share through offsetting. For these companies, we take absolute emission reduction commitments closest to the net-zero target year as minimum assumption of reductions in the net-zero target year. For example, Foxconn commits to 63% carbon emission reductions by 2035 compared to a 2020 baseline but does *not* commit to any emission reduction target alongside its net-zero pledge for 2050. We assume a 63% emission reduction by 2050 compared to a 2020 baseline as a minimum reduction for the net-zero target year as well. We make such assumptions for eleven companies (Amazon, American Airlines, ArcelorMittal, Deutsche Post DHL, Fast Retailing, Foxconn, Mercedes-Benz, Nestlé, Inditex, JBS, and Volkswagen). We do not use this estimate for the company-specific integrity assessment in Section B.

Emissions overlap between companies' value chains

Certain emission sources might overlap between companies' value chains, for example between steel companies' production emissions (ArcelorMittal, Thyssenkrupp) and automobile manufactures' upstream scope 3 emissions from procuring steel for their car production (Mercedes-Benz, Stellantis, Volkswagen). We do not consider these potential overlaps for the aggregate analysis given the small sample size and a lack of publicly-available information. Our aggregate results in Figure S1 and Figure 2 might represent an upper bound (optimistic) estimate given that companies likely consider each other's specific emission reduction commitments in their respective climate pledges. For example, Apple actively engages with Foxconn on its decarbonisation strategy as one of Apple's key own mitigation measures. For this reason, emission sources with solid decarbonisation plans might be counted twice as part of the total joint footprint of 2.2 $GtCO_2e$ across 24 companies. Even if the joint footprint across all 24 companies is less than 2.2 $GtCO_2e$ due to overlaps between the companies, we do not anticipate that this would have any significant impact on the aggregated findings.

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The rapid acceleration in the volume of corporate climate pledges, combined with the fragmentation of approaches and the general lack of regulation or oversight, means that it is more difficult than ever to distinguish between real climate leadership and unsubstantiated greenwashing.

The Corporate Climate Responsibility Monitor 2023 evaluates the climate strategies of 24 major corporations. It critically analyses the transparency and integrity of corporate pledges and claims to identify replicable good practice and areas for improvement.

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