

Addressing the Scope 3 Challenge - A workshop briefing from researchers working on corporate climate action and governance

This paper was developed from workshop discussions co-convened by the Grantham Institute at Imperial College London and Oxford Net Zero at Oxford University. Paper prepared by Dr Matilda Becker, University of Oxford, with inputs from workshop participants.

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Voluntary standards with robust criteria are widely regarded as playing an important role in increasing the ambition and integrity of net-zero action, alongside other measures such as national climate policies.ⁱ Standards provide guidance on how to set targets and implement sector-appropriate strategies, ideally promoting best practice. The Science Based Targets Initiative (SBTi) is the largest validator of corporate net-zero targets, representing nearly 40% of global market capitalisation.¹

Proposed updates to SBTi's Net Zero Standard made by the Board in April 2024, which would expand organisations' ability to use environmental attribute certificates for abatement purposes on Scope 3 emissions, attracted much attention and concern among members of the SBTi's Advisory Groups and other scientists and experts.ⁱⁱ Staff of SBTi raised internal alarm over the decision; members of SBTi's Advisory Groups threatened to resign over proposed changes to the Standard that they felt undermined the integrity of the initiative; and scientists and other experts in forest carbon cycling, climate policy and carbon markets called on SBTi to rescind its statement until concerns surrounding carbon offsets are adequately addressed, and to ensure that future decisions on scope 3 emissions are approved by scientists and technical advisers.² Since then, SBTi has released technical publications as part of their process toward its Corporate Net-Zero Standard review.

Concern about the Board's recommended updates to the Net Zero Standard centre around two items: 1) the governance around the proposed change, and 2) the fact that use of carbon credits to address inventory emissions is highly contentious. Scope 3 emissions measurement and action is often posited as presenting a major issue for companies trying to set and meet climate goals (see SBTi's recent survey

ⁱ Decarbonisation pathways to meet 1.5°C, as outlined in the SBTi Corporate Net Zero Standard, may also be influential in informing litigation cases. (Setzer and Higham, 2024. *Global trends in climate change litigation: 2024 snapshot*. Policy Report, London School of Economics. <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2024/06/Global-trends-in-climate-change-litigation-2024-snapshot.pdf>)

ⁱⁱ The proposed change by the Board in April 2024 would expand the ability of organisations to purchase carbon credits to abate their Scope 3 emissions. "While recognizing that there is an ongoing healthy debate on the subject matter, SBTi recognizes that, when properly supported by policies, standards and procedures based on scientific evidence, the use of environmental attribute certificates for abatement purposes on Scope 3 emissions could function as an additional tool to tackle climate change. Consequently, SBTi has decided to extend their use for the purpose of abatement of Scope 3 related emissions beyond the current limits." [SBTi, 2024](#). The Board recommended a shift in the timing allowance of credits (i.e., for allowance towards addressing near-term emissions, rather than only residual emissions remaining over the long-term) and an increase of the threshold of the percentage of credits allowed (currently 5-10% of the entire inventory of emissions). The Board statement was vague on the type of certificates or credits opening up avenues for credits (such as avoided emissions credits, not previously considered appropriate tools counterbalance ongoing emissions).

Current SBTi guidance on the use of carbon credits states:

"C12 – Carbon credits: The use of carbon credits must not be counted as emission reductions toward the progress of companies' near-term or long-term science-based targets. Carbon credits may only be considered as an option for neutralizing residual emissions (see C28) or to finance additional climate mitigation beyond their science-based emission reduction targets (see R9).

C28 – Neutralization of unabated emissions to reach net-zero: Companies shall remove carbon from the atmosphere and permanently store it to counterbalance the impact of any unabated emissions that remain once companies have achieved their long-term science-based target, and for subsequent years thereafter." ([SBTi Corporate Net-Zero Standard Criteria, Version 1.1, April 2023](#))

in which 53.6% of companies cited “Scope 3 as an overwhelming challenge”).³ Yet in these conversations there is poor disaggregation between the technical, procedural and financial hurdles to addressing these emissions. Some academics, meanwhile, see the Scope 3 challenges as just one strand in a wider and more fundamental set of problems with how voluntary corporate standards currently allocate targets and embed the role of ‘incumbent’ corporations.⁴

Oxford Net Zero and the **Grantham Institute at Imperial College** London facilitated four workshops under the Chatham House Rule with researchers and academics from Europe and North America. In response to the SBTi Board’s suggestion to allow the use of carbon credits within Scope 3, academics were convened to share their perspectives on Scope 3 emissions management, including the potential use of credits. As a result, the workshop was structured to include discussion of market-based mechanisms (MBMs) as an instrument to aid decarbonisation of individual companies and sectors, but we emphasise that participants by no means considered MBMs as the sole, priority or preferred approach to financing mitigation of Scope 3 emissions.ⁱⁱⁱ This paper presents views on Scope 3 in the context of corporate uptake of voluntary standards. A fourth workshop focussed on the intersection between SBTi, voluntary standards more widely, and policy and regulation - however this is not addressed in this briefing and highlights from this session will be published separately.

Participants had expertise in (*inter alia*) carbon accounting, supply-chain decarbonisation, voluntary carbon markets, sectoral decarbonisation, climate policy, governance and justice, and decarbonisation pathways. The aim of the convenings was to consider and critique a menu of interventions that could improve the effectiveness and workability of Scope 3 reporting and action. The workshops also identified key pinch-points that undermine or stymie the effectiveness and opportunities for corporate action. This briefing presents discussion across three key areas:

Area 1: Accounting methods and sector-based approaches in Scope 3

- 1A:** Accurate Scope 3 estimation and appropriate emissions management may benefit from approaches that focus on most material emissions from different sectors
- 1B:** Additional accounting methods may bring benefits to Scope 3
- 1C:** Updating the structure of Scope 3 may enable clearer definitions of responsibility, actions and assessment across a value chain

Area 2: Carbon credits as offsets to address Scope 3 emissions

- 2A:** Carbon credits used as offsets should not be used to abate Scope 3 emissions

ⁱⁱⁱ Drawing on work by Robiou to Pont et al (2024), some participants also discussed whether the convened academics should be informing the role of companies and Scope 3 from companies and sectors in reaching the Paris Agreement, or whether one should accept the mission and objective of SBTi in bringing individual companies to net zero. See ‘*What do we want Scope 3 to achieve*’ for further discussion.

2B: Work is needed to disaggregate between different types of ‘hard-to-abate’ emissions to advise on and standardise solutions befitting specific challenges

2C: Collective market-based and non-market-based approaches may be appropriate to compensate for *some* hard-to-abate emissions, though suggesting their use was contentious amongst participant and guardrails need to be defined.

Area 3: Impact of standards on investment in permanent carbon removal and storage

Discussion focussed on e.g., annual investment targets, to generate finance for removals (in line with SBTi’s existing beyond-value-chain recommendations).

What do we want Scope 3 to achieve?

Prior to exploring the challenges and solutions to reducing Scope 3 emissions, our convened researchers addressed questions around the *purpose* of Scope 3 and how it helps entities decarbonise. Scope 3 emissions estimates use attributional accounting to quantify indirect emissions that occur in the value chain of a company.⁵ Measuring and managing these emissions can be a tool for entities to contribute to global decarbonisation, by addressing shared responsibility, action and risk management of emission hotspots. Some workshop participants stated that science-based target setting should enable organisations to understand their emissions profile and use that knowledge to address emissions within their value chain.

Several researchers felt there is poor clarity as to how Scope 3 provides a structure for entities to achieve emissions reductions in the context of global emissions targets and as actors within a value chain. Some suggested Scope 3 targets use a single accounting tool to try to achieve both collective and individual action, and that targets are also used both to encourage mitigation and assess mitigation effectiveness. This lack of clarity on the purpose of Scope 3 presents a potentially serious issue because it confounds the necessary actions and solutions to meet the challenge of Scope 3. This can create space for solutions that distract from material emissions reductions, like carbon credits used as offsets. Ultimately, any net-zero standard with divergent purposes for Scope 3 makes adequate solutions and action difficult to pinpoint. These considerations undergirded discussions across the workshops.

Area 1: Accounting methods and sector-based approaches in Scope 3

Workshop participants considered overarching challenges with Scope 3 measurement, emissions reduction and reporting. Issues identified included:

- Aggregation of different ‘types’ of emissions - such as historical or product emissions - into one metric
- Poor distinction between measurement, action and reporting
- Inconsistency in data collection and reporting methods
- Differences in methods used by companies to estimate and model emissions
- Complexity of quantifying and verifying emissions claims across diverse and global supply chains
- Inter-company equity issues and responsibility for Scope 3 emissions
- Lack of and inconsistency and clarity of regulation for Scope 3 reporting across jurisdictions.

1A) Accurate Scope 3 estimation and appropriate emissions management may benefit from approaches that focus on most material emissions from different sectors

There was widespread agreement that many of the challenges listed above, particularly relating to data collection, reporting, and defining ‘material’ emissions, could be addressed through a sectoral approach to accounting and decarbonisation. For instance, the most material emission sources for a technology company differ significantly from those of a manufacturing firm. Even so, within sectors nuances exist. Participants gave the petroleum industry as an example of where sector-specific guidelines for Scope 3 emission reporting are provided yet lack an in-depth approach.⁶ While the guidelines do differentiate between the types of companies represented within the petroleum sector, they do so at a high-sectoral level and with a lack of activity specificity within disciplines, leading to larger deviations within the reported Scope 3 relevance by the sector and across same-type of companies.⁷

Understanding sector-specific nuances therefore allows for more effective allocation of resources and tailored strategies that address priority areas for emissions reduction.⁸ Sectoral pathways would help prescribe what organisations can focus on as effective interventions - e.g. uptake of green steel for use in the construction industry, rather than offsetting emissions embodied in steel using carbon credits - and highlight what specific levers exist to reduce emissions in associated supply chains. However, drawbacks to this approach also exist, including entities not being sector-bound to sectors identified by the IPCC, allowing companies to easily switch between sectors. Companies also operate in multiple sectors. Sectoral information is therefore useful to inform decarbonisation but ensuring sectoral compliance at the company level may be a challenge.

Action by companies on most significant (high impact) emission categories is preferable to perfect and complete data on all categories, and participants felt that an update to voluntary standards to help focus companies to act on most material emissions as a first order priority would be welcome.

Participants warned that this tailored approach would require clearly articulated priority data collection and disclosure timelines to produce a map of major emissions areas for each sector. This mapping would then need to be accompanied by inflexible boundaries and guardrails to ensure organisational compliance (i.e., so that companies actually report major emissions) and easier comparability between organisations.

1B) Additional accounting methods may bring benefits to Scope 3

A greater focus on activities (not just emissions reductions) as part of standardised target setting could help focus companies' work across Scope 3. To account for the diversity of interventions that can reduce carbon emissions, and prevent potentially inaccurate estimations and projections, it would be worthwhile to consider alternative metrics to CO₂ or greenhouse gas emissions to supplement or accompany existing metrics. Not all interventions can be measured in terms of emissions reduction, and in these instances alternative metrics (such as fossil fuel production, change in type or number of livestock, or use of electric over internal combustion engine vehicles) might be more useful than CO₂ estimates.⁹ Identifying alternative metrics should be sector-led.^{iv}

1C) Updating the structure of Scope 3 may enable clearer definitions of responsibility, actions and assessment across a value chain

Measuring emissions, setting targets, and reporting on Scope 3 emissions reductions could be improved by establishing a clear difference between assigning and *quantifying/estimating* what a company is responsible for, *acting* through value-chain abatement, and *assessing* the impact of those actions through reporting. The structure of Scope 3 would need to be updated to allow for this disaggregation, and scope to include additional non- tCO₂e datatypes to allow these three elements to be accounted for. One conceptual framework suggested for this was concentric rings where the 'bullseye' is the inventory, and where action in outer rings is layered from sectoral interventions (closest to bullseye) to non-associated interventions (furthest from bullseye). Interventions to reduce emissions in each of these 'layers' could then be graded and counted towards an entity's target. This concentric 'grades of association' structure would do away with the binary inventory/beyond-value-chain classification and might provide motivation for investment in decarbonisation initiatives that would not be successful unilaterally.^v

^{iv} Participants pointed out that quantifying or estimating the effect of interventions is theoretically beyond the scope of Scope 3, with Scope 3 being about allocating responsibility for emissions and tracking over time rather than an inventory method itself.

^v Some participants noted that the question of the purpose of a product or service remains unaddressed and how products meeting different human and societal needs are approached by taxonomies. This is a political and cultural question but important to consider nonetheless (cf. [Vita et al., 2019](#) on global emissions and quality of life).

Area 2: Carbon credits as offsets to address Scope 3 emissions

2A: Carbon credits used as offsets should not be used to abate Scope 3 emissions

Convened researchers demonstrated no support for the use of carbon credits as offsets to meet value-chain targets (beyond high-quality removal credits as currently an option for residual emissions).^{vi} A range of evidence was provided to substantiate the recommended exclusion of carbon offset credits:

- Little to no additionality¹⁰
- Over-crediting¹¹
- Issue with avoidance credits as compensation tools¹²
- Lack of permanence¹³ and dominance of avoidance projects¹⁴
- For nature-based and forestry credits, challenges with albedo and other biophysical feedbacks¹⁵

2B: Work is needed to disaggregate between different types of ‘hard-to-abate’ emissions to advise on and standardise solutions befitting specific challenges^{vii}

A recognition that some emissions in the value chain are ‘hard-to-abate’ is a key motivator for the suggestion that carbon credits be used to offset Scope 3 emissions.¹⁶ Our convened academics and experts took issue with the idea that emissions being ‘hard-to-abate’ should provide a straightforward pass for use of carbon credits as offsets.^{viii}

To acknowledge separate and specific challenges and solutions for companies in meeting Scope 3 emissions, the complexity of the challenge must be understood. Discursively grouping Scope 3 emissions as ‘hard-to-abate’ ignores distinct and different challenges in organisations’ value chains, hides alternative non-market-based solutions, and obscures the significant justice and equity implications of ‘hard-to-abate’ claims.^{ix} Carbon offset credits as a panacea to deal with challenging

^{vi} See footnote ii for currently allowable use of carbon credits.

^{vii} Note that ‘retiring’ the phrase ‘hard-to-abate’ has been suggested by some, as it distracts from climate solutions that exist for sectors, products and services currently listed as ‘hard-to-abate’ (cf. [Rathi, 2024](#)).

^{viii} Questions around what emissions are ‘hard-to-abate’ also opened doors to discussion about what the end-goal is for sectors and companies: some participants challenged the assumption that the end goal is for all companies to reach net zero, rather than for whole sectors to reach the residual emissions level. In some contexts, companies will be unable to reach net zero and will have residual emissions; others will be able (and arguably have an ethical responsibility based on historical emissions) to reach negative emissions; and others will have no “emissions space” left to grow in a decarbonised market. Associated with this is the question of who pays for these mitigation and compensation costs, whether for reaching net zero or negative emissions ([Robiou du Pont et al., 2024](#)).

^{ix} Equity considerations relate to who should pay for the mitigation costs of emissions remaining at the net-zero date of 2050, and whether these costs are used to abate or compensate for residual emissions or achieve negative emissions. Cf. [Buck et al, 2023](#) for a discussion of justice and residual emissions at a national level; [Armstrong and McLaren 2022](#) for a discussion of residual emissions, justice and net zero; and [Lund et al 2023](#) for discussion of necessary emissions and possible future pathways relating to residual emissions and associated justice questions.

emissions was widely rejected by workshop participants. Different types of ‘hard-to-abate’ emissions will require a mixture of solutions. Evaluating claims of ‘hard to abate’ and establishing definitions of ‘difficult-to-reach’ or ‘hard-to-abate’ emissions requires both a justice and equity lens and regular updating as climate solutions emerge and socio-political, legislative and regulatory landscapes evolve.¹⁷

Five categories of ‘hard-to-abate’ were identified:

- a) Technologically difficult to abate emissions, e.g. aviation emissions
- b) Economically difficult to abate, e.g., cost of technology development is prohibitive
- c) Logistically difficult to abate, e.g., poor traceability along extensive/unknown supply chains/suppliers
- d) Irreplaceable emissions, e.g., emissions from societal needs such as food production^x
- e) Practically difficult to abate emissions, e.g., downstream users’ application of products, services or technologies

Workshop participants felt that it was critical that allowable activities and pathways to reduce hard-to-abate emissions respond directly to the specific problem / challenge identified, not just prescribe blanket solutions for dealing with ‘all hard-to-abate’ emissions. It was also considered important that companies openly report on these challenges and reasoning for favoured solutions.

The concept of ‘hard-to-abate’ was considered as a shifting landscape rather than a fixed category of emissions. Some workshop participants referenced a paper by Lund et al which presents questions to help establish what ‘hard-to-abate’ emissions are, and whose responsibility it is to address them (see Appendix 1). Lund *et al.* approach this question by considering residual emissions as a constructed category reliant upon political definitions of ‘necessary’ and ‘possible to eliminate’ emissions, which necessarily lend themselves to being contested.¹⁸

2C) Collective market and non-market-based approaches may be appropriate to compensate for *some* hard-to-abate emissions, though suggesting their use was contentious amongst participants and guardrails need to be defined

There were mixed views on the use of safe-guarded voluntary carbon market credits (including commodity environmental attribute certificates (EACs)) to scale low-carbon technology to abate Scope 3 emissions, including hard-to-abate as identified above. There was concern and question from some participants as to why making new markets is often viewed as a default solution to addressing emissions (whether hard-to-abate or otherwise), rather than considering other innovative forms of decarbonisation such as direct emissions reductions through adoption of renewable energy and electric technologies, or regulatory-based solutions.¹⁹ There was concern that issues arising with e.g. Renewable Energy Certificates (generally not found to be additional) might be replicated through other EACs.

^x See footnote v for further discussion.

However, some participants noted that in some instances, voluntary carbon market credits that leverage collective purchasing-power to influence hard-to-abate supply-chain emissions may be appropriate. In one of the breakout groups, participants debated the applicability of collective approaches to addressing hard-to-abate emissions. These collective approaches could include market-based instruments such as pooled financing through contracts for difference²⁰, first-mover coalitions²¹ and Advanced Market Commitments (AMCs)²². Participants in the breakout group brainstormed, but did not necessarily endorse, possible guardrails to use of these market-based approaches (see appendix 2).

Through the discussion, non-market-based approaches were also considered for addressing hard-to-abate emissions in the value chain. Non-market based fiscal approaches might include debt-for-climate swaps²³ and REDD+ results-based payments (payments for emissions reductions without the issuance of associated credits).²⁴ ^{xi} Other approaches discussed include policy and advocacy efforts through business associations to achieve and inform government-driven systems wide transformation (e.g., for renewables investment). How contributions to these efforts should be rewarded, if they are even to be used at all, was not resolved by the group. Some suggested that these efforts should be captured using beyond value chain mechanisms, rather than directly through the inventory as any impact cannot necessarily be directly attributed to an organisation.^{25,26}

^{xi} Meanwhile, some participants countered the approach that decarbonisation objectives in one sector (e.g., cement) could be met through decarbonisation credits based on other sectors (e.g., forestry). Reasons for this include increased leakage effects and risks of avoiding mitigation actions with well-defined strategies and costs.

Area 3: Impact of standards on investment in permanent carbon removal and storage

Discussion focussed on e.g., annual investment targets, to generate finance for removals (in line with SBTi's existing beyond-value-chain recommendations).

Some participants reinforced existing recommendations found within 'Above and beyond: An SBTi report on the design and implementation of beyond value chain mitigation (BVCM)²⁷ stating that CDR technologies need to be scaled to meet net zero.^{xii} Scaling CDR was discussed per the suggestion by some that action is needed now by companies to develop an efficiently managed CDR market with interim investment targets for each company. Increasing investment in CDR now may help ensure there is adequate future removal capacity to address residual emissions remaining in 2050.²⁸ Helping ensure adequate future removal capacity could be achieved in part by SBTi recommending annual CDR investment targets as part of organisations' beyond-value-chain net-zero plans. Some participants noted that governments have a role to play in managing emissions through CDR, not just standards bodies including SBTi.

Advanced commitments to permanent removals to counterbalance residual emissions could create a high enough internal carbon price within companies to drive meaningful decarbonisation. Companies incorporating the cost of durable removals should incentivise abatement in all cases that it is cheaper. If net zero is the goal, some participants thought it unavoidable to link CO₂ production with CO₂ storage quantities at some point, so that CDR deployment is directly linked to residual CO₂ production. For fossil fuel extractors, it was seen as necessary by some to track the proportion of CO₂ generated by extracted fuels (whether within that company's operations (scope 1) or embedded in products sold (scope 3)) that is returned to permanent (e.g., geological) storage. It would also be necessary to demonstrate that this fraction returned to storage is increasing over time in line with Paris-compliant IPCC scenarios - though it was not universally agreed by participants whether this condition, even if satisfied, would be sufficient for fossil fuel extractors to receive validation from standard setters.

A challenge remains of informing sectoral action and approaches towards durable removals, in addition to minimising the risk of jeopardising the applicability of CDR if we do not reduce emissions first.²⁹ Some participants noted that disaggregating CDR types with a thorough analysis of permanence and other feasibility concerns (including social, environmental, regulatory and technological) is necessary. Participants discussed the need for efforts to establish the purpose, approach, and equity of quantifying residual emissions that CDR technologies may be used to mitigate against. Concerns with the use of CDR overlaps with challenges around defining 'hard-to-abate' and 'residual emissions' as outlined on pages 6-7.

^{xii} "BVCM also represents an opportunity to accelerate the development of CDR technologies needed to neutralize the impact of residual emissions by mid-century and thus to mitigate future costs and secure access to permanent removals." ([Benson et al., 2023, p. 33](#))

Appendix 1: Questions to help define what ‘hard-to-abate’ or residual emissions are, adapted from Lund *et al.*, 2023. See also Buck *et al.*, 2023 and Arendt, 2024.

1. Who claims the residual emissions?
2. Why are the residual emissions seen as both necessary and impossible to abate?
3. What evidence and assumptions about the future (e.g. economic growth, technological innovation) are the claims of necessity and possibility based on?
4. Could these assumptions be different?
5. Who is likely to benefit and lose from the residual emissions and corresponding carbon dioxide removals?
6. Do those who claim the residual emissions acknowledge the likely distribution of the benefits and costs?
7. Are there alternative claims about the necessity and possibility of these emissions? If so, repeat 1–6 above on the alternative claims.

Appendix 2: Idea-sharing of issues and potential safeguards of using commodity attribute certificates to address Scope 3, discussed in breakout groups at the workshop

Risk for Scope 3 market approaches	Considerations / Safeguards
<p>Credits given on aggregated marginal improvements fail to make transformative change / drive technological breakthroughs or replacement activities.</p>	<ul style="list-style-type: none"> ● Meta-standardization: Set a high bar for standards used to develop low-carbon technology / generate certificates not based on BAU thresholds, and use instead resources e.g., Exponential Roadmap Initiative & Oxford Net Zero’s Climate Solutions framework.³⁰
<p>Additionality issues: how do we know when certificates* achieve reductions?</p> <p>*additionality varies depending on whether one is evaluating individual certificates, individual certificate transactions, individual project issued certificates and aggregate market certificates.</p>	<ul style="list-style-type: none"> ● Market based approaches to meet value chain emissions should be thoughtful about the type of accounting used - e.g. concerns about the additionality of reductions based on consequential accounting - question about when to use attributable reductions from a baseline instead. ● Consider maturity of the technology / market ● IF these approaches are deemed appropriate, they may require considered time-bound periods of use, e.g. only for emerging technologies where markets need a demand signal (e.g. green cement). More research is needed on this.
<p>Logistical / governance concerns about setting up complex rules for so many sectors. Research shows techno-bureaucratic processes reduce democratic participation and risk private sector capture.</p>	<ul style="list-style-type: none"> ● Test governance/allowance of Scope 3 market-approaches with a small number of high-impact sectors or technologies, rather than all at once: Improve, innovate and iterate. ● Build in capacity and governance quotas for public sector/civil society involvement in sector-specific standardisation.
<p>Mitigation deterrence / deterrence of alternative solutions: will the development of a new Scope 3 market prevent companies from developing alternative solutions including changing or using alternative products to avoid emissions in the first place.</p>	<ul style="list-style-type: none"> ● It would be good for companies to demonstrate how alternative solutions/approaches have been explored and why they were not considered appropriate, justifying the theory of change as to why a market-based approach is helpful.

References:

- ¹ SBTi (2024). *SBTi Monitoring Report 2023*. Available at: <https://sciencebasedtargets.org/reports/sbti-monitoring-report-2023>.
- ² Anderegg, W.R. and Blanchard, L. (2024). ‘Climate-targets group should rescind its endorsement of carbon offsets’. *Nature*, 629, 41. <https://doi.org/10.1038/d41586-024-01271-6>.
- ³ SBTi (2024). *Business Ambitions For 1.5°C Campaign*. Available at: <https://sciencebasedtargets.org/business-ambition-for-1-5c>.
- ⁴ Robiou du Pont, Y., Rogelj, J., Hsu, A., van Vuuren, D. and Hoepner, A.G. (2024). ‘Corporate emissions targets and the neglect of future innovators’. *Science*, 384(6694), pp.388-390. <https://doi.org/10.1126/science.adl5081>.
- ⁵ Brander, M (2022). ‘The most important GHG accounting concept you may not have heard of: the attributional-consequential distinction’. *Carbon Management*, 13:1. Available at: <https://www.tandfonline.com/doi/full/10.1080/17583004.2022.2088402>.
- ⁶ IPIECA (2016). *Estimating petroleum industry value chain (Scope 3) greenhouse gas emissions. Overview of methodologies*. Available at: <https://www.ipieca.org/resources/estimating-petroleum-industry-value-chain-scope-3-greenhouse-gas-emissions-overview-of-methodologies>.
- ⁷ CDP (2024). CDP Technical Note: Relevance of Scope 3 Categories by Sector. Available at: https://cdn.cdp.net/cdp-production/cms/guidance_docs/pdfs/000/003/504/original/CDP-technical-note-scope-3-relevance-by-sector.pdf.
- ⁸ Mitchell-Larson, E. and Höglund, R. (2022) *Bridging the Ambition gap: A framework for scaling corporate funds for carbon removal and wider climate action*. Available at: https://carbongap.org/wp-content/uploads/2022/11/Ambition_Gap_Report_Nov22.pdf.
- ⁹ Rekker, S., Chen, G., Heede, R., Ives, M. C., Wade, B., & Greig, C. (2023). ‘Evaluating fossil fuel companies’ alignment with 1.5 C climate pathways’. *Nature Climate Change*, 13(9), pp. 927-934.
- ¹⁰ Bjørn, A., Lloyd, S. M., Brander, M., & Matthews, H. D. (2022). ‘Renewable energy certificates threaten the integrity of corporate science-based targets’. *Nature Climate Change*, 12(6), 539-546.; Naik, G. (2021). *Problematic corporate purchases of clean energy credits threaten net zero goals*. Available at: <https://www.spglobal.com/esg/insights/problematic-corporate-purchases-of-clean-energy-credits-threaten-net-zero-goals>; Offset Guide (no date). *Frequently Asked Questions: Green Power Purchasing Claims and Greenhouse Gas Accounting*. Available at: <https://offsetguide.org/green-power-faq/>; Langer, L., Brander, M., Lloyd, S. M., Keles, D., Matthews, H. D., & Bjørn, A. (2023). ‘Does the purchase of voluntary renewable energy certificates lead to emission reductions? A review of studies quantifying the impact’. SSRN. <http://dx.doi.org/10.2139/ssrn.4636218>
- ¹¹ Haya, B. and Dorosz, M. (2023). *Recommendations to the GHG Protocol Survey Responses on Market-based Accounting Approaches*. Available at: https://gspp.berkeley.edu/assets/uploads/page/Comments_to_GHG_Protocol_from_Berkeley_Carbon_Trading_Project.pdf; Gill-Wiehl, A., Kammen, D. and Haya, B. (2023). *Cooking the books:*

Pervasive over-crediting from cookstoves offset methodologies. <https://doi.org/10.21203/rs.3.rs-2606020/v1>;

Pande, R. (2024). ‘Can the market in voluntary carbon credits help reduce global emissions in line with Paris Agreement targets?’. *Science*, 384 (6696). <https://doi.org/10.1126/science.adp5223>.

¹² Axelsson, K., Wagner, A., Johnstone, I., Allen, M., Caldecott, B., Eyre, N., Fankhauser, S., Hale, T., Hepburn, C., Hickey, C., Khosla, R., Lezak, S., Mitchell-Larson, E., Malhi, Y., Seddon, N., Smith, A. and Smith, S.M. (2024). *Oxford Principles for Net Zero Aligned Carbon Offsetting (revised 2024)*.

Available at: <https://www.smithschool.ox.ac.uk/sites/default/files/2024-02/Oxford-Principles-for-Net-Zero-Aligned-Carbon-Offsetting-revised-2024.pdf>.

¹³ Smith, S. M., Geden, O., Gidden, M. J., Lamb, W. F., Nemet, G. F., Minx, J. C., Buck, H., Burke, J., Cox, E., Edwards, M. R., Fuss, S., Johnstone, I., Müller-Hansen, F., Pongratz, J., Probst, B. S., Roe, S., Schenuit, F., Schulte, I., Vaughan, N. E. (eds.) (2024). *The State of Carbon Dioxide Removal - 2nd Edition*. <https://doi.org/10.17605/OSF.IO/F85QJ>.

¹⁴ Christie-Miller, T. and Harvey, V. (2023). *Snapshot: the current carbon removal market in figures*.

Available at: <https://bezerocarbon.com/insights/snapshot-the-current-carbon-removal-market-in-figures>;

Hong, A., Keane, S., Macfarlane, M., Cabiyo, B., Butsic, V., Potts, M., Roche, E. (2023). *State of the Voluntary Carbon Market*. Available at: <https://insights.carbon-direct.com/hubfs/The%20State%20of%20the%20Voluntary%20Carbon%20Market.pdf>.

¹⁵ Hasler, N., Williams, C.A., Denney, V.C., Ellis, P.W., Shrestha, S., Terasaki Hart, D.E., Wolff, N.H., Yeo, S., Crowther, T.W., Werden, L.K. and Cook-Patton, S.C. (2024). ‘Accounting for albedo change to identify climate-positive tree cover restoration.’ *Nature Communications*, 15 (2275).

<https://doi.org/10.1038/s41467-024-46577-1>

¹⁶ Arendt, R. (2024). ‘Residual carbon emissions in companies’ climate pledges: who has to reduce and who gets to remove?’. *Climate Policy*, <https://doi.org/10.1080/14693062.2024.2358989>.

¹⁷ Buck, H.J., Carton, W., Lund, J.F. and Markusson, N. (2023). Why residual emissions matter right now. *Nature Climate Change*, 13(4), pp.351-358.; Lund, J.F., Markusson, N., Carton, W. and Buck, H.J., 2023. Net zero and the unexplored politics of residual emissions. *Energy Research & Social Science*, 98, p.103035.

¹⁸ Lund, J.F., Markusson, N., Carton, W. and Buck, H.J., 2023. Net zero and the unexplored politics of residual emissions. *Energy Research & Social Science*, 98, p.103035.

¹⁹ Cullenward, D., & Victor, D. G. (2020). *Making climate policy work*. John Wiley & Sons.

²⁰ Ason, A. and Dal Poz, J., (2024). *Contracts for difference: The instrument of choice for the energy transition*.

Available at: <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2024/04/ET34-Contracts-for-Difference.pdf>.

²¹ First Movers Coalition (no date). *First Movers Coalition*. Available at:

<https://initiatives.weforum.org/first-movers-coalition/home>.

²² Gangotra, A., Carlsen, W., Kennedy, K. and Lebling, K. (2023). ‘How Advance Market Commitments and Contracts for Difference Can Help Create a Market for Green Industrial

Products'. *World Resources Institute*. Available at: <https://www.wri.org/technical-perspectives/amc-cfd-for-green-industrial-products>.

²³ Whiting, K. (2024). 'Climate finance: What are debt-for-nature swaps and how can they help countries?'. *World Economic Forum*. Available at:

<https://www.weforum.org/agenda/2024/04/climate-finance-debt-nature-swap/>

²⁴ UNFCCC. (no date). 'REDD+ MRV and results-based payments'. Available at:

<https://redd.unfccc.int/fact-sheets/redd-mrv-and-results-based-payments.html>.

²⁵ Axelsson, K., Wagner, A., Johnstone, I., Allen, M., Caldecott, B., Eyre, N., Fankhauser, S., Hale, T., Hepburn, C., Hickey, C., Khosla, R., Lezak, S., Mitchell-Larson, E., Malhi, Y., Seddon, N., Smith, A. and Smith, S.M. (2024). *Oxford Principles for Net Zero Aligned Carbon Offsetting (revised 2024)*. Available at: <https://www.smithschool.ox.ac.uk/sites/default/files/2024-02/Oxford-Principles-for-Net-Zero-Aligned-Carbon-Offsetting-revised-2024.pdf>.

²⁶ Axelsson, K, Wigg C., Becker, M. (2024) 'Is impact out of scope? A call for innovation in climate standards to inspire action across companies' Spheres of Influence'. *Carbon Management*. 15:1.

<https://doi.org/10.1080/17583004.2024.2382995>

²⁷ Benson, S., Farelly, A., Watson, E., Kazanecki, H., Massei, M., von Preussen, A., Steck, C., Trouwloon, D. (2024). Above and Beyond: An SBTi Report On The Design Implementation Of Beyond Value Chain Mitigation (BVCM). Available at:

<https://sciencebasedtargets.org/resources/files/Above-and-Beyond-Report-on-BVCM.pdf>.

²⁸ Smith, S. M., Geden, O., Gidden, M. J., Lamb, W. F., Nemet, G. F., Minx, J. C., Buck, H., Burke, J., Cox, E., Edwards, M. R., Fuss, S., Johnstone, I., Müller-Hansen, F., Pongratz, J., Probst, B. S., Roe, S., Schenuit, F., Schulte, I., Vaughan, N. E. (eds.) (2024). *The State of Carbon Dioxide Removal - 2nd Edition*. <https://doi.org/10.17605/OSF.IO/F85QJ>.

²⁹ Ho, D.T. (2023). Carbon dioxide removal is not a current climate solution — we need to change the narrative. *Nature*, 616, p.9. <https://doi.org/10.1038/d41586-023-00953-x>

³⁰ Falk, J., Wigg, C., Axelsson, K. & Becker, M. (2024). 'Climate solutions framework (CSF) – defining climate solutions and climate solutions companies'. *Exponential Roadmap Initiative*. Available at: https://exponentialroadmap.org/wp-content/uploads/2024/07/Climate-solutions-framework_v1.0.pdf.