

Climate Change is everyone's business

WHITE PAPER

**RAOUL MARTIN
SUSTAINABLE EQUITY
KEMPEN CAPITAL MANAGEMENT**

ABSTRACT

Climate change has the potential to profoundly impact human systems ranging from society and companies to individuals. Scientists have proved that we must achieve net-zero emissions urgently to minimise the worst consequences of climate change. This paper succinctly examines the physical and non-physical risks associated with climate change and the historical and expected governmental and corporate responses. The role that governments, corporations, investors and individuals have to play in combating climate change is discussed. We quantitatively assess the underlying drivers for corporations and sectors to decarbonise and show that in-depth expert knowledge is required to fully grasp and evaluate the motivation, aggressiveness, and quality of companies' decarbonisation strategies. This paper advocates the need for investment specialists' active involvement in strategic dialogues with their portfolio companies to influence the pace at which decarbonisation is realised sustainably.

Table of Contents

1.	Climate Change and its physical impact	3
2.	Non-physical risks	5
3.	Governmental response	7
4.	How do we reach net-zero?	11
5.	Effectiveness of corporate carbon targets – a quantitative approach	17
6.	What's next?	29
7.	Bibliography	31
8.	Appendix	35

EXECUTIVE SUMMARY

Climate change has the potential to profoundly impact human systems ranging from society and companies to individuals. Scientists have proven that we must achieve net-zero emissions urgently to minimise the worst consequences of climate change. Governments, corporations, investors and individuals all have a role to play in combating climate change.

Where governments can set regulation and support companies and consumers in reducing their carbon footprint, corporate leaders can show how they were able to achieve emission reductions, educating others. Second, investors can understand the bottlenecks that companies face when attempting to decarbonise and continue to communicate with their portfolio companies. Third, it promotes effective communication among stakeholders, allowing for more informed decision making, lowering perceived risks associated with decarbonisation, and motivating stakeholders to drive positive change.

Although we find a strong correlation between carbon targets of companies and a reduction in their emissions over time, having just carbon targets in place is insufficient to convincingly and structurally shift to net-zero. Furthermore, decarbonisation of firms is not linear. Generally, direct emissions (Scope 1) must be reduced and offset completely, whereas indirect emissions from electricity use (Scope 2) can be reduced by purchasing renewable energy. Indirect emissions from the value chain (Scope 3) often represent the majority of companies' greenhouse gas inventories. Since a company's Scope 3 emissions often overlap with other companies' emissions, strategies to reduce Scope 3 emissions may enable synergies collaboration. Additionally, reducing scope 3 emissions, which includes both upstream emissions from the production of raw materials and downstream emissions from the use of products inevitably impacts companies' business model. Reducing Scope 3 emissions, therefore, also helps reduce the direct emissions caused by both producers and consumers.

The ability and willingness of companies to achieve meaningful reductions within a reasonable time frame for which they set ambitious targets depends on variables that are inherently different across industries and cannot easily be captured by a generic model. Designing and implementing a sustainable decarbonisation strategy that aligns with the Paris Agreement or transforms the broader business strategy requires the willingness to change, sufficient resources, a long-term strategy and specialist knowledge. Because a sustainable decarbonisation plan is inextricably linked to business strategy, investors are well placed to judge the quality and ambition of corporations' climate goals. Engaging with firms to design such a strategy and set targets accordingly is another role that investors can play.

International cooperation, effective regulation, and rethinking our status quo are all required transition to a net-zero economy. The interdependency between governments, companies, investors and individuals therefore makes fighting climate change everyone's business.

1. Climate Change and its physical impact

“We will move to a low-carbon world because nature will force us, or because policy will guide us. If we wait until nature forces us, the cost will be astronomical.” These words, spoken by Christiana Figueres, former Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC), succinctly formulates why climate change is one of the greatest challenges we confront in human history. On current trends, by the end of the century, the global warming effect will have taken us far away from pre-industrial climatic conditions (1).

According to scientific evidence, the rise in global temperatures is connected to an increase in greenhouse gases (GHGs) in the atmosphere (2). GHGs are naturally occurring, long-lived gases that absorb and reflect heat, warming the earth's surface and creating the conditions for all living species to survive. Carbon dioxide (CO₂) is the most prevalent GHG, accounting for around two-thirds of GHGs in the earth's atmosphere. Methane (16%) and nitrous oxide are two more major types (6%) (3).

It is crucial to remember that the atmospheric concentration of GHGs does not only reflect current emission levels (flows), but also the cumulative build-up (stocks) of GHGs through time (4). Unless and until the pace of emissions is matched by the ability of natural or man-made sinks to re-absorb or remove surplus GHGs, they

will linger in the atmosphere for decades or more, adding to existing stocks¹.

Anthropogenic emissions of greenhouse gases are responsible for approximately 1.1°C of warming since 1850-1900 (5). The 6th assessment report on the state of climate change published by the Intergovernmental Panel for Climate Change (IPCC) finds that averaged over the next 20 years, global temperature is expected to reach or exceed 1.5°C of warming (4).

The physical impacts of this rapid change are already being seen across the planet, with noticeable consequences for ecosystems, economies and wider society. Rising sea levels, increased risk from droughts and precipitation deficits, heightened risks of floods and extreme weather, impacts on biodiversity and ecosystems, including species loss and extinction are already underway.

The physical effects of climate change have the potential to have a significant influence on human systems, ranging from society and corporations to individuals. These physical dangers have the potential to have an impact on public health, food security, infrastructure services, physical assets, natural resources, and a variety of other sectors. Climate-related threats can jeopardize people's livelihoods throughout the world, as well as the security of the settings in which we live and work (6; 7).

¹ Less than 80% of CO₂ released into the air dissolves into the ocean over a period of 20–200 years. The rest is removed by slower processes that

take hundreds of thousands of years, including chemical weathering and rock formation (71).

2. Non-physical risks

2.1 Litigation risk

The first non-physical risk that arises from climate change and its impact on society is the heightened risk of litigation. Litigation risks relate to the possibility of legal action being taken against governments and organizations for harming the environment or neglecting to address and mitigate climate change (8). Several high-profile cases against Carbon Majors² are being pursued, for instance public nuisance, private nuisance, and negligence. In addition to litigation focused on the impact of previous emissions, litigants have sought improvements in present and future business behavior (9). In tobacco litigation, unfavourable litigation announcements were found to cause share prices to fall relative to those in reference industries (10). Another example of impactful litigation cases is the Dutch court verdict against oil giant Royal Dutch Shell, ordering the company to reduce its greenhouse gas emissions 45% by 2030, based on 2019 levels. This ruling applies to both Shell and its suppliers and covers both the companies' emissions but also those from products burned by its customers. The case has set a precedent for similar lawsuits against other global oil and companies (11).

Two key databases that track and report global climate-related cases filed against governments and corporates are the Climate Change Laws of the World and the US Climate

Change Litigation database. The former is a collection of national-level climate change legislation and policies from across the world. The database includes climate and climate-related legislation, and laws and policies encouraging low-carbon transitions, reflecting the importance of climate policy in sectors such as energy, transportation, land use, and climate resilience (12). The latter database includes litigations and administrative proceedings related to federal, constitutional, and state law (13). The database shows a near exponential growth in climate-related litigation cases both in the US and globally (14).

2.2 Financing risk

The second risk appertains to financing risk, often relating to insurability in the context of climate change. The capacity of an entity to be insured is referred to as its insurability. This can be determined by a variety of variables, including the entity's relative perceived risk profile (15). Some physical risks associated with business continuity can still be insured, albeit with a recurring 12-month re-evaluation. As businesses become increasingly vulnerable to the physical threats posed, insurance companies may no longer be willing to bear the risk of financial loss. For example, many properties in the east coast of the United States of America are now uninsurable or

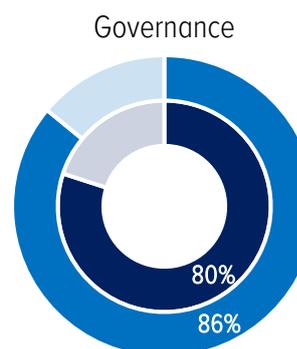
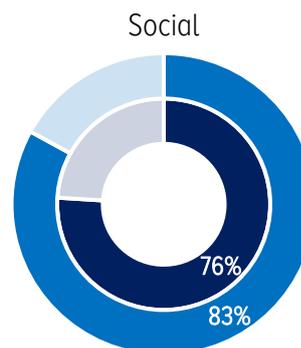
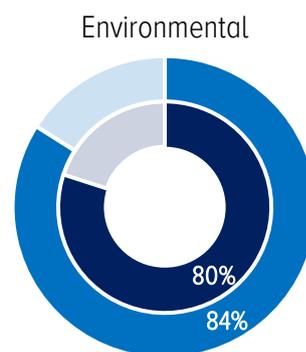
² Carbon Majors are the 100 companies that are linked to 71% of industrial greenhouse gas emissions since 1988 (59).

at a significant premium. As a result, it is important for organizations to be aware of and manage their exposure to present and future hazards. Considerations of these risks should also be incorporated into businesses' strategic investment plans to make them more robust to climate change and lower the chances of stranded assets.

2.3 Transition risk

Finally, transition risk refers to the societal changes arising from a transition to a low-carbon economy. This includes government policy and regulation, technological and institutional innovation and changing consumer behaviour (16). According to the transition risk framework by the Cambridge Institute for Sustainability Leadership (CISL), transition risks also include changes in sector-wide standards and influential developments in global financial markets (17).

Influential institutions, such as the Intergovernmental Panel on Climate Change (IPCC) in their 2018 special report and the 2021 sixth assessment report, have outlined the urgent need for a rapid and far-reaching transition to a net-zero economy. This requires halving CO₂ emissions by 2030 and reaching net-zero emissions by 2050, inevitably affecting all sectors and industries (5). Such a rapid and systemic change entails numerous dangers for firms, the financial sector, and the real economy. While some industries may see their costs rise as a result of greater expenditures in mitigation and adaptation measures, others may identify new opportunities.



● Employees
 ● Consumers

Figure 1: ESG commitments are driving consumer purchases and employee engagement. Figure adapted from PwC Consumer Intelligence Series June 2, 2021. Results from questionnaire. Q: Please indicate how much you agree or disagree with the following statements. Consumers (n=5005); Employees (n=2510) (70).

3. Governmental response

Climate change became a recognised global issue in 1988, including the US, when the Intergovernmental Panel for Climate Change (IPCC) was founded (18). Despite decades of public education on climate change and international negotiations to address it, only recently does the broader society start to realise the urge of the transition.

The United Nations Framework Convention on Climate Change (UNFCCC), signed in 1992 by 154 member states, is one of the first international treaties with focus on climate change, by aiming to stabilize greenhouse gas concentrations in the atmosphere and prevent destructive anthropogenic interference with the climate system (19). Furthermore, the UNFCCC's first agreement for implantation of measures, the Kyoto Protocol, was signed in 1997. However, these have been criticized as not having achieved their stated goals of reducing emissions. The failure to achieve meaningful progress and reach effective emission-reduction policies among the signatory member states has led to the United States initially to hold back from the protocol as well as the withdrawal of Canada in 2011 (20; 21).

The lack of progress resulting from these treaties under the umbrella of the UNFCCC has led to the most far-reaching and ambitious accord yet. The Paris Agreement, signed and ratified by 189 countries in 2015 is the first legally binding global treaty that explicitly lays forth defined objectives and timelines for all signatories. The Paris Agreement aims to combat climate change and to accelerate and intensify the actions and

investments needed for a sustainable low carbon future and sets out the following key goals:

1. Keeping the global average temperature rise to well below 2 degrees Celsius over pre-industrial levels, and pursuing measures to keep the temperature rise to 1.5 degrees Celsius above pre-industrial levels, recognising that this would considerably decrease the risks and consequences of climate change;
2. Improving the adaptability to the adverse effects of climate change and encourage climate resilience and low-carbon development in a way that does not jeopardise food production;
3. Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development (22).

Additionally, the United Nations' adoption of the Sustainable Development Goals (SDGs) in 2015 as part of the 2030 Agenda for Sustainable Development sets objectives addressing major global challenges, such as poverty, education, health, inequality and climate change. While 12 of the 17 objectives include direct aims to tackle climate change, Goal 13 focuses explicitly on climate action, encouraging governments, companies, and the financial sector to "take urgent action to combat climate change and its impacts" (23).

Collectively, the three post-2015 agendas for action – the Paris Agreement, the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction³ - provide the foundation for sustainable, low-carbon and resilient development under a changing climate (24).

Finally, the European Commission has proposed in 2019 The European Green Deal, which is a set of policy initiatives with the to become the world's first “climate-neutral bloc” by 2050. It has goals extending to many different sectors, including construction, biodiversity, energy, transport and food (25).

Figure 2 shows net-zero plans per country and city. The data, as of 2021-10-05, is obtained and adjusted from the Energy & Climate Intelligence Unit’s Net-zero Tracker. It shows the current state of the climate targets per country, state, and city. Most countries still have their targets under discussion, almost a third have targets in their policy document, three countries have proposed legislation and merely ten percent of countries have their climate targets in law. Notably, Suriname and Buthan are the first claiming to have achieved their net-zero targets, largely due to their natural forests.

The most recent global event held with respect to fighting climate change has been the 2021 United Nations Climate Change Conference, more commonly referred to as COP26. It was the 26th United Nations Climate Change conference, held at the SEC Centre in Glasgow, Scotland, United Kingdom, from 31 October to 13 November 2021 (26). A focus for the negotiations was to

finalise the ‘Paris Rulebook’, which includes the rules needed to implement the Paris Agreement. The three key items that were required to be achieved were:

1. **Find a solution on carbon markets**, by creating a robust system of carbon credits that supports the move to net-zero.
2. **Resolve the issues of transparency**, by putting in place a universal system that encourages all countries to keep to their commitments.
3. **Broker an agreement that drives ambition from governments** over the coming years to keep 1.5 degrees alive (27).

After six years of negotiations, governments have agreed on this rulebook. Governments have now formally adopted 1.5 degrees as their official target. Various additional policy agreements were made for 2030, including lowering methane emissions, preventing deforestation, phasing out coal power, and prohibiting public funding of fossil fuels overseas (28).

Finally, The Sustainable Finance Disclosure Regulation (SFDR), introduced in 2019 and came into effect in March 2021, is part of a new wave of European regulation aimed at building a sustainable economy. The SFDR applies to investment advisors and financial market participants that create and sell financial products and perform portfolio management services. Since 2017, the EU has been enhancing

³ The Sendai Framework for Disaster Risk Reduction 2015-2030 outlines seven clear targets and four priorities for action to prevent new and reduce existing disaster risks: (i) Understanding disaster risk; (ii) Strengthening disaster risk governance to manage disaster risk; (iii)

Investing in disaster reduction for resilience and; (iv) Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction (61).

its sustainable finance legislation in recognition of the role that the financial sector can play in attaining the EU's long-term development goals. These measures aim to encourage supporting sustainable businesses while diverting resources away from damaging ones. To achieve this, the SFDR has defined three core aims:

1. To improve disclosures such that institutional asset owners and retail clients can understand, compare, and monitor financial products' and firms' sustainability characteristics.
2. To ensure a level playing field within the EU so that European firms will not be exposed to unfair competition from firms outside the EU.
3. To counter greenwashing.

Net-zero Plans

Adjusted and data from the Energy & Climate Intelligence Unit

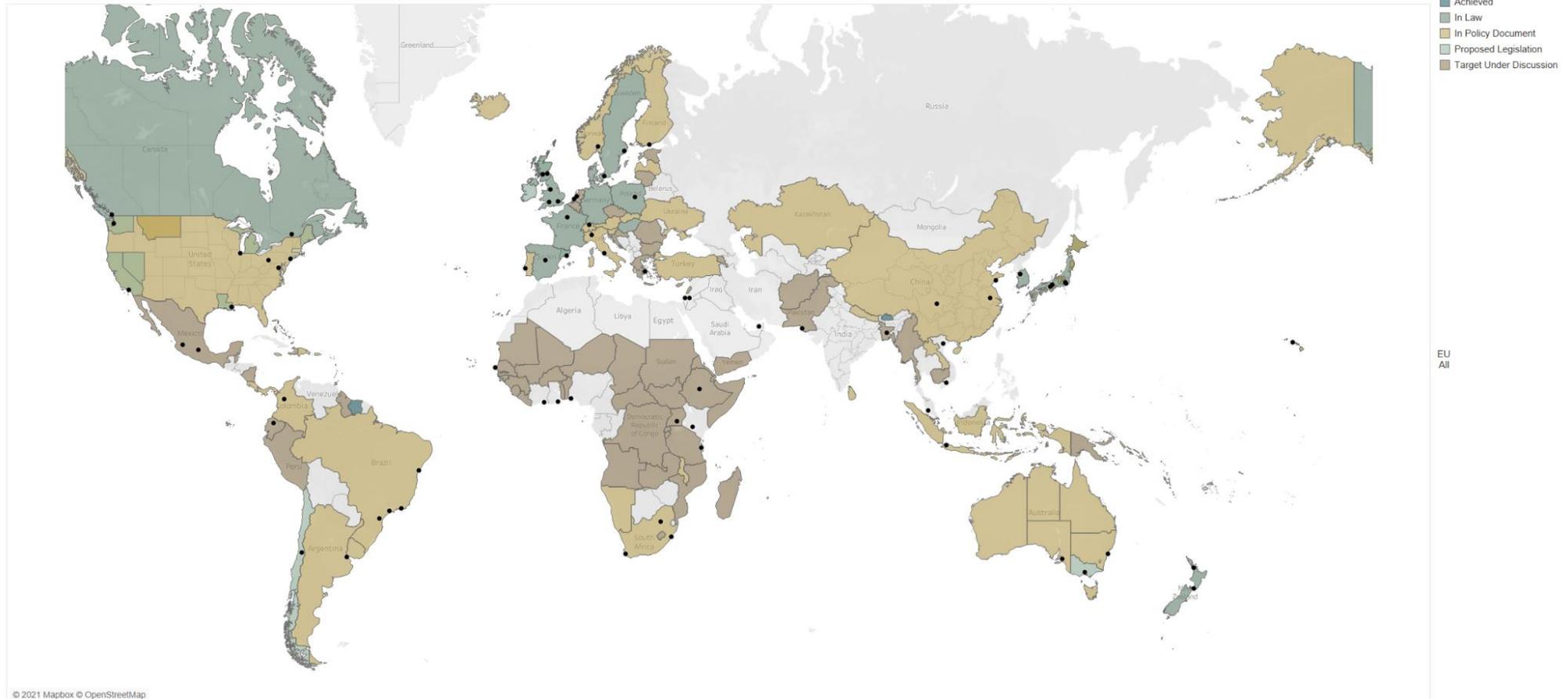


Figure 2: Net-zero plans per country and city. Adjusted and data (as of 2021-10-05) from the Energy & Climate Intelligence Unit (29).

4. How do we reach net-zero?

Achieving net-zero emissions, also referred to as carbon or climate neutrality, is a commitment to decarbonisation and climate action. Although the term carbon is used, carbon footprint also includes other greenhouse gases, usually carbon-based, measured in terms of their carbon dioxide equivalence. Figure 3 shows the 2050 strategic vision on the EU emissions trajectory in a 1.5°C scenario, set out by the European Commission. The graph gives a holistic view of the emissions trajectory where most reduction will have to be in absolute terms. Where emissions cannot be further reduced, these are aimed to be compensated for by carbon sinks⁴, and carbon removal technologies.

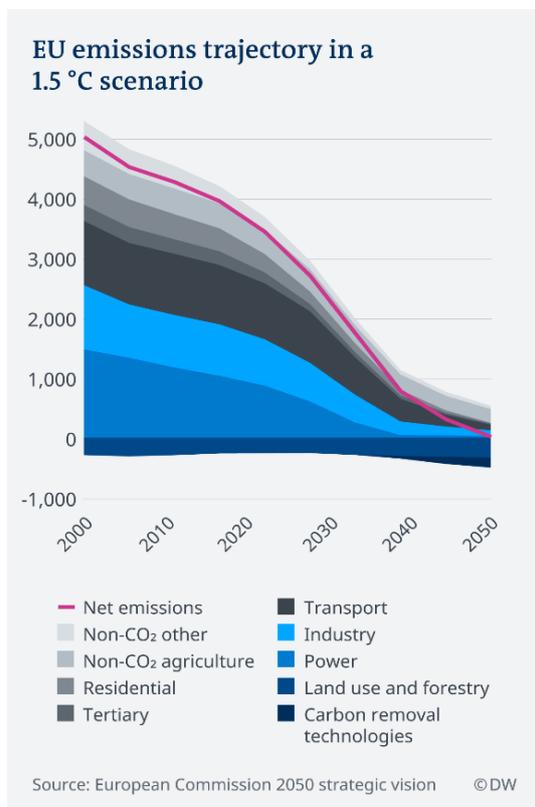


Figure 3: EU emissions trajectory in a 1.5°C scenario (65).

⁴ A carbon sink is any reservoir, natural or otherwise, that accumulates and stores some carbon-containing chemical compound for an indefinite period and thereby lowers the concentration of carbon dioxide (CO₂) from

4.1 Governments

The first step into achieving net-zero is by aligning governments, mainly through the Paris Agreement on climate change from 2015. The second set of goals are called the Sustainable Development Goals, which were also agreed at the global level by member governments through the United Nations, sometimes called the Agenda 2030.

A systematic framework to identify and implement successful decarbonisation initiatives is offered in the Cambridge Institute for Sustainability Leadership's (CISL) (30). This report outlines the following three tasks – Tasks 1 to 3 – that are paramount for governments to fulfil swiftly and effectively:

- Task 1: Measure the right things, set the right targets
- Task 2: Align incentives to support better outcomes
- Task 3: Drive socially-useful innovation

4.2 Companies

Just as governments can set goals on a global scale, companies can set their own goals by identifying their material risks and opportunities, measuring and reporting improvements. To

the atmosphere. Examples include: forests, oceans, soils and savannas (69).

summarise, the four broad steps towards creating a successful decarbonisation strategy are:

1. Measuring and reporting on environmental impact
2. Setting targets for reducing emissions
3. Creating route maps to reach net-zero
4. Creating an incentive structure for executives that is linked to reducing emissions

Net-zero emissions are achieved by both balancing emissions of carbon dioxide with its removal, which is often done through carbon offsetting, and by reducing emissions. Carbon offsetting is a reduction in greenhouse gas emissions elsewhere to compensate for emissions made by the company. Reducing absolute emissions can be done by shifting towards (renewable) energy sources and industry processes that produce less greenhouse gases. Direct and, preferably as much as possible, indirect emissions are included in measuring and reducing the carbon footprint. Generally, direct emissions (Scope 1) must be reduced and offset completely, whereas indirect emissions from electricity use (Scope 2) can be reduced by purchasing renewable energy. Indirect emissions related to the value chain (Scope 3) often represent the largest portion of companies' GHG inventories. Since a company's Scope 3 emissions often overlap with other companies' emissions, strategies to reduce Scope 3 emissions may present opportunities to identify synergies and to collaborate.

The [CISL](#) outlines the following four tasks – Tasks 7 to 10 – that are important if businesses are

to make the necessary change and contribute to a sustainable economy:

- Task 7: Align organisational purpose, strategy and business models
- Task 8: Set evidence-based targets, measure and be transparent
- Task 9: Embed sustainability – decarbonisation – in practices and decisions
- Task 10: Engage, collaborate and advocate change (30)

To be successful in a net-zero economy, a company must make a fair social contribution and have a neutral or a positive environmental impact, alongside creating value. This can be achieved by aligning the organisation's core purpose with a net-zero goal, so that it exists to have a positive impact on the world.

Various important global initiatives have been formed for measuring, tracking, and reporting systematically on companies' decarbonisation strategy. Firstly, the [TCFD](#) is the task force on climate-related financial disclosures and chaired by Michael Bloomberg. The Task Force's report establishes recommendations for disclosing clear, comparable, and consistent information about the risks and opportunities presented by climate change. Their widespread adoption will ensure that the effects of climate change become routinely considered in business and investment decisions. Adoption of these recommendations will also help companies better demonstrate responsibility and foresight in their consideration of climate issues. That will lead to a smarter, more efficient allocation of capital, and

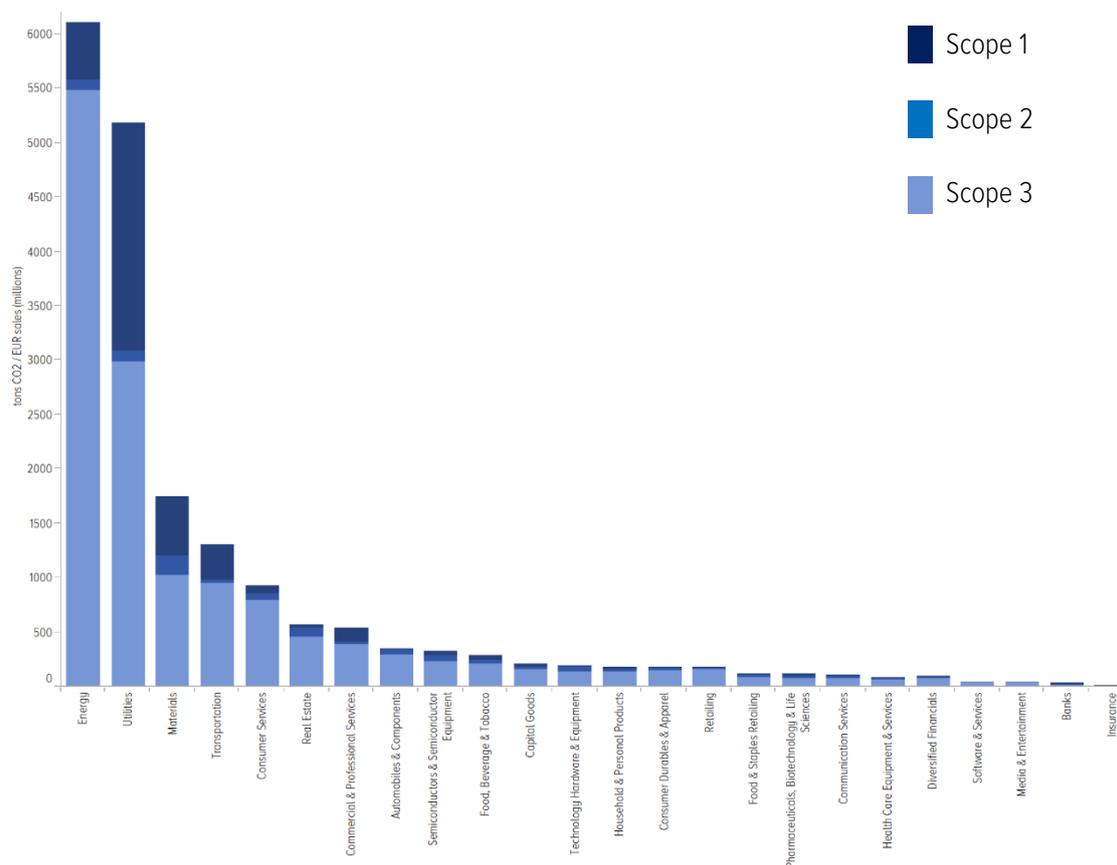


Figure 4: MSCI WORLD Scope 1, 2, and 3 emissions intensity by GICS® industry groups as of January, 2022. Data from ISS and MSCI.

help smooth the transition to a more sustainable, low-carbon economy.

Secondly, the Carbon Disclosure Project (CDP) is a not-for-profit charity that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts. The website of CDP contains the company submitted questionnaires. A-listed companies are considered leaders on environmental action and transparency.

Third, Climate Action 100+⁵ is a collaborative engagement initiative launched in December 2017, which now has the support of over 570 investors representing more than US\$54 trillion of assets under management. The initiative aims to engage with systemically important greenhouse gas emitters and other companies

across the global economy that have significant opportunities to drive the clean energy transition and help achieve the goals of the Paris Agreement on climate change. This agreement defines the goal of holding the global average temperature increase to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. It also includes the aim to reach global peaking in greenhouse gas emissions as soon as possible, undertake rapid reductions, and achieve a balance between emissions by sources and removals by sinks in the second half of the century. The latest Progress Report of Climate Action 100+ is showcasing companies making progress towards net-zero emissions. The report Value Change in the Value Chain discusses best

⁵ Kempen has been signatory to the Climate Action 100+ initiative since its origination in 2018 and is responsible for direct engagements with focus companies, individually and/or collaboratively.

practices in Scope 3 greenhouse gas management.

Finally, the Science Based Targets Initiative (SBTi) defines and promotes best practice in science-based target setting. Offering a range of target-setting resources and guidance, the SBTi independently assesses and approves companies' targets in line with its strict criteria. On October 28th 2021, the Science-Based Targets initiative introduced the Net-Zero Standard, the first science-based framework for enterprises to set net-zero targets. The Standard will make it clear how important decarbonization is in company net-zero goals. The SBTi's new Net-Zero Standard is the world's first framework for setting business net-zero targets in accordance with climate science. It gives firms the knowledge and resources they need to create science-based net-zero ambitions. Companies will be able to set certified net-zero objectives commensurate with limiting temperature rise to 1.5°C using the SBTi (31).

While climate change and the transition to net-zero emissions pose a wide variety of risks to business and the global economic system, not all climate-related impacts will be negative (32). There are several climate-related events that, although potentially harmful to a certain business or organization, can also bring chances for growth and innovation. Businesses that seize such chances early can introduce new goods and services to the market, gain the trust of investors, be well prepared for regulatory changes, and increase their resource efficiency.

Early-movers can launch new goods and services to the market, earn investor trust, be well prepared for regulatory changes, and boost resource efficiency. By analysing the S&P 500, the

CDP determined that the potential value of climate-related business opportunities was more than seven times higher than the cost of achieving them. Furthermore, failing to act early in mitigating climate-related hazards is also expected to cost significantly more than for those early-movers (33).

4.3 Investors

Financial constraints are frequently cited as the primary cause for the failure to execute adequate, significant decarbonisation initiatives. Cost reductions will accrue as a result of initial investments (34). Redirecting financial flows away from carbon-intensive commercial operations and toward net-zero processes and technology is already a critical strategy for public-sector investors and enterprises. However, in the private sector, decarbonisation initiatives are frequently seen as costly, with little return and considerable risk (35).

Capital flows and investments play a vital role in financing the transition to a net-zero economy. Investors as a whole – both private and public – are pivotal in allowing companies to innovate and facilitate the decarbonisation of their operations, as well as leveraging opportunities by collaborating with suppliers and clients. [The CISL Rewiring the Economy report](#) outlines the following three tasks – Tasks 4 to 6 – that financial institutions and investors should embrace in facilitating the transition to net-zero:

- Task 4: Ensure capital acts for the long term

- Task 5: Price capital according to the true costs of business activities
- Task 6: Innovate financial structures better to serve sustainable business (30)

Investors can directly engage with the companies that they hold in their portfolio to assess the quality of companies' strategy to decarbonise. As will be shown later in this paper, setting a net-zero target does not suffice. Discussing meaningful details about how these commitments will affect corporate strategy can be a powerful source of conversation, as transparency and sharing knowledge can drive the momentum required for both public and private investors to make informed investment decisions, in turn accelerating the transition to a net-zero economy.

FCLTGlobal's *Climate Transition Conversation Guide*, for which the Kempen Sustainable Equity team has provided input⁶, is a tool that provides a framework that companies and investors can use to engage on how climate change impacts corporate plans for long term value creation. Companies may use this tool to drive internal discussions and decision making as they construct a comprehensive climate transition plan that is inextricably tied to their long-term strategy. This tool may be used by shareholders to engage portfolio firms in the intricacies of this implementation. FCLT outlines the following six core questions to consider:

1. **Corporate Purpose:** How does climate change affect the way that the company intends to

create value now and in the future?

2. **External Environment:** How does climate change influence the company's core drivers of growth, competitive environment, and management's view of the market?
3. **Strategy, Goals and KPIs:** How does climate change affect the company's strategic plan, and related goals and KPIs?
4. **Capital Allocation and Investments:** How does climate change affect the company's capital allocation plan?
5. **Risks:** How has climate change been reflected in the company's risk management framework?
6. **Accountability and Incentive Alignment:** How is the company structured to allow for the integration of climate change into the business strategy at all levels (36)?

4.4 Individuals

Nations and corporates are represented by their people. If we want them to achieve net-zero, individuals should consider the possibilities in which they can contribute. As populations become more environmentally conscious and an increasing number of people attempt to reduce

⁶ The Kempen Sustainable Equity team and others have participated in a number of working groups, together with FCLT and other thought leaders within the investment industry.

their environmental footprint, we may find a tipping point where wide acceptance leads to further acceleration in reducing overall emissions.

The Paris Agreement was the first legally binding international agreement to clearly state that mitigation and adaptation plans must be driven by the equity principle. This approach recognizes that existing disparities impact various countries' abilities to manage climate change, and it provides resources based on the need (37). Furthermore, Around 17% of the world population currently lives in developed countries, which have accounted for more than three-quarters of global emissions between 1850-2021 (38; 39; 40).

By consuming less food, plastic, and material, by using public transport or bike more often, and by replacing their fossil-fuelled energy use with renewable electricity, nations of individuals can lead significant positive change.

The behavior of individuals is critical to companies because they are both consumers and employees. Individuals can therefore have a major impact on the achievement of the climate goals and we can urge individuals to be aware of this.

5. Effectiveness of corporate carbon targets – a quantitative approach

SUMMARY

The growing awareness of climate change is pressuring companies to disclose their carbon emissions and targets. In recent years, we have seen a dramatic increase in the number of targets set on reducing carbon emissions. While these targets have been mostly on direct emissions from operations and purchased electricity, we are now starting to see companies report and set targets on their scope 3, or indirect emissions.

There may be many reasons for companies to set targets, ranging from a strong willingness and ability to decarbonise, public pressure, or to make the intention for drafting a decarbonization strategy explicit. As a result, the effectiveness of setting carbon targets on meaningful emission reduction may vary significantly too. Therefore, we have quantitatively investigated the extent to which carbon targets, their type, and aggressiveness can be linked to realised emission reductions and whether these correlations differ across industries.

In general, we find a strong linkage between having carbon targets and the reduction of emissions. However, results vary significantly across sectors. This can be explained by the limited and highly variable data that is currently available to the public, but also because the underlying factors determining the ability for companies to decarbonise differ across sectors.

Although we find a strong correlation between carbon targets of companies and a reduction in their emissions over time, having just carbon targets in place is insufficient to convincingly and structurally shift to net-zero. Willingness and ability is key to start, but strategy and action determine the decarbonisation trajectory of a company and its long-term success. Especially now that companies are starting to realise that they need to reduce their scope 3, they will need to think of how to make their products more sustainable by reducing the emissions caused by use of their products. This will inevitably impact the business practices directly, making it vital for companies to take all three scopes into consideration for their long-term strategy.

5.1 Introduction

The growing awareness of climate change is putting pressure on companies to disclose their carbon emissions and targets. As a result, there has been a steady increase in the number of firms disclosing their carbon emissions through the CDP, as shown by Figure 5. Furthermore, public- and peer pressure, the TCFD, litigation risks and expected regulation as a result from the Paris Agreement all incentivise boards to include climate risk mitigation on the business agenda. The rise in the number of companies setting a carbon reduction target has therefore a similar pattern, as shown by Figure 6.

As public pressure thus rises and an increasing number of companies set decarbonisation targets, it quickly becomes difficult to distinguish the feasibility of these targets and the quality of business strategies that underpin them. In return, one may argue that the effectiveness of carbon targets across firms vary significantly. As can be seen in Appendix 8.1, the number and type of targets vary significantly across industries. For example, the underlying reasons for companies from the food and beverage industry to set carbon targets may indeed not be relevant for home builders and the ability to reduce emissions are assumed to differ, too. In turn, there is a wide range of reasons for setting targets and the ability of reducing emissions. Therefore, we investigate whether we

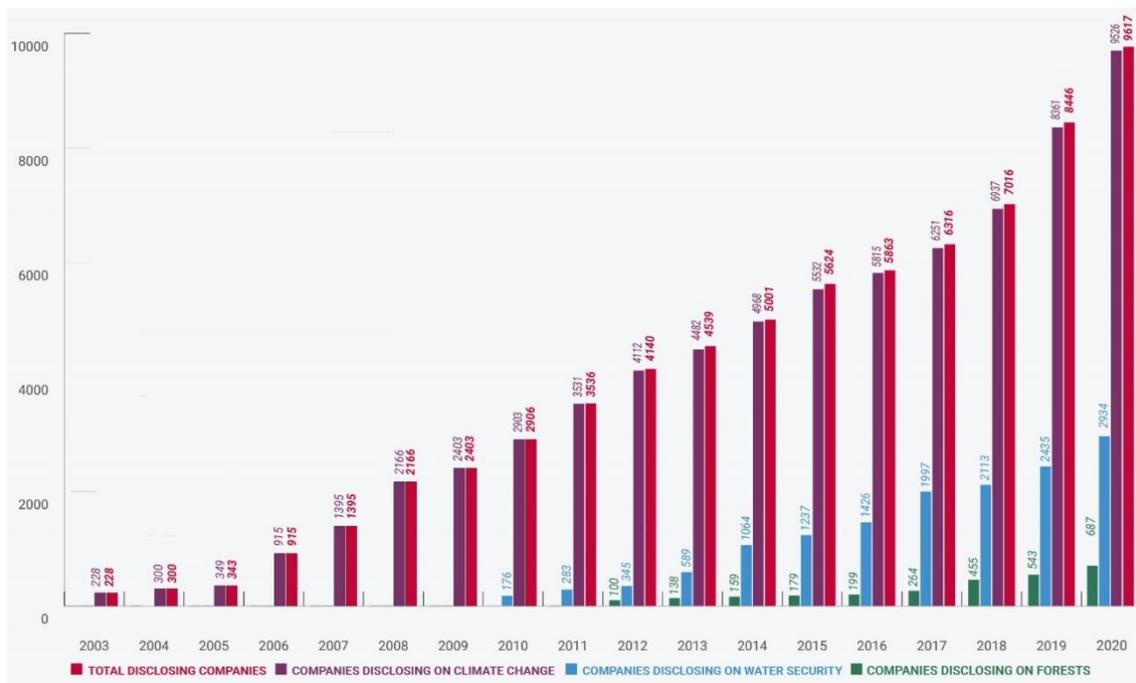


Figure 5: Growth in disclosing companies since 2003 (66).

can quantify the extent to which carbon targets are linked to real emission reduction results, while correcting for certain underlying biases which influence the probability of setting a target in the first place.

This section elaborates on our quantitative assessment of the underlying drivers for corporations and sectors to decarbonise. In our overall cross-sectional analyses, we find a statistically significant link between carbon targets and realised reductions. However, we also show that in-depth expert knowledge is required to fully grasp and evaluate the motivation, aggressiveness, and quality of companies' decarbonisation strategies.

5.2 Approach, results, and discussion

The acceleration of public disclosure and carbon targets shows that companies are

increasingly willing to focus on climate change and how it impacts their business. Although these developments in carbon disclosure and targets, these merely become meaningful if they underpin a decarbonisation strategy that is aligned with its broader business strategy. To significantly reduce carbon emissions, companies will require to rethink how they operate in their value chain. In some cases, this could result in closing down or refitting their factories. In other, simpler cases, it would result in switching to renewable energy in their operations. The level of material change required to reach net-zero varies across sectors and industries and directly influences the ability that management has to steer the company away from polluting business practices.

An example of a company that is willing and able to decarbonise their operations as well as their value chain is Novozymes. Novozymes is a Danish biotechnology company focused on the research and development of biotechnology solutions, which produces industrial enzymes and microorganisms. Its business areas include

EXAMPLES

Two companies that are willing but have limited ability to reduce their carbon footprint without significantly shifting their revenue mix or requiring divestment are Michelin and Ørsted. The former is a leading French tire manufacturer committed to sustainable development and mobility by use of sustainable natural rubber and producing more energy efficient and sustainable tyres. However, achieving net-zero for Michelin requires off-sets, a shift in their revenue mix towards less carbon intensive operations such as services and consultancy, or an overall decline in demand for car tires. Since 2008, Ørsted, a multinational Danish power company, has transformed from an energy company reliant on fossil fuels, such as oil and coal, to a global leader in renewables. The company is committed to providing green energy through energy storage facilities, bioenergy plants and wind and solar farms (43). Although having successfully transformed their business strategy, they have sold their oil and gas assets to competitors, thereby initially limiting the overall impact. As a result, both companies fail to reduce their industries' total emissions in the near term as competitors can take up the foregone market share. However, by producing renewable energy, Ørsted provides a long-term alternative to fossil fuels and thereby helps reduce global emissions while gaining market share.

A company that is able to decarbonise but was unwilling to do so initially is CLP Holdings, which is a Hong Kong listed Power Generation and Distribution company. The company generates 51% of its power from coal, but intends to close these plants down over time to align with the Paris Agreement. However, in 2019, they were also considering building two new coal plants in Vietnam. Based on Kempen estimations these would emit around 1 billion tonnes of CO₂ over their lifetimes. Hence, Kempen's Infrastructure team started engaging directly with the company to prevent these investment from happening. Consequently, in December 2019, the company announced no new coal plants would be built by CLP. The company also committed to strengthening its Climate Vision 2050 targets every 5 years.

agriculture, bioenergy, biopharma, food and beverage, household care, leather, pulp and paper, textile and wastewater solutions. Their products help client reduce their carbon footprint and become more productive, while using less natural resources than when using conventional techniques. For example, their biosolutions can increase productivity and lower environmental impact of crop yields (41). The company has been investing heavily to continuously improve its productivity and reduce the impact of its production processes on climate and natural resources like energy and water. Their climate targets are validated by the Science Based Targets initiative and they strongly support the TCFD recommendations. They also joined the RE100 coalition and have committed to 100% renewable electricity by 2030 (42).

Varying levels of ambition and ability to decarbonise are not limited to individual companies but also across industries. While the biotechnology industry finds impactful innovations for reducing clients' environmental footprint, the marine industry is severely lagging. Self-regulation in the industry has proven counterproductive for years and despite goals set, total GHG emissions may rise by 30% by 2050 (44).

It may be assumed that firms with a higher level of ambition, and thus also willingness, are more inclined to have ambitious targets and report on their emissions. Additionally, firms that

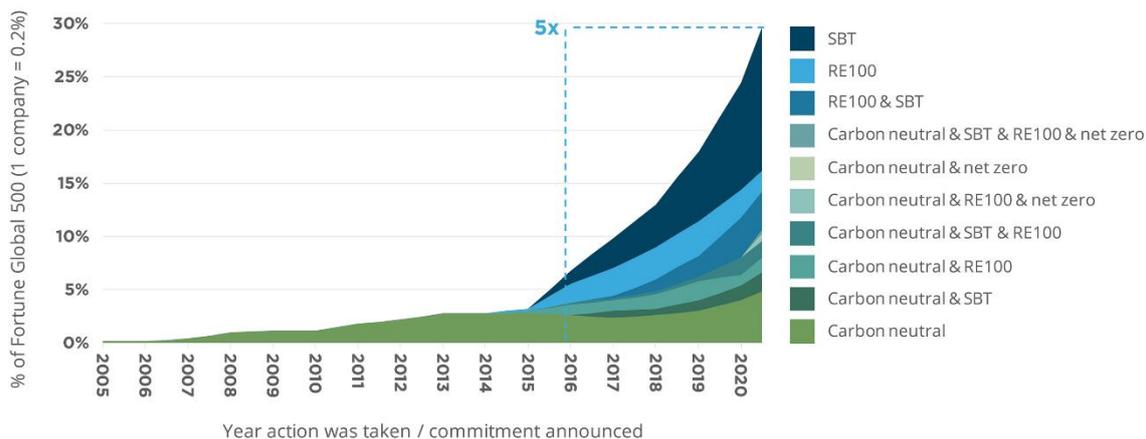


Figure 6: Percentage of Fortune Global 500 companies that have made a public commitment that they are, or will be by 2030: carbon neutral, meeting an RE100, SBT or net-zero target (64).

rely on their brand-name and risk facing public scrutiny, such as Unilever and L’Oréal, may be more inclined to report on and target a reduction of their emissions. Conversely, firms that have a significantly high barrier to decrease emissions may for the same reasons be less inclined to be transparent on their carbon emissions and also less inclined to set ambitious targets. The interaction between the willingness and ability of a company to decrease emissions and align the business strategy with a meaningful decarbonisation strategy, in turn, influences the probability of a company reporting on their

emissions and setting ambitious targets. Firms expecting to be able to reduce their emissions meaningfully with relative ease are expected to have ambitious targets in place with relatively short time-horizons to achieving net-zero. As a result, data on carbon emissions, targets, and environmental performance⁷, are assumed to be biased towards well-performing companies and may paint a picture that is too optimistic.

In an attempt to quantitatively assess the effectiveness of carbon targets on the actual reduction size of emissions, we collaborate with the Erasmus School of Economics and analyse the

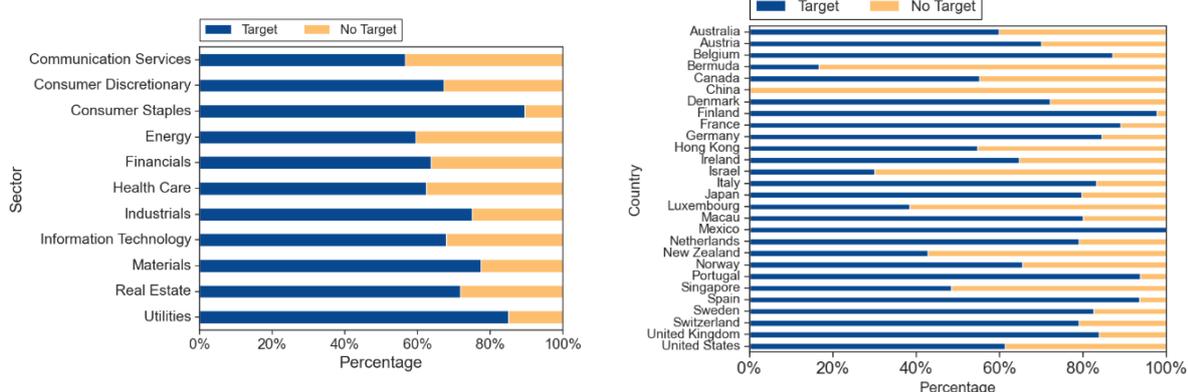


Figure 7: The LHS shows the percentage of firms having a target in a given year for each of the 11 GICS sectors and The RHS shows the percentage of firms having a target in a given year for each of the 28 countries. The data consists of our sample set of the MSCI World Index constituents in the period between 2015 and 2018. The data are obtained from the MSCI ESG Manager and FactSet.

⁷ Environmental Performance is defined as the yearly fraction of absolute CO₂ emissions compared to its base year and is therefore bounded between zero and infinity. Lower is better.

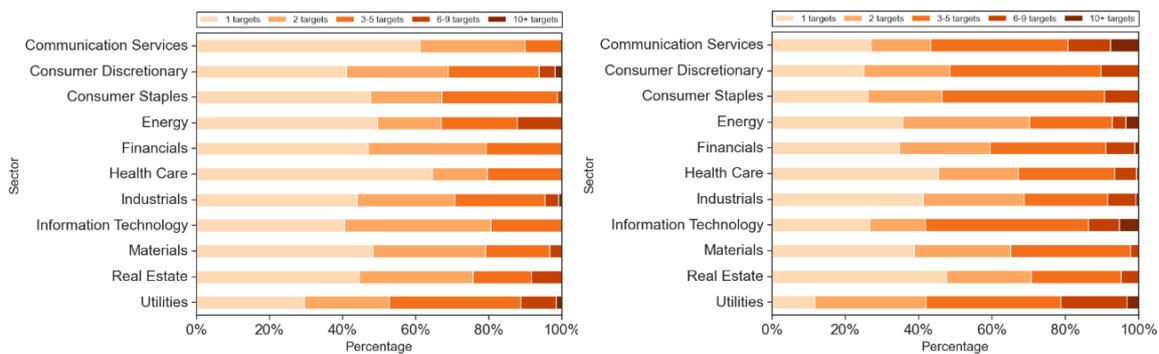


Figure 8: The LHS shows the percentage of firms having one or more intensity targets in a given year for each of the 11 GICS sectors. The RHS shows the percentage of firms having one or more absolute targets in a given year for each of the 11 GICS sectors. The data consists of our sample set of the MSCI World Index constituents in the period between 2015 and 2018. The data are obtained from the MSCI ESG Manager.

current state of self-disclosure of carbon emissions and companies' decarbonisation strategies (45). Building upon the work of Dahlmann et al. (2019) (46), we combine self-disclosed data on climate change targets with historical carbon emissions data for MSCI World constituents. The research aims to determine whether climate change targets affect a firm's environmental performance. Moreover, we examine the influence of the target characteristics *Type*, *Scope*, *Reduction Size*, and *Time Horizon* on emissions reductions. The sample of companies we consider for this research are the holdings of the MSCI World Index 2015, with a sample period between 2015 up to and including 2019. The data are obtained from the MSCI ESG Manager and FactSet.

The MSCI World Index 2015 captures large and mid-cap holdings across 11 GICS⁸ sectors and 28 developed markets countries. The reason for which we choose this data set is two-fold. First, by selecting a fixed set of companies we mitigate forward-looking bias, as there are no companies added or excluded over time. Secondly, focusing on these constituents enables us to perform a firm-year level analysis for four consecutive years of carbon data.

In our preliminary data analysis, we observe differences in the percentage of carbon targets set across the 11 GICS sectors and across countries that constitute the MSCI World index. The LHS of Figure 7 shows the percentage of firms having a target in a given year per GICS sector, where a distinction is made between firms having any carbon target and firms having no target in any given year. Similarly, the RHS of Figure 7 shows for each of the 28 countries, the percentage of firms having a target in any given year. From this figure, we deduce the percentage of firms having a target differs across sectors, which is expected from the standpoint of willingness and ability. Across countries, we observe a larger spread in the percentage of firms having a target, which can be attributed to the varying number of companies per country, as well as a concentration of certain sectors within each respective geography.

We further investigate various target characteristics by use of CDP questionnaire data. We base the definitions of target characteristics on the works of from Dahlmann et al. (2019) and Watanabe and Baker (2020) (46; 47). These include *Type*, *Scope*, *Reduction Size* and *Time Horizon*. The first characteristic, *Target Type*,

⁸ GICS refers to the Global Industry Classification Standard

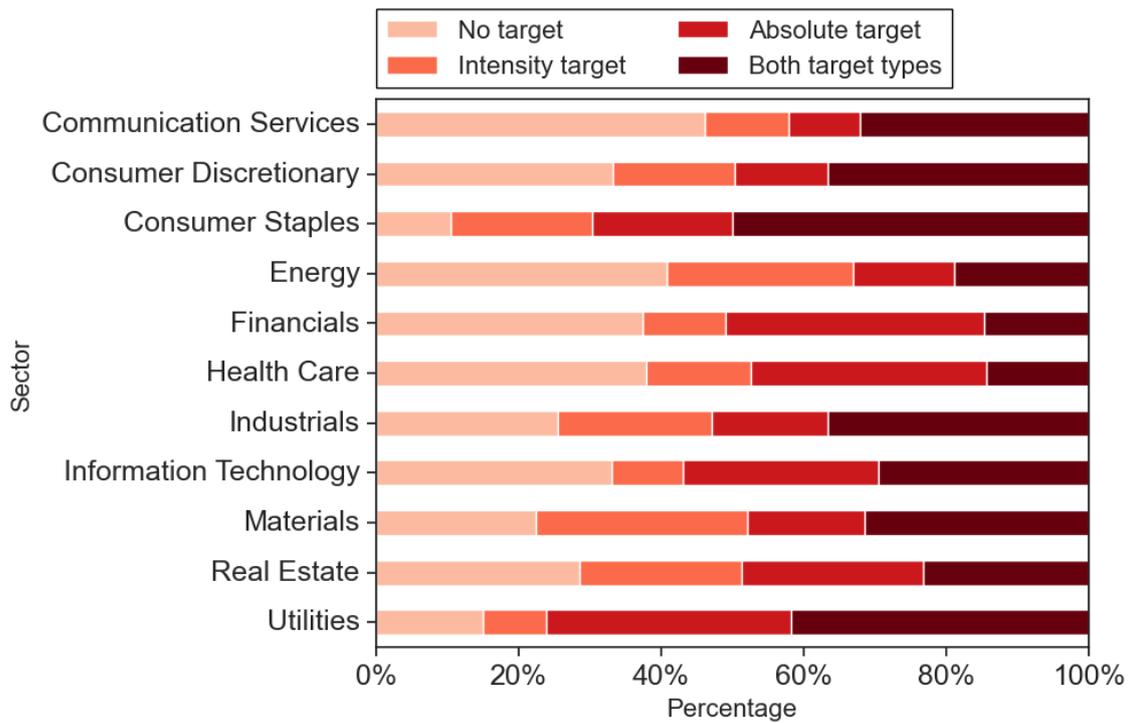


Figure 9: Visualisation of the target characteristic Type. The figure shows the percentage of firms' Target Type in a given year for each of the 11 sectors. Besides the possibility of having no target, a firm can have (an) intensity target(s), (an) absolute Target(s) and both (an) absolute and (an) intensity target(s). The data consists of our sample set of MSCI World Index constituents between 2015 and 2018). The data are obtained from the MSCI ESG Manager, ISS, and FactSet.

indicates whether the target(s) of a firm in a specific year focus on absolute emissions, on carbon intensity, or on both absolute and intensity. Absolute reductions refer to a real reduction in emissions and thus require the total amount of carbon emitted into the atmosphere to be reduced. On the other hand, an intensity reduction is based on the economic output indicator *Sales* and could be achieved even if a company increased its *Sales* and kept its actual emissions flat. This is because, in our case, it refers to the total emissions over a given period in CO₂e, where carbon intensity can then be calculated by dividing emissions by total revenues. Figure 9 visualises this characteristic through the distribution of each Type across sectors. Here, we again observe noticeable differences across sectors. For instance, the sector Consumer Staples has a notable fraction of absolute targets, whereas the sectors Energy,

Industrials and Materials have mostly intensity targets. For companies from these latter sectors where the linkage between sales and carbon emissions is relatively higher, intensity targets might be a preferred choice, whereas for sectors with a relatively lower linkage between sales and carbon emissions, such as Consumer Staples, the ability to meet absolute targets is comparable to the ability to meet intensity targets. This linkage stems from the fact that the former sectors emit significantly more carbon due to their physical operations, whereas the latter sector emits mainly through the use of electricity in their direct operations.

In addition, the *Number of Absolute Targets* and the *Number of Intensity Targets* are of interest. Figure 8 summarises the features of the *Number of Intensity Targets*. The LHS of this figure reveals most firms have only one intensity target in any given year, such as Health Care. The RHS

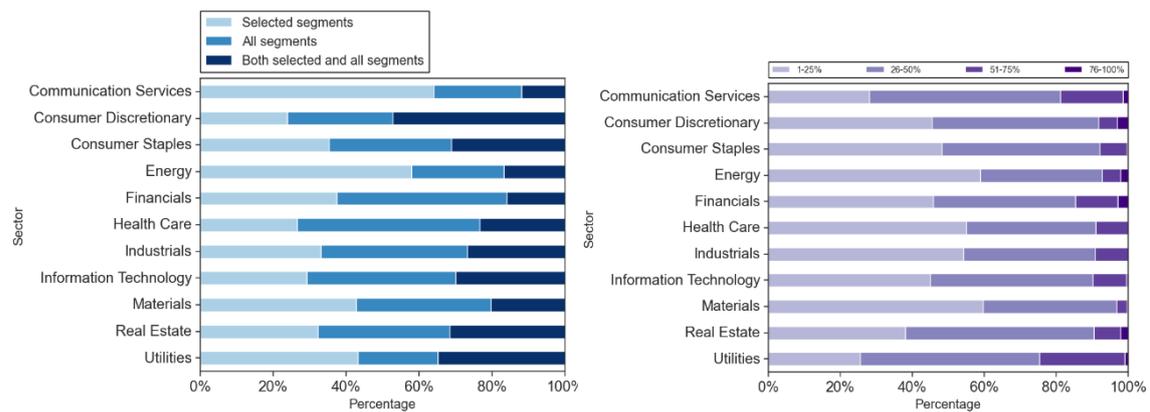


Figure 10: Visualisations of target characteristics *Scope* and *Size*, respectively. The LHS shows the percentage of firms having carbon targets covering selected and/or all business segments in a given year for each of the 11 GICS sectors. The RHS shows the distribution of the reduction sizes of firm-level carbon targets for each of the 11 GICS sectors. The data consists of our sample set of the MSCI World Index constituents in the period between 2015 and 2018. The data are obtained from the MSCI ESG Manager.

indicates that there are relatively more absolute targets per sector than intensity targets.

The factor *Target Scope* indicates whether the target(s) in a given year cover(s) selected segments, all segments, or both selected and all segments in the case that a firm has multiple targets in place. The LHS of Figure 10 displays the target characteristic *Scope*. Both the Communication Services sector and the Energy sector have a relatively high percentage firms with a focus on selected divisions within their business, whereas in the Financials and Information Technology sectors most firms focus on all divisions of the respective firms.

Third, *Reduction Size* is defined as the mean percentage reduction in carbon emissions of all targets in a given year that is aimed to be achieved within the given time horizon, relative to its baseline year. From Figure 10 we deduce that on average, most firms have a *Target Reduction Size* between 1% and 25%, while the smallest part of firms has a *Target Reduction Size* between 76% and 100%. This stems from the fact that most firms have a short and/or medium-term target during

which relatively small reductions can be achieved as shown in Figure 11.

Indeed, this figure visualises the final factor *Target Time Horizon*, which indicates the number of years that a target is given to be achieved. In this analysis, the factor is calculated as the mean target period in years for all targets in a given year for a given company.

From our preliminary analysis, we observe large differences in the factors that describe the carbon targets within our dataset. We argue that, apart from variation across sectors, we find significant variation in ambition and ability levels of decarbonisation based on financial metrics⁹. Inevitably, firms that are better able to finance their transition to a low-carbon economy may be more inclined to and vice versa.

We select financial explanatory variables based on financial literature. Brammer and Pavelin (2008) find high-quality disclosure to be

⁹ This has been shown in our collaboration with the Erasmus School of Economics, Erasmus University Rotterdam and can be shared upon request.

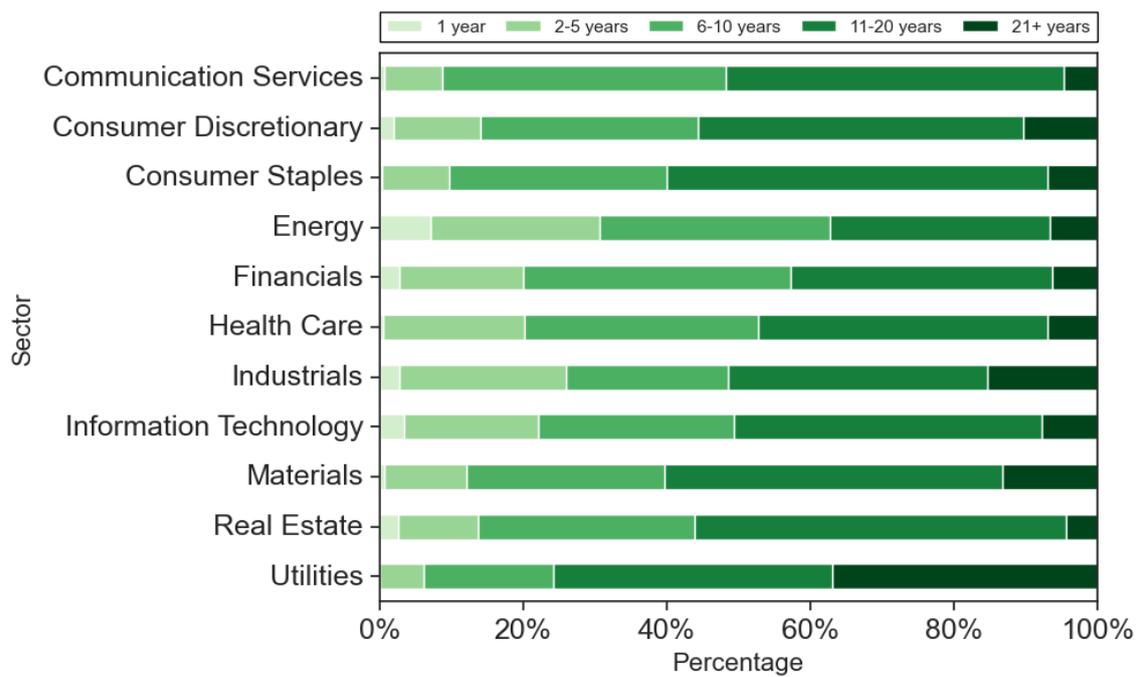


Figure 11: Visualisation of the target characteristic Horizon. The figure shows the distribution of the carbon target horizons for each of the 11 GICS sectors. The data consists of our sample set of the MSCI World Index constituents in the period between 2015 and 2018. The data are obtained from the MSCI ESG Manager.

primarily associated with larger firms and those in sectors most closely related to environmental concerns (48). Furthermore, Darnall et al. (2010) show that smaller firms are more responsive to value-chain, internal, and regulatory stakeholder pressures and that the relationship between stakeholder pressures and environmental strategy tends to vary with company size (49). Therefore, we include *Size*, defined as the natural logarithm of market capitalisation as a control variable. Secondly, we include *Leverage*, defined as the ratio of total debt divided by total assets, as Clarkson et al. (2008) find that debt holders exercise pressure on firms to disclose environmental-related matters to assess potential future liabilities (50). For this factor, we would therefore expect a positive covariance with the probability of setting a carbon target. Thirdly, we deduce from research by Berrone and Gomez-Mejia (2009), Cordeiro and Sarkis (2008), and

Pinkse and Busch (2013) that *R&D Intensity*, defined as the ratio of R&D expenses to total assets, has a positive significant correlation with environmental responsiveness (46; 51; 52; 53). In addition, we include *ROTA*, defined as the ratio of net income to total assets, as, among others, Bewley and Li (2000) and Luo et al. (2012) show there is a positive relationship between profitability and voluntary disclosure (54; 55).

Financial strength, geographic location, and sector play a major role in firms' ability to reduce carbon targets. Hence, we hypothesise that these factors directly bias the probability of setting a target. Sector-adjusted Carbon Intensity, defined as the standardised carbon intensity¹⁰ corrected for its sector average, is included as a key independent variable based on Dahlmann et al. (2019) (46). Finally, as pressure to set targets mounts over time, the year in which a target may or may not be set influences this probability too.

¹⁰ Carbon intensity is defined as the ratio of total Scope 1 & 2 CO₂ emissions to total revenues

Table 1: Regression results of the logit model to predict the probability that a company has a target in a given year, applied in stage 1 of the two-stage Heckman (1979) approach (56). The dependent variable is the binary variable of having any target in a given year. The data are obtained from the MSCI ESG Manager, ISS and FactSet.

DV: Probability any target	1		
	$\hat{\beta}$	Std. Err	Sig
Constant	-2.509	0.193	0.00***
Firm Size	1.082	0.053	0.00***
R&D intensity	0.227	0.061	0.00***
Leverage	0.172	0.045	0.00***
ROTA	0.124	0.083	0.14
Ind-adj. Carbon Intensity	0.007	0.025	0.77
Sector	Yes		
Country	Yes		
Year	Yes		
Observations	4488		
df Residuals	4442		
% Correctly classified	70.06%		
McFadden's R^2	0.223		

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

More specifically, we hypothesise that more recent years are linked with a higher probability of setting a target.

In an attempt to quantify the linkage between carbon targets and the realised reduction in carbon emissions, we first need to correct for the self-selection biases that are caused by the abovementioned factors. In other words, we analyse various financial and categorical metrics on the probability of setting a target in the first place. By estimating this probability, we can correct for these factors when quantifying the covariation between the environmental performance of firms with their carbon targets. The methodology employed for this purpose is the so-called Two-Stage Heckman (56) approach, similar to Dahmann et al (2019) (46).

In the first stage, the likelihood of firms having any kind of climate change target is estimated through a binary logit model, for which the results can be found in Table 1. The table shows a significant relationship between most

selected financial factors and our qualitative factors sector and country. Moreover, the model shows a relatively good fit given the high variance in our data. Therefore, it is able to capture a portion of self-selection bias for setting carbon targets.

Subsequently, we use the obtained estimated probabilities of whether firms are likely to have a climate change target as a key explanatory variable in a linear regression model, which constitutes step two of the Two-Stage Heckman (56) approach. The model is pooled, as this research considers firm-year level observations and the model is unbalanced because not all firms has data for every year in our sample.

We employ a variety of combinations of climate target characteristics as explanatory variables in seven models. With this set-up, we can test whether a specific characteristic is linked to subsequent changes in emissions. To test for *Target Type*, we formulate three models. One model contains the numerical explanatory variable Target Type, where 1 = no target, 2 =

intensity target(s) only, 3 = absolute target(s) only, 4 = both intensity and absolute targets in place. The second model has two binary variables, one for having (an) intensity target(s) and one for having (an) absolute target(s). The last model focuses on the number of targets by adding two numerical variables, one for the number of intensity targets and one for the number of absolute targets. To examine the effects of *Target Scope*, a model is added that implements two binary variables, namely one that indicates the presence of targets focusing on all segments and one that indicates the presence of targets focusing on selected segments. Lastly, the numerical variables *Reduction Size* and *Time Horizon* are considered in two separate models as the standardised mean percent reduction targeted and the mean target period length in years, respectively.

Additionally, the predicted probabilities are taken as an explanatory variable for seven different linear regression models in stage two. This variable can be interpreted as the explanatory variable of having a target at all, to a certain extent corrected for self-selection bias in step 1. Moreover, all models contain the financial control variables *Firm Size*, *ROTA*, *Leverage*, *R&D Intensity*, and the categorical variables *Sector*, *Country*, and *Year*.

Regression results are summarised in Table 2. Most importantly, we observe a statistically significant and negative coefficient for the probability of having a target, indicating that having a target at all can be associated with a reduction in absolute carbon emissions. To reiterate, *Environmental Performance* is defined as the yearly fraction of absolute CO₂ emissions compared to its base year, thus lower is better

and a negative coefficient can be interpreted as being associated with a reduction in absolute carbon emissions. Moreover, Model 2 shows that having an absolute target or having both an intensity and absolute target is positively associated with a larger reduction in emissions than having just an intensity target or no target. Similarly, Model 5 indicates that having a wide Scope has a significantly positive relationship with absolute reductions. Finally, the same can be concluded for having longer time horizons, on average.

Collectively, one may reject the hypotheses of targets and their specific characteristics having no effect on the absolute reduction in carbon emissions. Intuitively, this should make sense, as one would expect that target with a high level of ambition stem from having an emission reduction strategy in place, in turn causing a gradual improvement in firm-level emissions. It is important to note that the link between carbon targets and their characteristics and reduction of carbon emissions does not necessarily imply a causal structure. The ability of reducing carbon emissions may be the prime source of setting a target in the first place. A carbon target can by itself underpin the decarbonisation strategy, and therefore constitutes a result. Setting a carbon target can also incentivise companies to prioritise decarbonisation on their business agenda, in which case the target may have a causal role.

However, in further analysis, where we repeat this process separately for each sector, we

find less conclusive evidence.¹¹ More specifically, the limited number of observations per sector and the heteroskedastic nature of the data causes the observations to contain a signal-to-variance ratio that is too low for finding any meaningful statistical significance. It becomes clear that sector-specific latent variables need to be identified to describe the level of willingness and ability of setting carbon targets and the effectiveness of the overarching decarbonisation strategies of companies.

Having just carbon targets in place is not enough to convincingly and structurally shift to net-zero. Furthermore, decarbonisation of firms is not linear. For example, factories that are expected to be shut down in the future may cause a sudden sharp drop in emissions at that specific moment in time.

¹¹ This has been shown in our collaboration with the Erasmus University Rotterdam and can be shared upon request.

Table 2: Regression results of the linear regression models, applied in stage 2 of the two-stage Heckman (1979) approach (56), to determine the relationships between corporate climate change targets (characteristics) and changes in Environmental Performance. The models determine the relationship of the Probability of Any Target (Model 1), Target Type (Model 2 and 3), Number of Targets (Model 4), Target Scope (Model 5), Target Reduction Size (Model 6) and Target Time Horizon (Model 7) and Environmental Performance. The control variables are Firm Size, defined by the natural logarithm of Market Cap, Z-scores of R&D Intensity, Leverage and ROTA, and binary variables of Sector, Country and Year. Standard errors are White standard errors. The data consists of our sample set of MSCI World Index 2015 companies in the period between 2015 and 2018. The data are obtained from the MSCI ESG Manager, ISS and FactSet.

DV: % Change in emissions	1			2			3			4		
	$\hat{\beta}$	Std.Err	Sig	$\hat{\beta}$	Std.Err	Sig	$\hat{\beta}$	Std.Err	Sig	$\hat{\beta}$	Std.Err	Sig
Constant	-0.031	0.018	0.08*	-0.022	0.018	0.23	-0.033	0.018	0.07*	-0.033	0.018	0.07*
Firm Size	0.002	0.007	0.73	0.005	0.007	0.48	0.005	0.007	0.47	0.005	0.007	0.45
ROTA	0.016	0.007	0.03**	0.015	0.007	0.05*	0.015	0.007	0.05*	0.015	0.008	0.05*
Leverage	0.013	0.005	0.01**	0.014	0.005	0.00***	0.014	0.005	0.00***	0.014	0.005	0.00***
R&D Intensity	0.005	0.005	0.29	0.005	0.005	0.28	0.005	0.005	0.27	0.005	0.005	0.27
Probability of Any Target	-0.076	0.040	0.06*	-0.056	0.041	0.17	-0.056	0.041	0.17	-0.075	0.041	0.07*
Target Type				-0.012	0.041	0.00***						
Intensity Target							-0.016	0.007	0.03**			
Absolute Target							-0.022	0.008	0.01**			
Number of Intensity Targets										-0.004	0.002	0.04**
Number of Absolute Targets										-0.003	0.002	0.20
Sector	Yes			Yes			Yes			Yes		
Country	Yes			Yes			Yes			Yes		
Year	Yes			Yes			Yes			Yes		
Observations	4488			4392			4392			4392		
df Residuals	4442			4345			4344			4344		
R ²	0.020			0.023			0.023			0.021		

DV: % Change in emissions	5			6			7		
	$\hat{\beta}$	Std.Err	Sig	$\hat{\beta}$	Std.Err	Sig	$\hat{\beta}$	Std.Err	Sig
Constant	-0.037	0.019	0.05*	-0.041	0.019	0.03**	-0.033	0.018	0.06
Firm Size	0.000	0.007	1.00	0.003	0.007	0.66	0.003	0.007	0.62
ROTA	0.015	0.008	0.07*	0.015	0.007	0.04**	0.015	0.007	0.04**
Leverage	0.012	0.005	0.02**	0.013	0.005	0.01**	0.014	0.005	0.00***
R&D Intensity	0.008	0.005	0.10	0.005	0.005	0.30	0.005	0.005	0.31
Probability of Any Target	-0.035	0.044	0.43	-0.065	0.040	0.11	-0.062	0.040	0.12
Scope All Segments	-0.023	0.008	0.00***						
Scope Selected Segments	-0.009	0.008	0.24						
Mean % Reduction Targeted				-0.007	0.005	0.13			
Mean Target Period Length							-0.001	0.000	0.01**
Sector	Yes			Yes			Yes		
Country	Yes			Yes			Yes		
Year	Yes			Yes			Yes		
Observations	3790			4481			4488		
df Residuals	3742			4434			4441		
R ²	0.023			0.021			0.022		

*p < 0.1; **p < 0.05; ***p < 0.01.

6. What's next?

The ability and willingness of companies to achieve meaningful reductions within a reasonable time frame for which they set ambitious targets depends on latent variables which vary significantly across industries and cannot easily be captured by a generic model. Designing and implementing a sustainable decarbonisation strategy that aligns with the Paris Agreement or transforms the broader business strategy requires the willingness to change, sufficient resources, a long-term strategy and specialist knowledge.

To achieve net-zero while maintaining or even improving their competitive positioning, companies need to rewire their decision-making process for future investments and business strategy. Shifting to renewable energy use, developing operational protocols, launching operational incentive programs and investing in low-carbon projects will all reduce a company's own carbon footprint.

Reducing Scope 1 and Scope 2 emissions will, however, not be sufficient. Even for companies that have set a science-based target, net-zero commitment is not a given as can be seen from Figure 11 in Appendix 8.2. As suggested by the Science-Based Targets initiative, companies that aim to achieve net-zero and leave a meaningful impact need to innovate on their business model, by setting a price on carbon, increasing product lifespans, increasing logistical efficiency and consider shifting toward product-service systems.

Finding alternative suppliers with lower carbon footprints may also incentivise suppliers

with larger footprints to decarbonise. Shifting to low-carbon alternatives may be a solution for some too, but this is in many cases not yet feasible.

Companies can also engage with their own customers, through education, collaboration or compensation. Indirectly through regulation or through marketing and choice architecture designs can also influence customers to reduce their footprint (57). The level of materiality and impact that a company can have on its value chain through focusing on either up- or down-stream Scope 3 emissions depend heavily on the type of industry, as shown in Figure 12 in Appendix 8.2.

Furthermore, they need to engage with their suppliers to reduce their emissions. Identifying key suppliers to engage and maintain a collaboration via two-way communication channels, monitor progress regularly, and create incentives for action benefits both suppliers and customers and may reduce Scope 3 emissions.

We already see an acceleration in the extent to which companies are able to measure their Scope 3 emissions, with guidance given by the Greenhouse Gas Protocol (58) whose Scope 3 Standard is the only internationally accepted method for companies to account for these types of value chain emissions. Furthermore, well-known ESG data providers such as MSCI, ISS, and Sustainalytics are increasingly able to provide a more granular assessment methodology for Scope 3. Measuring Scope 3 emissions, however, remains a complex task and requires expert knowledge and experience to translate the data into meaningful strategic decisions.

Active investors are in a good position to assess the quality and ambitiousness firms' climate goals, as a sustainable decarbonisation strategy is inevitably interwoven with business strategy. Engaging with firms to design such a strategy and set targets accordingly is another role that investors can play.

For enabling thorough and comparable assessments, more, unbiased, and standardised data are required. This data can not only be used to monitor improvements and actions taken by companies that set carbon targets, it has many indirect advantages. First, leaders can show how they were able to achieve emission reductions, from which others can learn. Second, investors can learn more about the bottlenecks that companies face when attempting to decarbonise and continue their dialogue with the respective portfolio companies. Third, it supports effective communication among stakeholders and enables more informed decision making, reduces the perceived risks involved in decarbonising, and motivates stakeholders to drive positive change.

International cooperation, effective regulation, and rethinking our status quo are all required transition to a net-zero economy. The interdependency between governments, companies, investors and individuals therefore makes fighting climate change everyone's business.

KEMPEN

SUSTAINABLE EQUITY

The Kempen Sustainable Equity team seeks attractive, long-term returns by delivering investment alpha while aligning with the Paris Agreement. Furthermore, we aim to have investment portfolios with a carbon intensity of less than 50% of their respective benchmark. This is in accordance with the Paris Aligned Benchmark established by the EU.

We consider both the risks and the opportunities associated with climate change in our investment analyses. In our proprietary ESG scoring methodology, we explicitly assess carbon risk by assigning an exposure and management score. The management score is based on a company's track record, which is determined by examining controversies, current policies and processes, and management's forward-thinking strategy. In our valuation models, the ESG risk score determines a portion of the cost of capital.

In our analysis, we consider firms' current carbon intensity as well as their plans to reduce their carbon intensity. Most companies in our portfolios have set carbon targets for scopes 1 and 2. Not all businesses readily report on Scope 3 or include it in their emission reduction goals. It is critical, in our opinion, that they do so because their entire value chain, including suppliers and end-users of products and services, must achieve net-zero.

Our ESG framework also assesses a company's exposure to potential growth drivers in the transition to net-zero, as well as its ability to capitalise on these drivers based on its business model, incentives, innovation capacity, and strategy. Growth can occur through mitigation, enabling, or adoption.

We intend to maintain a continuous dialogue with all companies in our portfolios to fully understand the company, improve shareholder returns, and drive the company's sustainability. As active long-term investors, we engage in comprehensive engagements with our portfolio companies to unlock value while reducing risk.

Finally, voting is an essential component of responsible investment and active ownership. We vote in the best interests of our clients per our fiduciary duty. Our voting policy is founded on our core values of best-in-class corporate governance.

Please refer to the following resources for further information:

Team: [Sustainable Equity | Kempen](#)

Voting Records: [VDS Dashboard \(issgovernance.com\)](#)

Engagements: [Engagement Factsheets | Kempen](#)

7. Bibliography

1. *Losing earth: The decade we almost stopped climate change*. Rich, Nathaniel. s.l. : New York Times Magazine, 2018, Vol. 1.
2. Dahlman, LuAnn. Climate Change: Annual greenhouse gas index. *Climate.gov*. [Online] 14 08 2020. [Cited: 01 10 2021.] <https://www.climate.gov/news-features/understanding-climate/climate-change-annual-greenhouse-gas-index>.
3. United Nations Environment Programme. Facts about the climate emergency. *UN Environment Programme*. [Online] [Cited: 01 11 2021.] unep.org/explore-topics/climate-action/facts-about-climate-emergency.
4. International Panel on Climate Change. *Sixth Assessment Report*. s.l. : IPCC, 2021.
5. IPCC. *Global Warming of 1.5°C : An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related*. s.l. : Press., 2018.
6. McKinsey & Co. Expanding electric-vehicle adoption despite early growing pains. [Online] 26 08 2019. [Cited: 22 06 2021.] <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/expanding-electric-vehicle-adoption-despite-early-growing-pains>.
7. *The global climate in 2015-2019*. Siegmund, P, et al. 2019, World Meteorological Organization, Geneva, Vol. 24.
8. Hamaker-Taylor, Robin, Bater, Richard and Coudel, Nadine. Voluntary climate disclosures can reduce litigation risk. [Online] 2019. [Cited: 13 06 2021.] <http://www.acclimatise.uk.com/2019/06/13/voluntary-climate-disclosures-can-reduce-litigation-risk/>.
9. *Global trends in climate change litigation: 2020 snapshot*. Setzer, Joana and Byrnes, Rebecca. 2020, Grantham Research Institute for Climate Change and Environment, London School of Economic.
10. Setzer, Joana. Climate litigation against “Carbon Majors”: economic impacts. *OpenGlobalRights*. [Online] 16 07 2019. [Cited: 27 01 2022.] <https://www.openglobalrights.org/climate-litigation-against-carbon-majors-economic-impacts/>.
11. Harrabin, Roger. Shell: Netherlands court orders oil giant to cut emissions. *BBC*. [Online] 26 05 2021. [Cited: 27 01 2022.] <https://www.bbc.com/news/world-europe-57257982>.
12. Environment, Grantham Research Institute on Climate Change and the. About. *Climate Change Laws of the World*. [Online] [Cited: 29 09 2021.] <https://climate-laws.org/about>.
13. U.S. Climate Change Litigation. *Climate Case Chart*. [Online] [Cited: 29 09 2021.] <http://climatecasechart.com/climate-change-litigation/us-climate-change-litigation/>.
14. Setzer, Joana and Higham, Catherine. *Global trends in climate change litigation: 2021 snapshot*. s.l. : Grantham Research Institute on Climate Change and the Environment, 2021.
15. The Economic Times. Definition of Insurability. [Online] [Cited: 29 05 2021.] <https://economictimes.indiatimes.com/definition/insurability>.
16. Supervision, Basel Committee on Banking. *Climate-related risk drivers and their transmission channels*. s.l. : Bank for International Settlements, 2021.
17. CISL. Transition risk framework: Managing the impacts of the low carbon transition on infrastructure investments. [Online] 2019. [Cited: 13 06 2021.] <https://www.cisl.cam.ac.uk/resources/sustainable-finance-publications/transition-risk-framework-managing-the-impacts-of-the-low-carbon-transition-on-infrastructure-investments>.
18. United States. Congress. Senate. Committee on Energy and Natural Resources. *Greenhouse effect and global climate change: hearings before the Committee on Energy and Natural Resources, United States Senate, One Hundredth Congress, first session*. Washington D.C. : Washington [D.C.] : U.S. G.P.O., 1988.
19. United Nations. *United Nations Framework Convention on Climate Change*. 1992.
20. Clark, Duncan. Which nations are most responsible for climate change? *The Guardian*. [Online] The Guardian, 21 04 2011. [Cited: 05 10

- 2021.]
<https://www.theguardian.com/environment/2011/apr/21/countries-responsible-climate-change>.
21. Canada pulls out of Kyoto Protocol. *CBC*. [Online] CBC, 12 2011. [Cited: 05 10 2021.] <https://www.cbc.ca/news/politics/canada-pulls-out-of-kyoto-protocol-1.999072>.
22. United Nations Framework Convention on Climate Change. *Adoption of the Paris Agreement, FCCC/CP/2015/L.9/Rev.1*. Paris : United Nations, 2015.
23. United Nations. 13: Take urgent action to combat climate change and its impacts. *United Nations Department of Economic and Social Affairs - Sustainable Development*. [Online] [Cited: 05 10 2021.] <https://sdgs.un.org/goals/goal13>.
24. UNFCCC. Action on Climate and SDGs. *UNFCCC*. [Online] [Cited: 05 10 2021.] <https://unfccc.int/topics/action-on-climate-and-sdgs/action-on-climate-and-sdgs>.
25. Commission, European. Financing the green transition: The European Green Deal Investment Plan and Just Transition Mechanism. *European Commission*. [Online] 14 01 2020. [Cited: 05 10 2021.] https://ec.europa.eu/commission/presscorner/detail/en/ip_20_17.
26. The Energy and Climate Intelligence Unit. UK to host 2021 UN climate summit, COP26. *Energy and Climate Intelligence Unit*. [Online] [Cited: 22 11 2021.] <https://eciu.net/analysis/briefings/international-perspectives/cop-26>.
27. UNFCCC. Collaboration. *UN Climate Change Conference UK 2021*. [Online] [Cited: 22 11 2021.] <https://ukcop26.org/cop26-goals/collaboration/>.
28. Robeco. Reflections on the COP26 Climate Summit. [Online] 17 11 2021. [Cited: 22 11 2021.] <https://www.robeco.com/nl/visie/2021/11/reflections-on-the-cop26-climate-summit.html>.
29. Energy & Climate Intelligence Unit. Net-zero Tracker. *Energy & Climate Intelligence Unit*. [Online] [Cited: 05 10 2021.] <https://eciu.net/netzerotracker/map>.
30. Cambridge Institute for Sustainability Leadership (CISL). *Rewiring the Economy: Ten tasks, ten years*. Cambridge : Cambridge University, 2015.
31. SBTi. Science Based Targets. *Launching the global net zero standard*. [Online] 28 10 2021. [Cited: 01 11 2021.] <https://sciencebasedtargets.org/events/launching-the-global-net-zero-standard>.
32. CalPERS & Wellington Management. Physical risks of climate change (P-ROCC): a new framework for corporate disclosures. [Online] 2019. [Cited: 13 06 2021.] <https://www.wellington.com/en/physical-risks-of-climate-change-p-rocc/>.
33. CDP. Major risk or rosy opportunity: Are companies ready for climate change? [Online] 2018. [Cited: 13 06 2021.] <https://www.cdp.net/en/research/global-reports/global-climate-change-report-2018/climate-report-risks-and-opportunities>.
34. Woetsel, J., et al. Climate risk and response: physical hazards and socioeconomic impacts. [Online] 2020. [Cited: 13 06 2021.] <https://www.mckinsey.com/business-functions/sustainability/our-insights/climate-risk-and-response-physical-hazards-and-socioeconomic-impacts>.
35. van Veelen, Bregje, et al. *Climate Innovations in Finance*. 2018.
36. Focusing Capital on the Long Term (FCLT). *Climate Transition Conversation Guide*. 2021.
37. *Social impacts of climate change mitigation policies and their implications for inequality*. Markkanen, Sanna and Anger-Kraavi, Annela. 7, s.l. : Taylor & Francis, 2019, Climate Policy, Vol. 19, pp. 824-844.
38. World Population Review. Developed Countries List. *World Population Review*. [Online] [Cited: 22 11 2021.] <https://worldpopulationreview.com/country-rankings/developed-countries>.
39. den Elzen, Michiel G. J., et al. Countries' contributions to climate change: effect of accounting for all greenhouse gases, recent trends, basic needs and technological progress. *PBL Netherlands Environmental Assessment Agency*. [Online] 10 2013. [Cited: 22 11 2021.] <https://www.pbl.nl/en/publications/countries-contributions-to-climate-change>.
40. Evans, Simon. Analysis: Which countries are historically responsible for climate change? *Carbon Brief*. [Online] 05 10 2021. [Cited: 22 11 2021.] <https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change>.
41. Novozymes. More from one acre. *Novozymes*. [Online] 07 03 2017. [Cited: 23 11 2021.]

- <https://www.novozymes.com/en/news/news-archive/2017/03/more-from-one-acre-new-report>.
42. —. Sustainability: Novozymes' ESG Ratings and Rankings. *Novozymes*. [Online] [Cited: 23 11 2021.] <https://www.novozymes.com/en/about-us/sustainability/awards-recognitions>.
43. Ørsted. Reports, presentations and fact sheets. *Ørsted*. [Online] [Cited: 25 11 2021.] <https://orsted.com/en/investors/ir-material/financial-reports-and-presentations#financial-reports-presentations-and-fact-sheets-2021>.
44. Apuzzo, Matt and Hurtes, Sarah. Tasked to Fight Climate Change, a Secretive U.N. Agency Does the Opposite. *New York Times*. [Online] 03 06 2021. [Cited: 07 06 2021.] <https://www.nytimes.com/2021/06/03/world/europe/climate-change-un-international-maritime-organization.html>.
45. *Quantifying the impact of companies' climate change targets on their environmental performance: a sector-specific analysis*. Dumoulin, Anne. Rotterdam : Erasmus School of Economics - Erasmus University Rotterdam, 2021.
46. *Managing carbon aspirations: The influence of corporate climate change targets on environmental performance*. Dahlmann, Frederik, Branicki, Layla and Brammer, Stephen. 1, s.l. : Springer, 2019, Vol. 158.
47. *Breaking down corporate carbon targets, a guide on assessing companies' carbon emission reduction targets*. Watanabe, K and Baker, B. s.l. : MSCI ESG Research Insights, 2020.
48. *Factors influencing the quality of corporate environmental disclosure*. Brammer, Stephen and Pavelin, Stephen. 2, s.l. : Wiley Online Library, 2008, Business strategy and the environment, Vol. 17, pp. 120-136.
49. *Adopting proactive environmental strategy: The influence of stakeholders and firm size*. Darnall, Nicole, Henriques, Irene and Sadorsky, Perry. 6, s.l. : Wiley Online Library, 2010, Journal of management studies, Vol. 47, pp. 1072-1094.
50. *Revisiting the relation between environmental*. Clarkson, Peter M, et al. 4-5, s.l. : Elsevier, 2008, Vol. 33, pp. 303-327.
51. *Environmental performance and executive compensation: An integrated agency-institutional perspective*. Berrone, P. and Gomez-Mejia, L. R. 2009, Academy of Management Journal, Vol. 52, pp. 103-126.
52. *Does explicit contracting effectively link CEO compensation to environmental performance?* Cordeiro, J. J. and Sarkis, J. 2008, Business Strategy and the Environment, Vol. 17, pp. 304-317.
53. *The emergence of corporate carbon norms: Strategic directions and managerial implications*. Pinkse, J. and Busch, T. 2013, Thunderbird International Business Review, Vol. 55, pp. 633-645.
54. *Disclosure of environmental information by canadian manufacturing companies: A voluntary disclosure perspective*. Bewley, K. and Li, Y. s.l. : Emerald Group Publishing Limited, 2000, Advances in Environmental Accounting and Management.
55. *Corporate incentives to disclose carbon information: Evidence from the CDP Global 500 report*. Luo, Le, Lan, Yi-Chen and Tang, Qingliang. 2, s.l. : Wiley Online Library, 2012, Journal of International Financial Management & Accounting, Vol. 23, pp. 93-120.
56. *Sample selection bias as a specification error*. Heckman, James. s.l. : JSTOR, 1979, Econometrica: Journal of the econometric society, pp. 153-161.
57. Science Based Target initiative. *Best Practices in Scope 3 Greenhouse Gas Management*. 2018.
58. GHG Protocol. Scope 3 Calculation Guidance. *Greenhouse Gas Protocol*. [Online] [Cited: 04 02 2022.] <https://ghgprotocol.org/scope-3-technical-calculation-guidance>.
59. CDP. <https://www.cdp.net/en/articles/media/new-report-shows-just-100-companies-are-source-of-over-70-of-emissions>. CDP. [Online] 10 07 2017. [Cited: 29 09 2021.] <https://www.cdp.net/en/articles/media/new-report-shows-just-100-companies-are-source-of-over-70-of-emissions>.
60. Seneviratne, Sonia, et al. Changes in climate extremes and their impacts on the natural physical environment. [ed.] Cambridge University Press. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. Cambridge : Intergovernmental Panel on Climate Change (IPCC), 2012, pp. 109-230.
61. UNDRR. Sendai Framework for Disaster Risk Reduction 2015-2030. *United Nations Office for Disaster Risk Reduction*. [Online] [Cited: 05 10 2021.] <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>.

62. Farsan, Alexander, et al. *Value Change in the Value Chain: Best Practices in Scope 3 Greenhouse Gas Management*. s.l. : Science Based Targets; Gold Standard; Nagivant, 2018.
63. United Nations Climate Change. Paris Agreement - Status of Ratification. [Online] [Cited: 13 06 2021.] <https://unfccc.int/process/the-paris-agreement/status-of-ratification>.
64. Natural Capital Partners. Response Required. *Natural Capital Partners*. [Online] [Cited: 15 11 2021.] <https://www.naturalcapitalpartners.com/insights/response-required>.
65. DW. Net-zero by 2050: What does it mean? *DW*. [Online] 31 05 2019. [Cited: 01 11 2021.] <https://www.dw.com/en/net-zero-by-2050-what-does-it-mean/a-48958487>.
66. CDP. Mainstreaming Transparency. *CDP*. [Online] [Cited: 14 10 2021.] <https://www.cdp.net/en/companies/companies-scores>.
67. CE Delft; COWI. *Development of a methodology to assess the 'green' impacts of investment in the maritime sector and projects*. s.l. : European Union, 2021.
68. Global Maritime Forum. *The First Wave – A blueprint for commercial-scale zero-emission shipping pilots*. Copenhagen : Energy Transitions Commission, 2020.
69. Client Earth. What is a carbon sink? *Client Earth*. [Online] 22 12 2020. [Cited: 25 11 2021.] <https://www.clientearth.org/latest/latest-updates/stories/what-is-a-carbon-sink/>.
70. PwC. Beyond compliance: Consumers and employees want business to do more on ESG. *PwC*. [Online] 2021. [Cited: 27 01 2022.] <https://www.pwc.com/us/en/services/consulting/library/consumer-intelligence-series/consumer-and-employee-esg-expectations.html>.
71. Carbon Brief and Duncan Clark. How long do greenhouse gases stay in the air? *The Guardian*. [Online] 16 01 2012. [Cited: 28 01 2022.] <https://www.theguardian.com/environment/2012/jan/16/greenhouse-gases-remain-air>.

8. Appendix

8.1

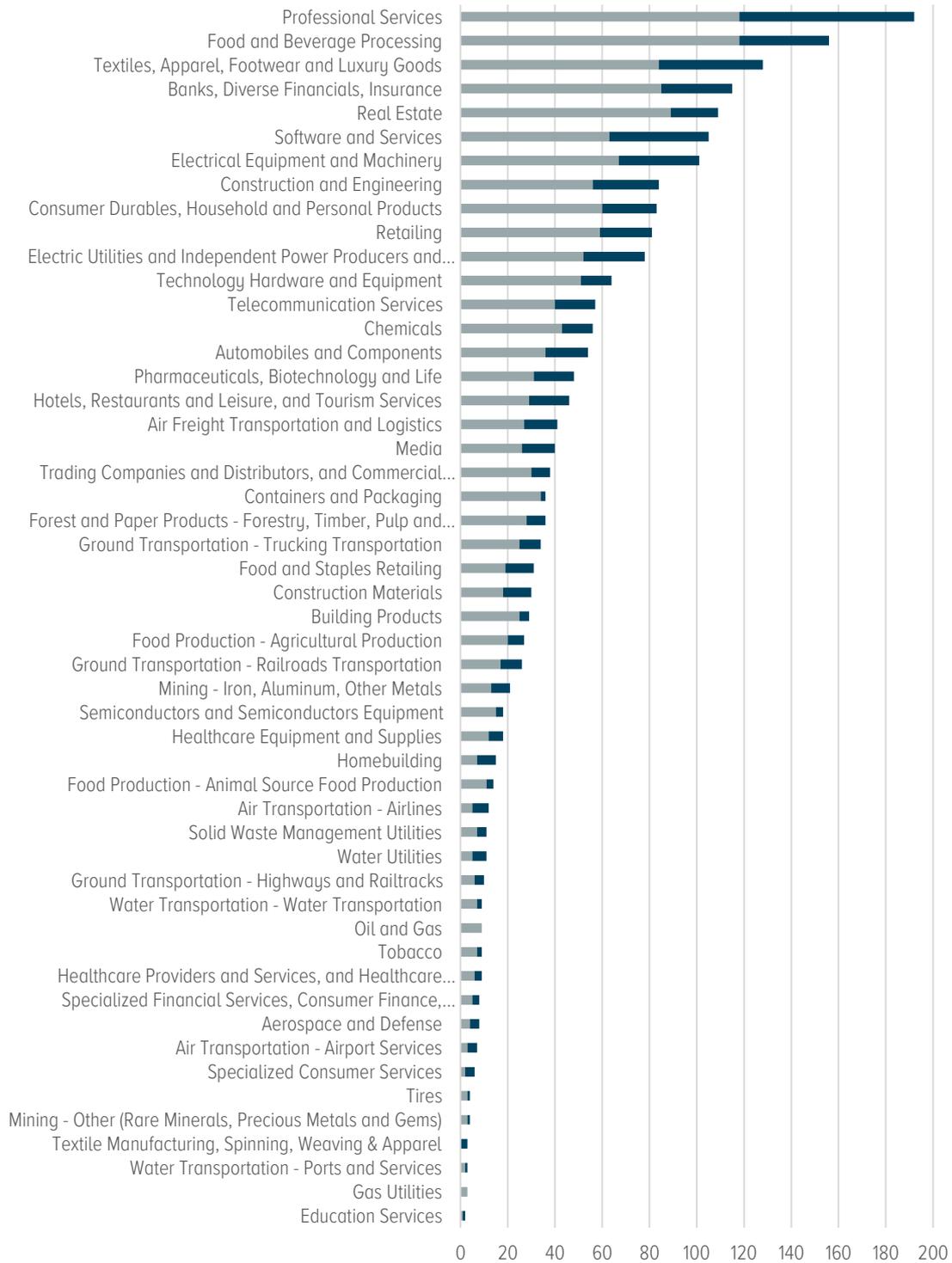


Figure 12: Number of companies with an SBT, with or without net-zero commitment (31).

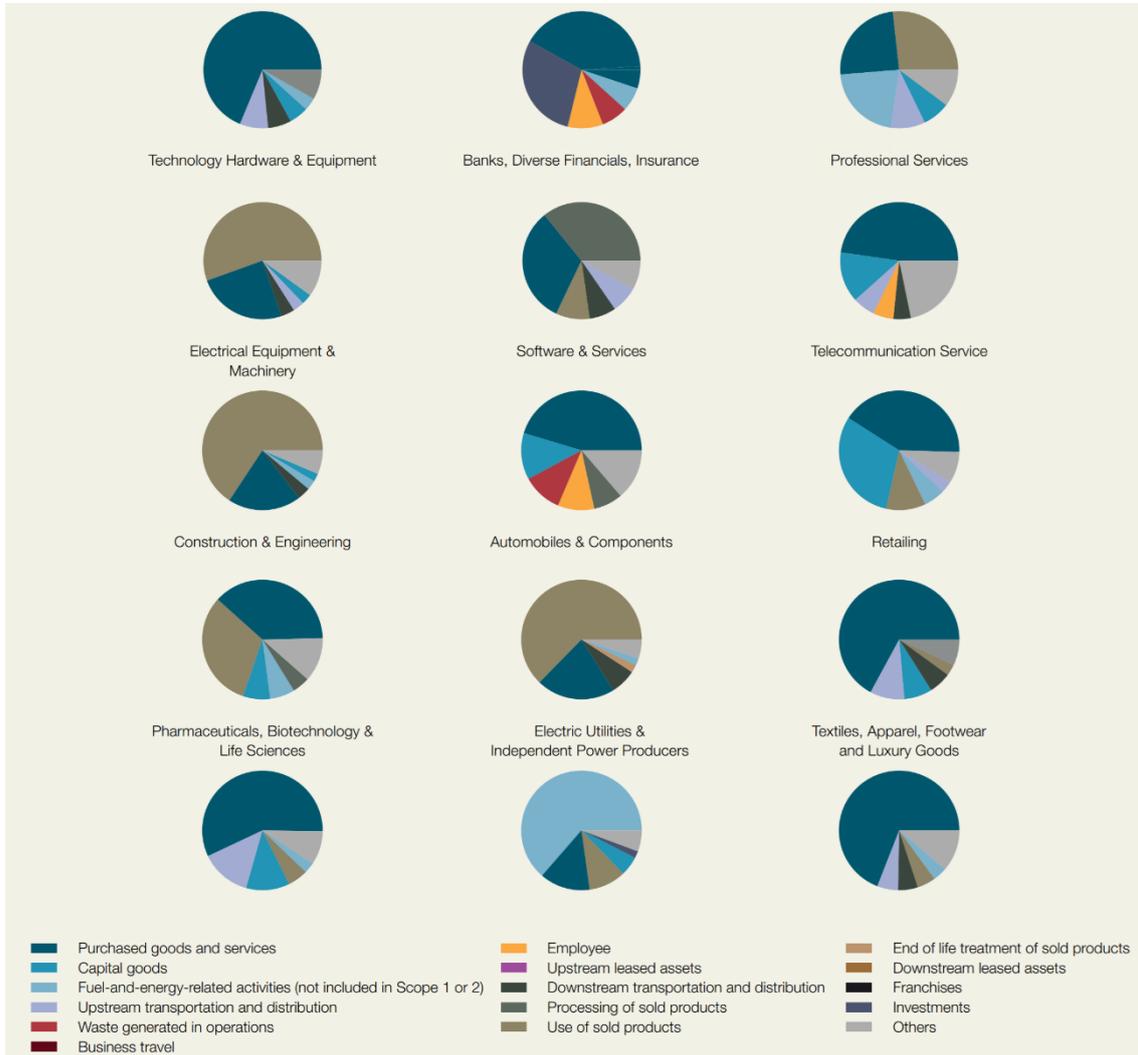


Figure 13: Percentage of Scope 3 emissions per category for SBTi sectors with the most committed and approved companies as of november 2018 (62).



Disclaimer

This presentation of Kempen Capital Management NV (KCM) is for information purposes only. The information in this document is incomplete without the verbal explanation given by an employee of KCM. KCM is licensed as a manager of various UCITS and AIFs and authorized to provide investment services, and, as such, is subject to supervision by the Netherlands Authority for the Financial Markets. KCM explicitly wants to prevent the benchmarks being used in this presentation from being published or made available to the public within the meaning of the Benchmark regulation. Therefore, the benchmark data in this presentation is made available to you, exclusively to internal business and non-commercial purposes.

No part of this presentation may be used without prior permission from KCM.