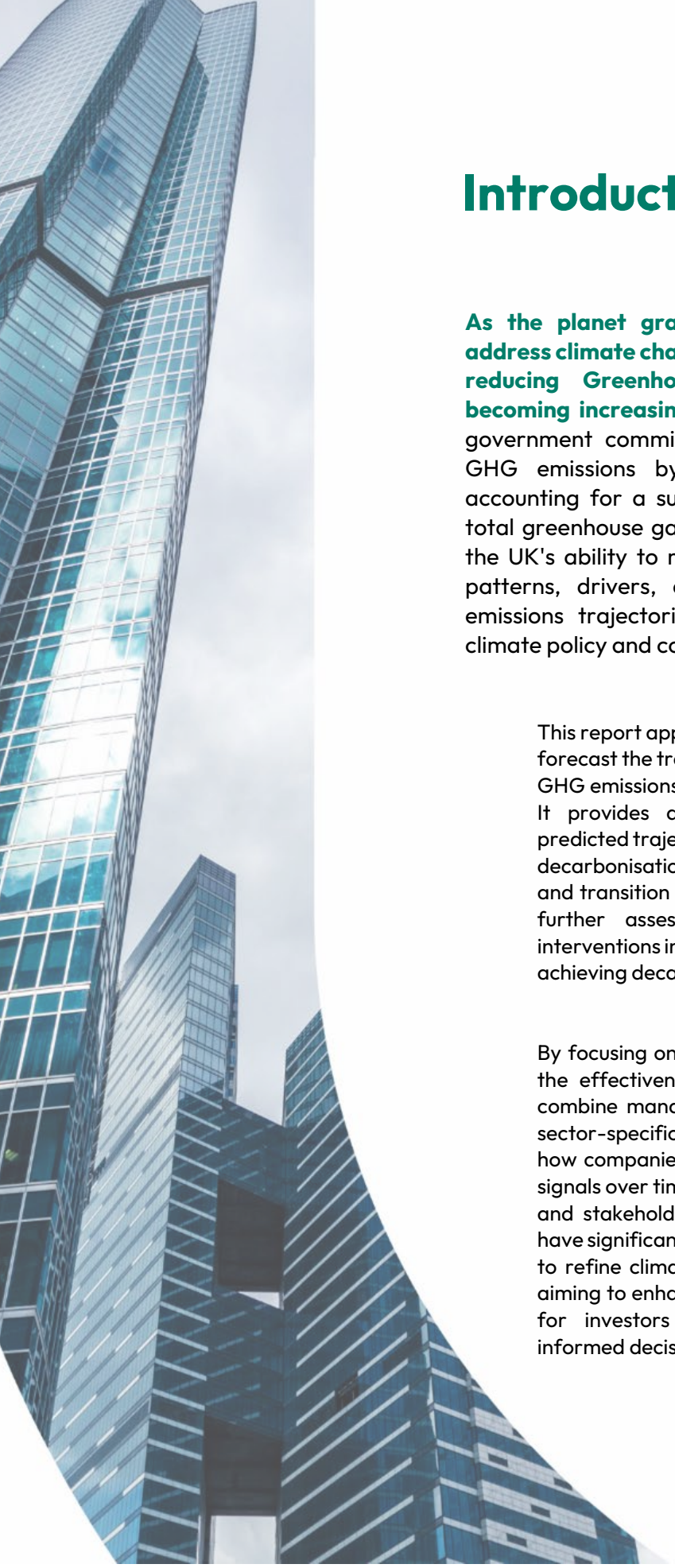
University of Exeter

J O Hambro Capital Management Group

GREEN FUTURES SOLUTIONS

Horizon UK Corporate Emissions Report

Nicola Wilson,
Jesse F. Abrams,
Nikolaos Dimakis,
Andrew Parry,
Timothy M. Lenton



Introduction

As the planet grapples with the urgent need to address climate change, the corporate sector's role in reducing Greenhouse Gas (GHG) emissions is becoming increasingly scrutinised. In June 2019, the government committed the UK to achieve net-zero GHG emissions by 2050. The corporate sector, accounting for a substantial portion of the country's total greenhouse gas output, will play a pivotal role in the UK's ability to meet its goals[1]. Understanding the patterns, drivers, and barriers in corporate GHG emissions trajectories is crucial to inform effective climate policy and corporate sustainability strategies.

This report applies a probabilistic model, 'Horizon', to forecast the trajectory of listed UK companies in their GHG emissions reduction efforts from 2025 to 2050. It provides a comprehensive analysis of these predicted trajectories, examining the expected future decarbonisation pathways and the resulting physical and transition risks. These projected trajectories are further assessed by sector to identify policy interventions in shaping GHG emissions outcomes and achieving decarbonisation goals.

By focusing on the UK, this study offers insights into the effectiveness of current national policies that combine mandatory reporting, carbon pricing, and sector-specific regulations. Moreover, it explores how companies are likely to respond to these policy signals over time, as well as to broader market trends and stakeholder pressures. The findings presented have significant implications for policymakers seeking to refine climate regulations, for corporate leaders aiming to enhance their sustainability strategies, and for investors and consumers looking to make informed decisions in a carbon-constrained world.

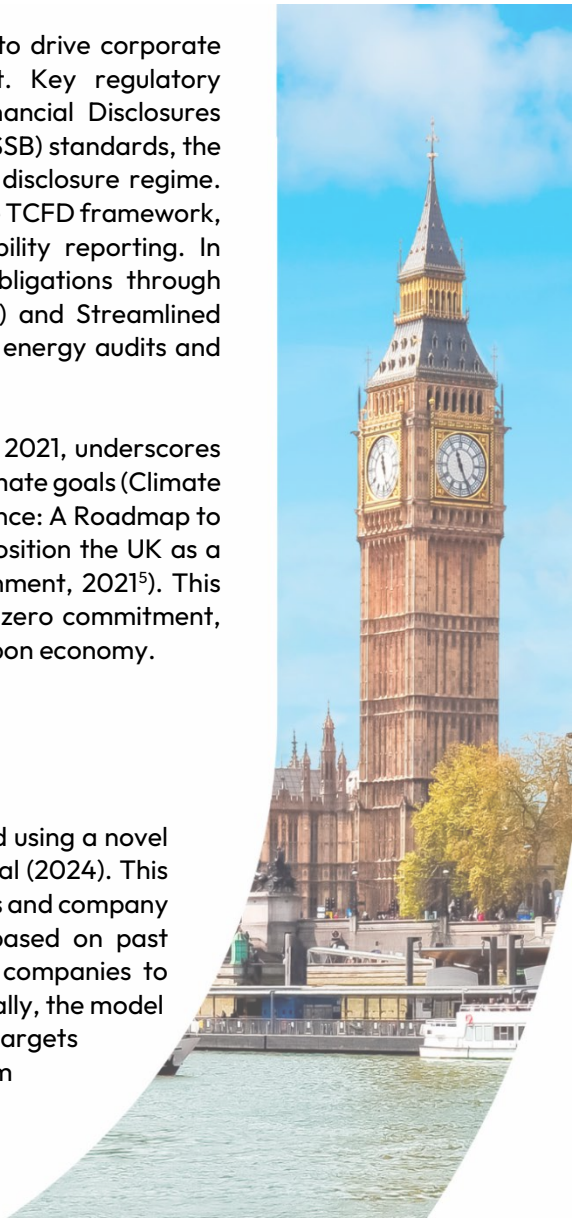
[1] The Climate Change Act 2008 (2050 Target Amendment) Order 2019

Context

The UK has made significant strides in reducing greenhouse gas emissions. By the end of 2022, the UK achieved a reduction of approximately 50% in onshore emissions compared to 1990 levels (Department for Energy Security and Net Zero, 2024[2]). This progress is largely attributed to the ongoing transition to renewable energy sources, such as wind and solar power, which now account for over 50% of the UK's electricity generation[3]. Additionally, the phasing out of coal-fired power plants and the implementation of energy efficiency measures across various sectors have contributed to the decline in GHG emissions.

The UK has implemented a range of regulations and policies to drive corporate decarbonisation and support its net-zero by 2050 target. Key regulatory requirements include the Task Force on Climate-related Financial Disclosures (TCFD), and the International Sustainability Standards Board (ISSB) standards, the latter of which the UK is in the process of integrating into its disclosure regime. Notably, the ISSB standards build upon and are set to replace the TCFD framework, consolidating it into a broader global baseline for sustainability reporting. In addition, businesses are also subject to energy efficiency obligations through schemes like the Energy Savings Opportunity Scheme (ESOS) and Streamlined Energy and Carbon Reporting (SECR), which mandate regular energy audits and GHG emissions reporting.

The UK government's Net Zero Strategy, published in October 2021, underscores the importance of these disclosures in achieving the country's climate goals (Climate Change Committee, 2021[4]). Additionally, the 'UK Greening Finance: A Roadmap to Sustainable Investing' sets out the government's ambition to position the UK as a global leader in green and sustainable investment (HM Government, 2021[5]). This roadmap aims to align the financial system with the UK's net-zero commitment, ensuring that financial flows support the transition to a low-carbon economy.



Horizon Model

Companies' scope 1 and 2 emission trajectories were forecasted using a novel probabilistic model, called 'Horizon', as reported by Weaver et al (2024). This model employs financial data from FactSet, along with emissions and company target data collected by CDP, to predict future emissions based on past performance and industry trends. It was applied to 347 UK companies to project likely emission trajectories from 2024 to 2050. Additionally, the model incorporates information on alignment with the Science Based Targets Initiative (SBTi) and country net-zero commitments sourced from Net Zero Tracker[6]. Company reduction ambitions are evaluated against published pathways from the Network for Greening the Financial System (NGFS), utilising the GCAM 6.0 model.

[2] UK first major economy to halve emissions - GOV.UK
[3] Britain's Electricity Explained: 2024 Review | National Energy System Operator
[4] Independent Assessment: The UK's Net Zero Strategy - Climate Change Committee
[5] Greening Finance: A Roadmap to Sustainable Investing
[6] Full methodology of the model development is reported by Weaver et al, (2024): An audit of corporate decarbonisation ambition against low-carbon futures. | Research Square.

UK Companies' Decarbonisation Pathways

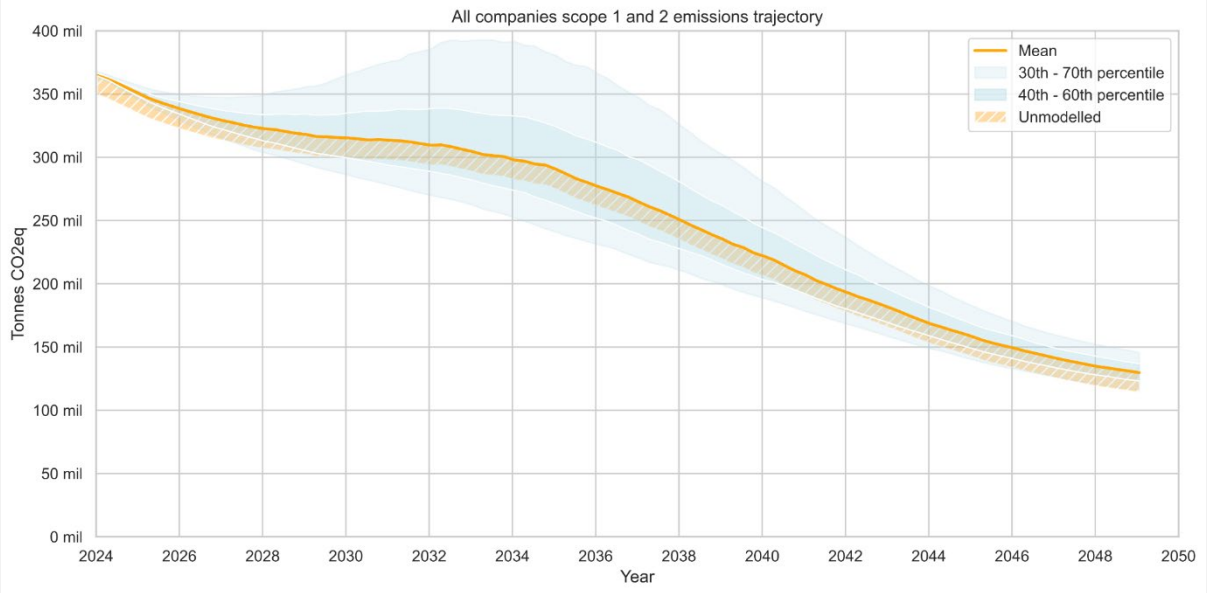
UK Corporate Sector

The corporate sector plays a crucial role in the reducing of the UK's carbon footprint, particularly companies in high-emission sectors. Our total UK companies universe consists of 3,133 companies reported by FactSet covering the entire UK market capitalization. Among them, UK companies with reported emissions for four or more consecutive years were modelled within Horizon to predict future emissions. These 347 companies, represent 89% of the total market capitalization of the UK listed companies and spanning 20 industry sectors, ranging from energy-intensive sectors such as 'Transportation' and 'Energy Minerals' to low energy-intensive sectors like 'Technology Services'. With 80 companies, the finance sector is strongly represented, while other sectors like health services and communications are comparatively limited. These modelled trajectories provide valuable insights into the potential progress and challenges in reducing emissions across various sectors and the UK economy as a whole, as well as underscoring the importance of transparency in emissions reporting to monitor alignment with the UK's climate targets.

Total Emission Trajectories

As of 2025, the mean total Scope 1 and 2 emissions (Figure 1) for all companies is just below 350 million tonnes of CO_2 equivalent (tCO_2e). By 2050, this figure is projected to decrease to an average of about 115 million tCO_2e, representing a reduction of approximately 62%. While this decline indicates the potential for significant progress in emissions reduction over the coming decades, the mean trajectory suggests an initial plateau in emissions. Figure 1 suggests that emissions will peak in 2024 and then will decrease to around 300 million tCO_2e, remaining close to this level before a long-term downward trend begins after 2032. In contrast, the 70th percentile trajectory shows a delayed peak, occurring late in 2033, with emissions reaching almost 400 million tCO_2e. This variability underscores both the uncertainty in emissions pathways, as some scenarios indicate higher near-term emissions, as well as the need for appropriate policies and incentives to support the commitments for the transition to Net Zero. It is essential to note that these projections only account for Scope 1 and 2 emissions, which include direct emissions from owned or controlled sources and indirect emissions from the generation of purchased energy. Scope 3 emissions, which encompass all other indirect emissions across a company's value chain, are not included but often represent a significant portion of a company's total carbon footprint.

Figure 1: **Total scope 1 and 2 emissions for all UK companies** (including offshored emissions). Unmodelled emissions represent the portion of emissions from companies with insufficient data to model



Off-shored Emissions

Based on analysis of the data, approximately 11.3% of total UK corporate emissions are generated within the UK, while the remaining 88.7% are generated offshore. This significant proportion of offshored emissions highlights the importance of considering global supply chains when assessing a company's total carbon footprint and developing effective decarbonisation strategies. These strategies could further alter the sourcing of emissions in the case of disrupting trade patterns due to expected external shocks such as tariffs. While this off-shoring of production has benefited the UK's domestic level of emissions, it has done so at the expense of extraterritorial emissions. We should note here though that this limited coverage of 11.3% is due to the underlying companies' level of disclosure.

UK progress against climate goals

The NGFS[7] scenarios provide a framework for understanding the potential future impacts of climate change and related policies on the economy and financial system. They assess both physical and transitional risks associated with different climate scenario pathways. The projected emissions trajectories for the modelled companies by 2050 are evaluated against each NGFS pathway (Figure 2) to identify progress against climate transition targets. These scenarios are categorised into four groups: 'Orderly,' 'Disorderly,' 'Too Little, Too Late,' and 'Hot House World' (Table 1).

[7] The Network of Central Banks and Supervisors for Greening the Financial System (NGFS), NGFS Scenarios Portal

Table 1: Description of climate scenarios from NGFS Portal

Orderly scenarios	Assume early and gradually increasing climate policies with relatively low physical and transition risks	**Net Zero 2050** Achieves global net zero CO_2 emissions by 2050, limiting global warming to 1.5°C through stringent climate policies and technological innovation
		Below 2°C Gradually increases policy stringency to limit warming to below 2°C with a 67% probability
		Low Demand Assumes significant behavioural changes to reduce energy demand, combined with carbon pricing and technological advancements, to achieve global net zero CO_2 emissions around 2050
Disorderly scenarios	Involve delayed or divergent policies leading to higher transition risks	**Delayed Transition** Emissions do not decrease until 2030, requiring strong policies thereafter to limit warming to below 2°C
Hot House World Scenarios	Assume insufficient global efforts to limit significant global warming, resulting in severe physical risks including irreversible impacts	**Current policies** Only currently implemented policies are maintained, leading to high physical risks and potential warming of 3°C or more by 2100
		Nationally Determined Contributions (NDCs) Includes all pledged policies, even if not yet implemented, leading to moderate physical and transition risks
Too Little, Too Late	Assume a late and uncoordinated transition fails to limit physical risks	**Fragmented World** Delayed and inconsistent climate policies globally, resulting in high physical and transition risks

The 'Orderly' scenarios represent low transition and physical risks, where early and coordinated policy action leads to a smooth transition to a low-carbon economy. It includes both the 'Net Zero by 2050' and 'Below 2°C' pathways. The 'Disorderly' scenario involves high transition risks due to delayed or uncoordinated policies, resulting in abrupt and costly adjustments. The 'Too Little, Too Late' scenario is characterised by high physical risks, where insufficient early action leads to severe climate impacts, necessitating drastic measures to be put into place later. 'Current policies' and 'Nationally Determined Contributions' are part of the 'Hot House World' group of scenarios, which represent high physical risks with minimal transition efforts, leading to significant and widespread climate-related damages.

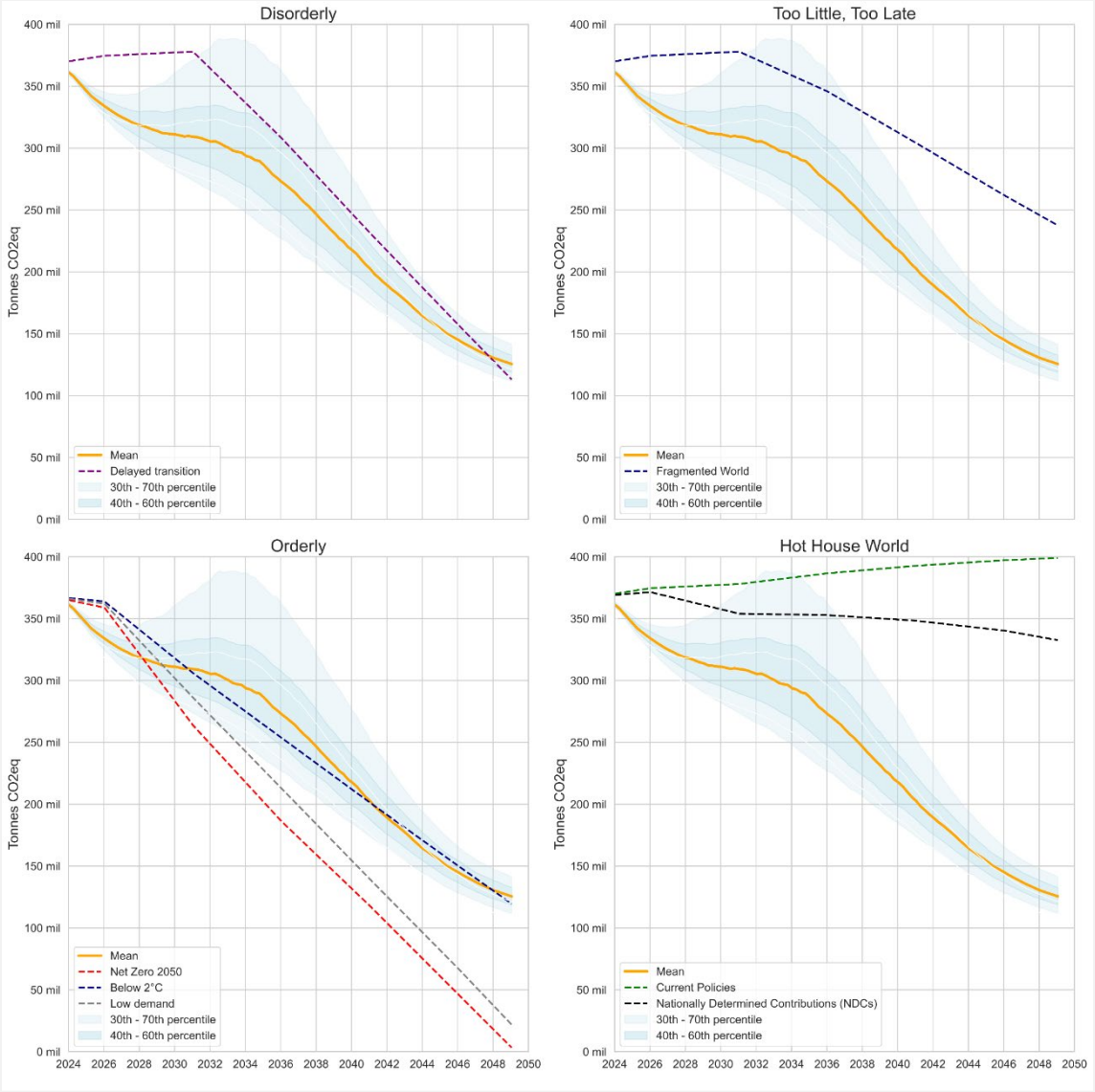
> **"UK companies' emissions are projected to fall below the highest risk scenarios of 'Too Little, Too Late' and 'Hot House World' by 2050."**

UK companies' GHG emissions are projected to fall below the highest risk scenarios of 'Too Little, Too Late', and 'Hot House World' by 2050, which are characterised by significant physical, and transition risks due to delayed or insufficient climate action. This indicates that the modelled companies are on a path that avoids the worst-case outcomes. The projected trajectory is currently in line with the 'Delayed Transition' pathway, as shown in the figures above. This is characterised by high transition risks, which stem from the changes required to move towards a net-zero economy, including shifts in technology, markets, policy, regulation, and consumer sentiment. These risks can have material impacts on the value of companies and their assets, making it essential for businesses to integrate climate considerations into their strategic planning, as is it is increasingly evident in the insurance sector, especially in the US[8].

Within the 'Orderly' scenarios characterised by low physical and transition risks, the results are mixed. While the trajectories are in line with the 'Below 2°C' pathway, which aims for a relatively smooth transition to a low-carbon economy, they remain above the 'Low Demand' and 'Net Zero 2050' pathways. The latter scenarios represent more ambitious pathways with stringent GHG emissions reductions and significant shifts in energy demand and supply. The findings suggest that while progress is being made, there is still a considerable gap to align with the most ambitious climate goals, highlighting the need for continued and enhanced efforts in GHG emissions reduction and sustainable practices.

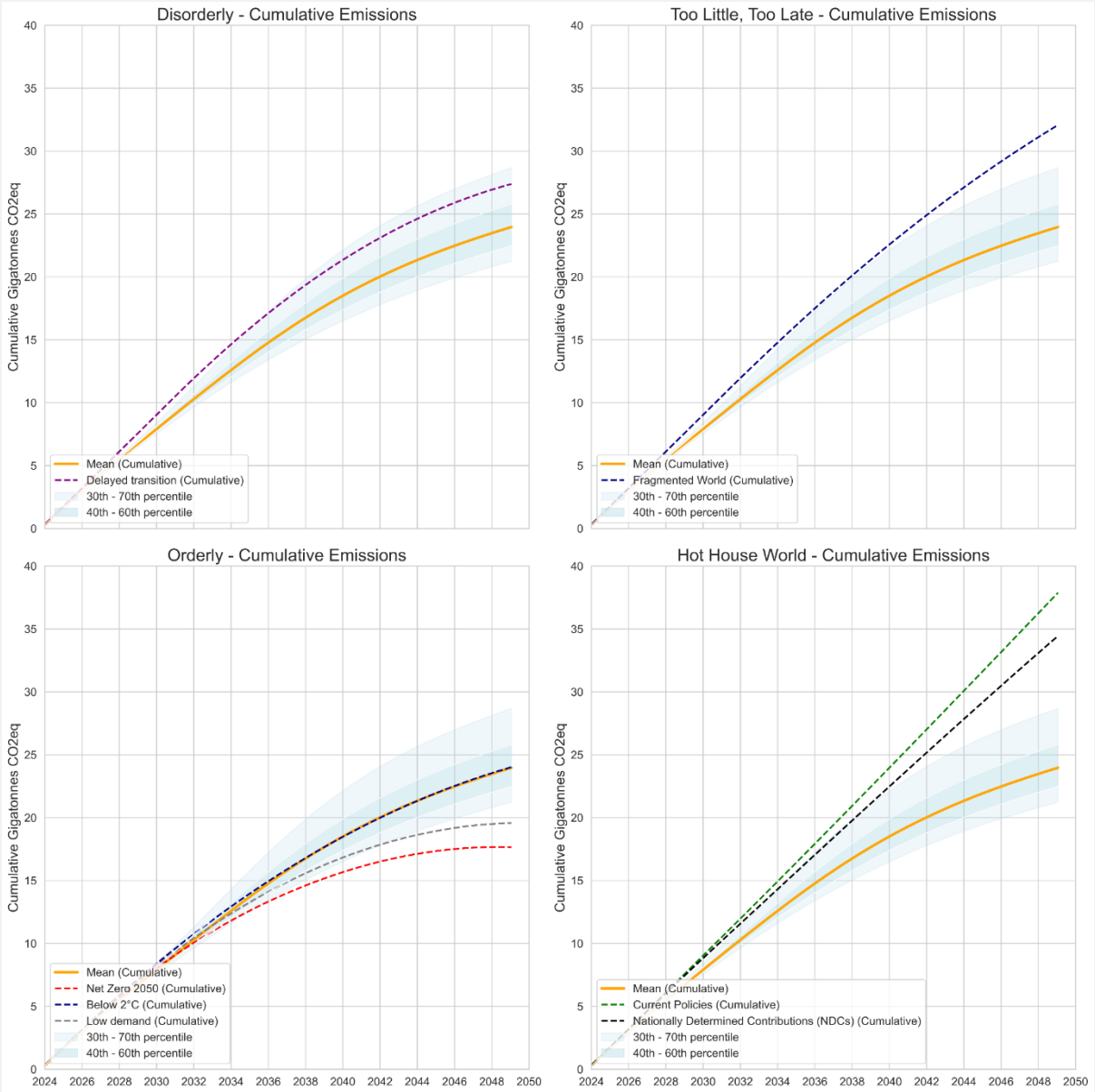
[8] The growing void in the U.S. homeowners insurance market: who should bear the rising cost of climate change? | npj Climate Action

Figure 2: **Total emissions and trajectories for all companies** against each NGFS GCAM 6.0 scenario grouped by scenarios: 'Too Little, Too Late', 'Disorderly', 'Hot House World' and 'Orderly'. The yellow line represents the mean modelled trajectory of scope 1 and 2 emissions with the shaded areas representing the 30 – 70th percentile and 40 – 60th percentiles. The dotted coloured lines represent each respective GCAM 6.0 alignment pathway.



In the projection charts above, the gap between current trajectories and the most ambitious pathways like "Net Zero 2050" is particularly concerning given the risk of nonlinear change such as climate tipping points - critical thresholds where small changes can trigger large, often irreversible shifts in Earth systems. These nonlinear changes, such as the collapse of ice sheets or widespread forest dieback, could accelerate warming beyond what current models predict. Aligning with the 2015 Paris Agreement target of limiting warming to 1.5°C (as represented by the "Net Zero 2050" scenario) or well below 2°C (aligned with the "Below 2°C" pathway) is therefore not merely aspirational but essential to mitigate these risks.

Figure 3: **Total cumulative emissions and trajectories for all companies**, against each NGFS GCAM 6.0 scenario, grouped by scenarios: 'Too Little, Too Late', 'Disorderly', 'Hot House World' and 'Orderly'. The yellow line represents the mean modelled trajectory of scope 1 and 2 emissions with the shaded areas representing the 30 – 70th percentile and 40 – 60th percentiles. The dotted coloured lines represent each respective GCAM 6.0 alignment pathway.



While UK companies are making progress, our analysis suggests that current efforts must be significantly accelerated to meet the 2025 Paris Agreement commitments. Without stronger action, the UK risks not only crossing critical climate tipping points but also facing increased economic instability, supply chain disruptions, and heightened regulatory and investor pressures as the global transition to a low-carbon economy intensifies.

Sectoral comparison

Emissions by Sector

The companies that comprise the UK economy are split in 20 sectors. GHG Emissions are dominated by the energy-intensive GHG emissions of Process Industries, Energy Minerals, Transportation and Non-Energy Minerals making up a total of 88% of total UK companies' current GHG emissions (Figure 4). Just seven sectors account for 99% of all UK companies' GHG emissions.

The mean GHG emissions trajectories indicate the Energy Minerals sector exhibits substantially higher mean GHG emissions compared to other sectors (Figure 5). Notably, the Industrial Services, Consumer Services, Consumer Durables, and Transportation Sectors have not yet reached their peak GHG emissions (Figure 5). In contrast, other sectors are predicted to follow an immediate mean downward trend in their GHG emissions trajectories.

Figure 4: **Current UK companies' emissions by sector as a proportion of total UK companies' emissions**

Sector Scenario Alignment

To assess decarbonisation progress, companies were assessed for their likelihood of being aligned with the NGFS Below 2°C pathway. A company's likelihood of being aligned is calculated from the number of the company's emission pathways projected to finish below the pathways emission level by 2030, 2040, and 2050, as a proportion of the total number of pathways. This indicates the likelihood that a company is aligned with the NGFS 'Below 2°C'[9] is then used to categorise companies by their degree of alignment likelihood: 'likely' for a 66-100% probability, 'about as likely as not' for a 33-66% probability, and 'unlikely' for a less than 33% probability. As a result, 69% of companies are 'likely' to be aligned, 27% as likely as not, while only 4% are 'unlikely' to be so (Figure 6).

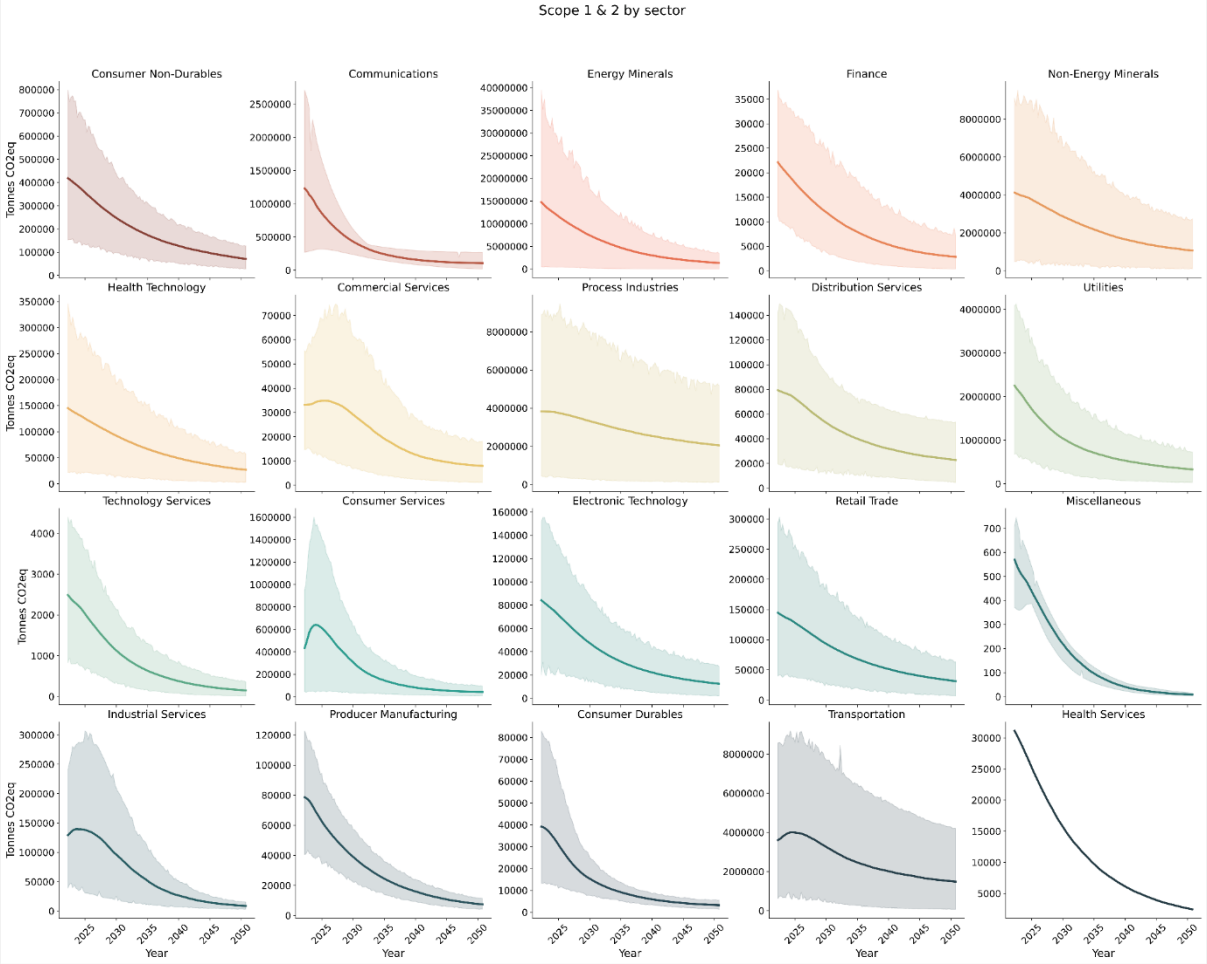


Figure 5: **Emission trajectories per sector**. Note each plot has a separate y-axis to account for the significant variation in emission sizes between sectors

[9] Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties https://www.ipcc.ch/site/assets/uploads/2017/08/AR5_Uncertainty_Guidance_Note.pdf

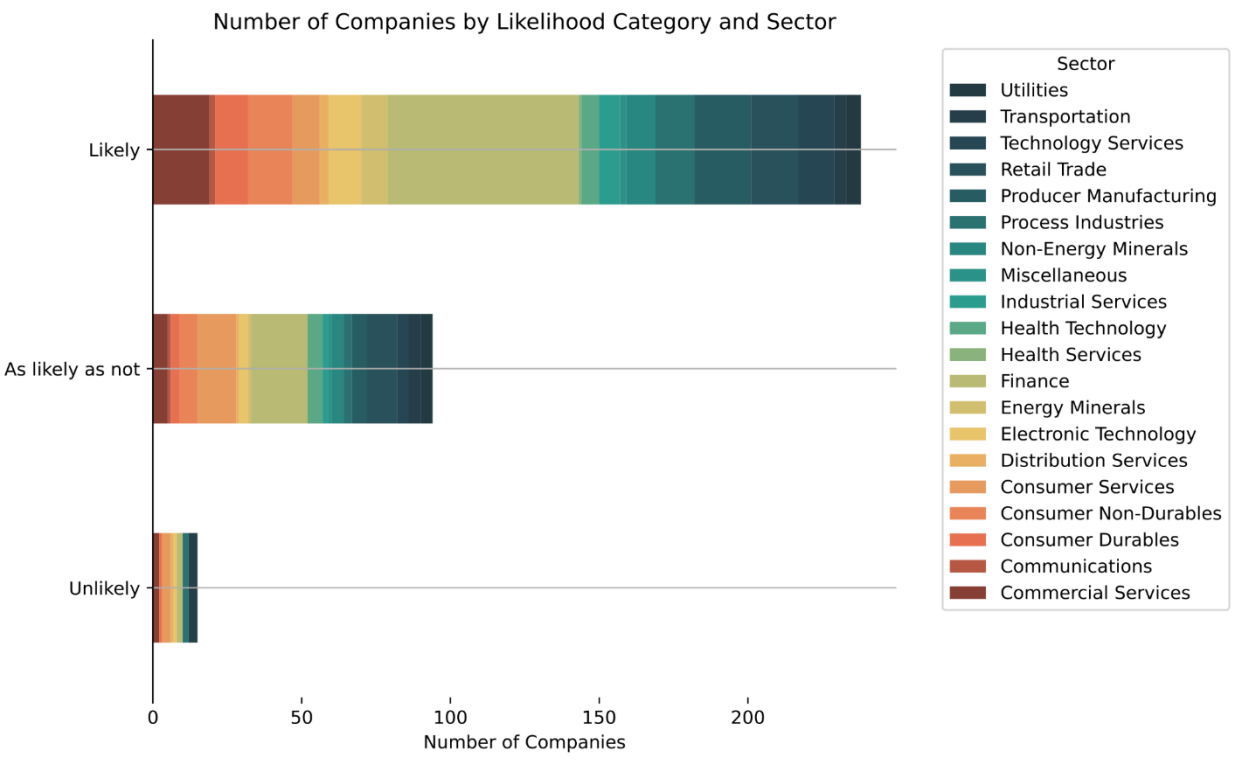


Figure 6: **Number of companies coloured by sector, in each likelihood group of being aligned with the NGFS GCAM 6.0 below 2-degree pathway**. Likelihood group corresponds to the IPCC likelihood scale of 'likely' for a 66-100% probability, 'about as likely as not' for a 33-66% probability, and 'unlikely' for a less than 33% probability.

Leaders and Laggards

Leading and Lagging Sectors

In Figure 6, the likelihood of scenario alignment is used as an indicator of a company's performance in decarbonising. The proportion of companies within each sector that are considered likely (probability >66%) to be aligned with a Below 2°C pathway by 2050 is analysed as an indicator of sector performance in decarbonising. The leading sector in decarbonising scope 1 and 2 GHG emissions is Health Services, the only sector where all companies are likely to be aligned by 2050 (Figure 7). Over 80% of companies in the Health Technology, Electronic Technology, and Consumer Non-durables sectors are also expected to be aligned. Conversely, the consumer services sector is the worst performer, with less than 40% of companies likely to be aligned. This is followed by the Transportation, Non-energy Minerals, Industrial Services, and Utilities sectors.

Figure 7 shows that ten sectors currently fall below the UK 2050 mean likelihood of alignment with the Below 2°C pathway. Notably, seven sectors exhibit a decline in alignment likelihood from 2030 to 2050, indicating a regression in their climate performance. For example, Transportation drops from 58% in 2030 to 56% in 2050, and Distribution Services declines from 71% to 64% over the same period. This downward trend suggests that these sectors are struggling to implement sufficient GHG emissions reduction strategies, potentially due to limited policy enforcement, slow technological advancements, or inadequate market incentives.

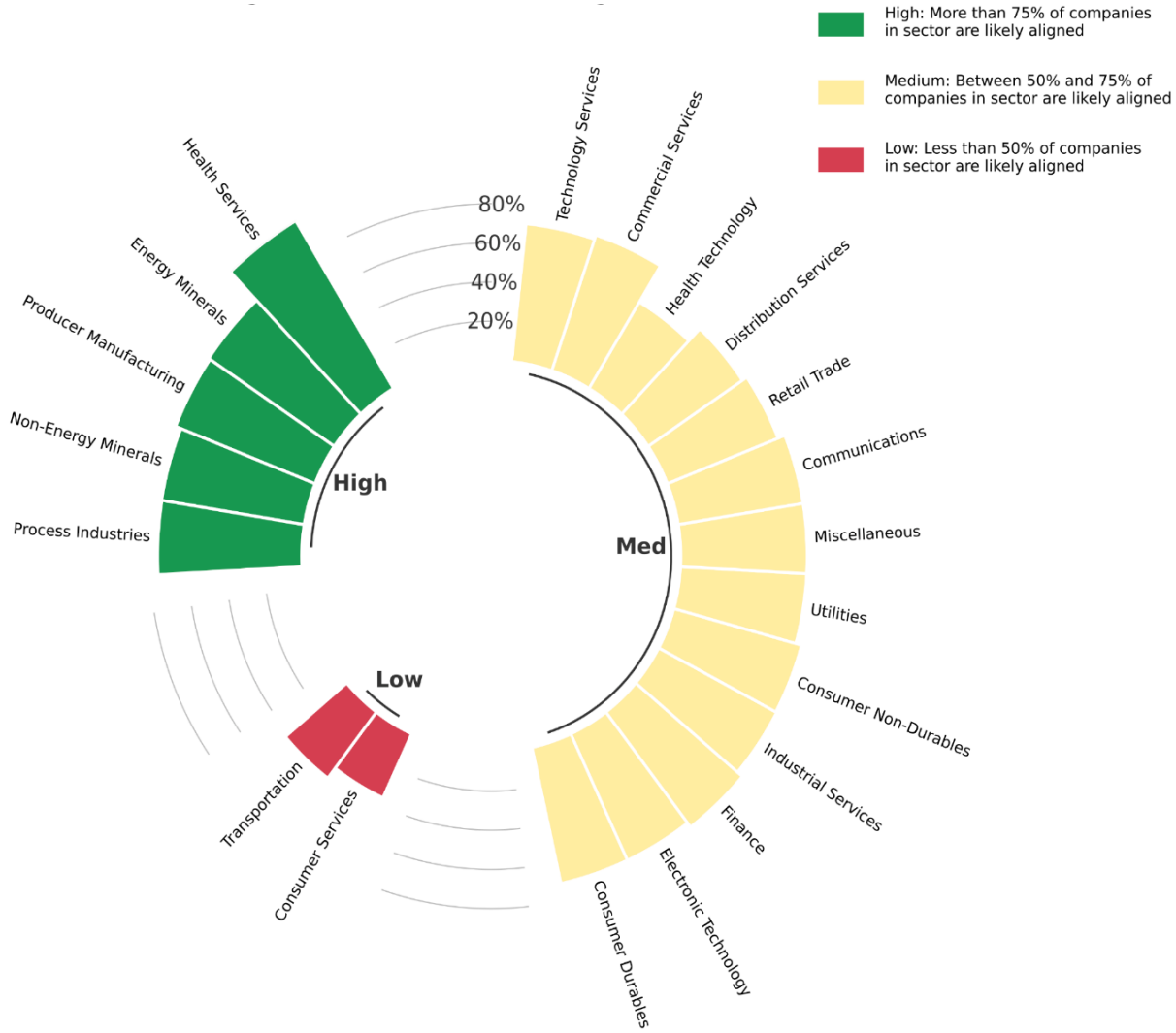


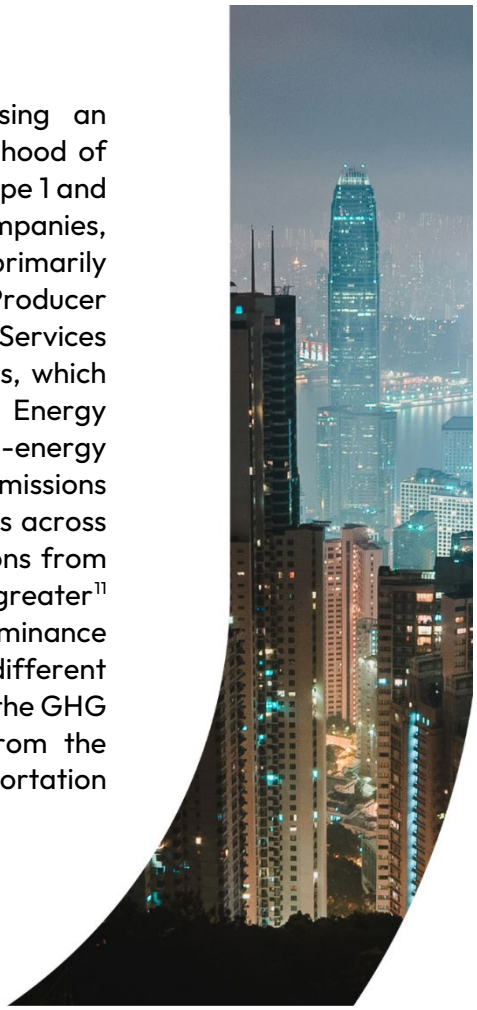
Figure 7: **The proportion of companies per sector aligned to the NGFS GCAM 6.0 'below 2oC' pathway**. Sectors are grouped into high (green), medium (yellow) and low (red). High represents those sectors where more than 75% of companies in the sector are likely aligned to the 2-degree pathway; medium represents between 50% and 75% of companies within the sector are likely aligned; and low represents less than 50% of companies in the sector are likely aligned. 'Likely aligned' corresponds to the IPCC definition of >66% likelihood.

In contrast, sectors such as Finance (75% to 78%) and Technology Services (74% to 77%) show slight improvements, highlighting the impact of stronger regulatory frameworks and investment in sustainable innovation. The sectors that are becoming less aligned will require targeted interventions, such as stricter GHG emissions policies, incentives for green technology adoption, and enhanced corporate accountability, to ensure they contribute effectively to the UK's climate commitments.

However, care should be taken especially in the hard to abate critical sectors, so as to ensure that these incentives do not penalize the profitability of the industry, which otherwise would lead to issues in national security. In the case of steel for instance, companies are making commitments and support the transition to a low carbon future, while at the same time presenting the significance of a properly thought of policy[10].

Leading and lagging companies

Leading and lagging companies are identified using an abatement metric, calculated from a company's likelihood of aligning with the Below 2°C pathway and their total scope 1 and 2 GHG emissions in 2050 (Figure 9). The leading companies, characterised by the smallest abatement scores, are primarily found in the Finance, Consumer Services, Producer Manufacturing, Commercial Services, and Technology Services sectors (Figure 10). Conversely, the lagging companies, which have the largest abatement scores, are from the Energy Minerals, Process Industries, Transportation, Non-energy Minerals, and Utilities sectors. The scale in GHG emissions highlights the significant disparity in abatement efforts across companies (Figure 9). By 2050, the total GHG emissions from the worst 10 performing companies is over 1000 times greater[11] than the top 10 leading companies. This sectoral dominance highlights the varying challenges and progress across different industries in achieving decarbonisation goals. Notably, the GHG emissions from the top three lagging companies from the Energy Minerals, Process Industries, and Transportation sectors, are of a significant magnitude higher.



[10] House of Commons, Science and Technology Committee, Written Evidence Submitted by British Steel, March 29th 2021.

[11] This value is normalised to the Free-Float Market Value, which represents the market capitalization of the free-float shares. It is calculated by multiplying the current share price by the number of free-float shares.

Figure 8: **Change in alignment by sector from 2030 to 2050** with mean UK alignment in 2050 indicated. Yellow circles indicate the sector likelihood of alignment in 2030 and green circles in 2050. The dotted line represents the UK 2050 mean.

Lagging companies are primarily found in high energy-intensive sectors with substantial initial Scope 1 and 2 GHG emissions in comparison to leading companies (Figure 10). Although the trajectories for companies with the lowest abatement scores are trending downward, the speed of their decarbonisation efforts is insufficient to meet climate targets by 2050.

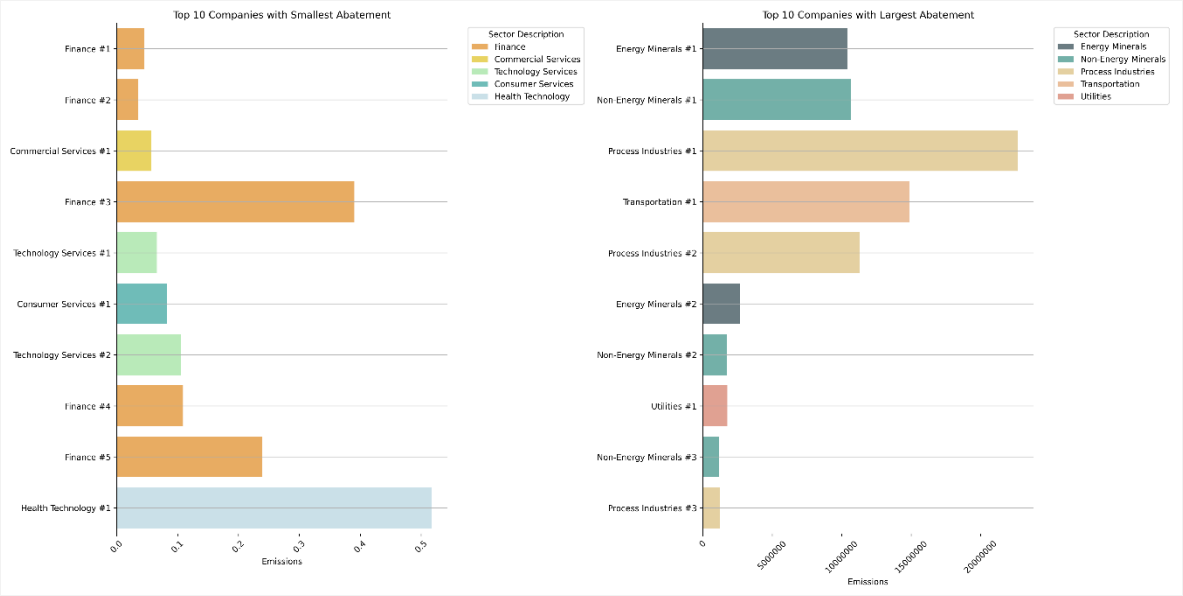


Figure 9: **The top 10 leading (left) and lagging (right) companies** scored by abatement (calculated from a company's likelihood of alignment with the 2-degree pathway and total scope 1 and 2 emissions in 2050). Companies are ordered by abatement score and coloured by sector. Emissions in 2050 are shown on the x-axis.

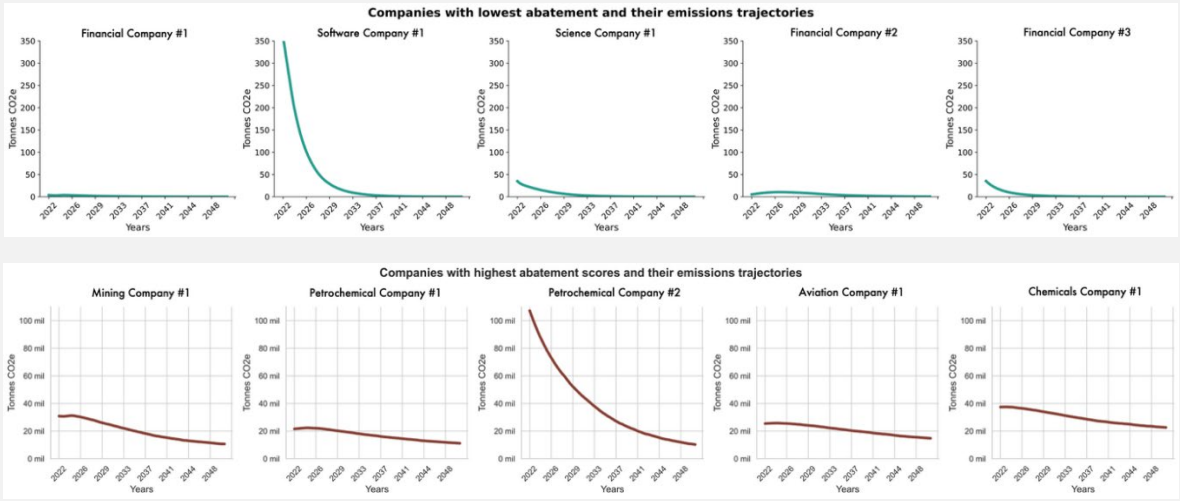


Figure 10: **Emission trajectories of the 5 leading (top row, green) and 5 lagging (bottom row, red) companies.** Note the different y-axis and the significantly higher emissions in the lagging companies. As a reminder, the projection focuses on each company's scope 1, and scope 2 emissions.

Features driving decarbonisation

Neither financial performance, company size, nor total company GHG emissions were found to be indicators of a company's likelihood of aligning with net-zero pathways. This suggests that other factors, possibly including corporate governance, profitability, strategic priorities, and sector-specific challenges, play a more significant role in determining a company's decarbonisation trajectory. While 74% of companies have set net-zero targets, of which 68% are stated to be aligned with SBTI, net-zero targets were not found to be correlated with the likelihood of reaching decarbonisation goals (Figure 11). However, the emission trajectories of companies who set targets are predicted to have already peaked in comparison to those without targets, which may be driven by more immediate action. Interestingly, the group without targets have lower average GHG emissions across the ensemble of companies (Figure 12).

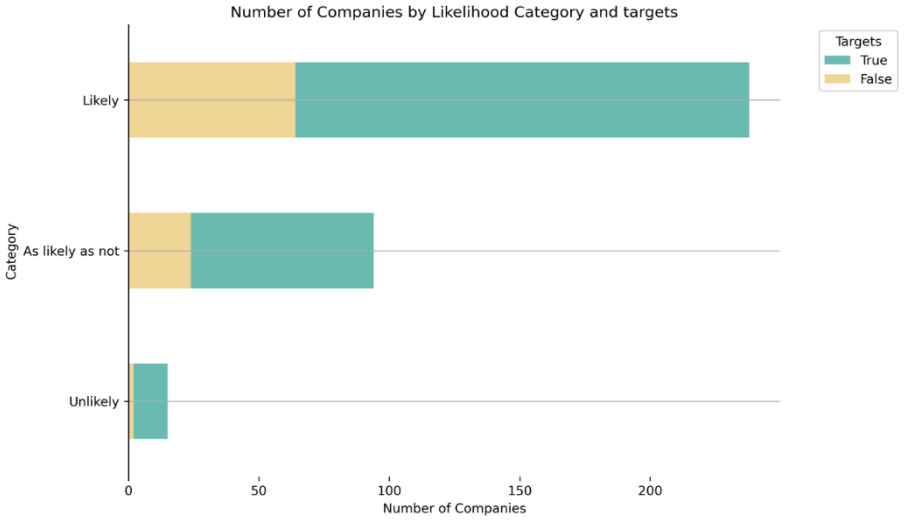


Figure 11: **Percent of companies with targets (green) or without targets (yellow)** and their likelihood of being aligned with the below 2-degree pathway

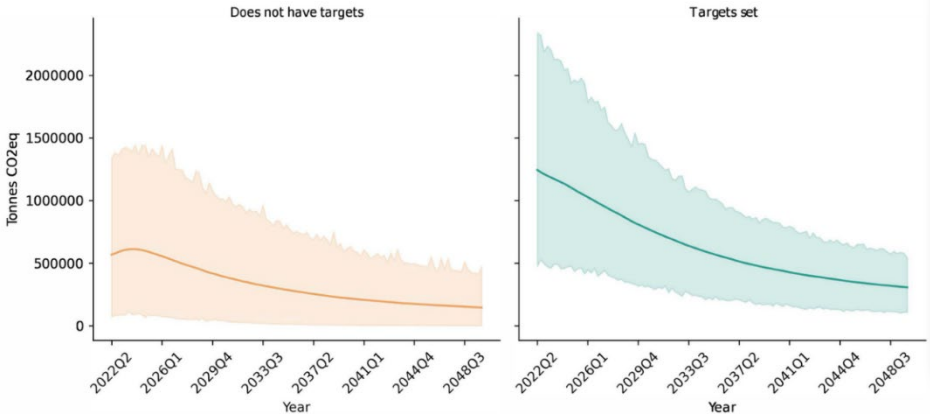


Figure 12: **Comparison of emission trajectories between companies with targets (right) and those without targets (left) up to 2050**. The solid line represents the mean trajectory of all companies with the shaded area representing the range of trajectories per group.

Discussion and Recommendations

Current Progress and Climate Transition Pathways

Current progress indicates that the UK corporate sector is aligned with the Below 2°C scenario but falls short of achieving net-zero and low-demand pathways. GHG emissions are projected to plateau until the end of the decade, placing the UK on a trajectory for a disorderly 'Delayed Transition' - a pathway with significant transition risks due to delayed climate action. Whilst progress is being made, there is still a considerable gap remaining between current efforts and the ambition required to meet climate goals. This underscores the need for continued and enhanced efforts in GHG emissions reduction and the adoption of more sustainable practices if the UK's Net Zero for 2050 commitment is to be achieved.

Both physical and transition risks are critical considerations for companies and their investors. Physical risks arise from the direct impacts of climate change, such as increased frequency and severity of extreme weather events. Transition risks, on the other hand, stem from the changes required to move towards a net-zero economy, including shifts in technology, markets, policy, regulation, and consumer sentiment. These risks can have material impacts on the value and profitability of companies and their assets, making it essential for businesses to integrate climate considerations into their strategic planning.

Taking early action to mitigate climate change can lead to significant economic benefits. Proactive measures can reduce the long-term costs associated with severe climate impacts, such as damage to infrastructure, increased insurance premiums, and health-related expenses. Early investment in sustainable technologies and practices can also create new market opportunities, drive innovation, and enhance competitiveness. Moreover, companies that lead in climate action are likely to gain a positive reputation, attract environmentally conscious consumers, and secure long-term investor confidence.

Conversely, delaying action can result in higher costs in the future. As climate impacts become more severe, the expenses related to adaptation and mitigation will increase. Businesses may face stricter regulations, higher carbon taxes, and increased operational disruptions. The risk of stranded assets, where investments in fossil fuels and non-sustainable practices become obsolete, also rises with delayed action. Additionally, companies that fail to act promptly may suffer reputational damage and lose market share to more proactive competitors.

A delayed transition to a net-zero economy poses significant risks. Companies may struggle to adapt to rapid policy changes, technological advancements, and shifting market demands. This can lead to financial instability and reduced asset values. Furthermore, the longer the delay, the more abrupt and disorderly the transition may become, exacerbating economic and social disruptions. Therefore, it is crucial for businesses to act swiftly and decisively to mitigate these risks and ensure a smooth and sustainable transition.

Recommendation 1: to accelerate action and avoid a delayed disorderly transition, implement more aggressive near-term policies to drive decarbonisation early

This would include strengthening carbon pricing mechanisms, enhancing mandatory reporting requirements, and providing clear policy signals to encourage immediate action. Early action would allow for a more orderly transition, reducing both physical and transition risks while creating economic opportunities through innovation and the development of new markets.

Sector-specific interventions

18% of all UK GHG emissions are attributed to the corporate sector (Department for Business, Energy and Industrial Strategy, 2021[12]). Key sectors that are lagging in their decarbonisation efforts are predominantly energy-intensive industries i.e. Energy Minerals, Process Industries, Transportation, Non-energy Minerals, and Utilities sectors.

The Transport sector remains a significant source of GHG emissions, primarily from road transport although notable emission decreases have been seen driven by increased electrification. While the previous government had committed to phasing out the sale of new petrol and diesel cars by 2030, this target has recently been pushed back to 2035, potentially slowing the transition to electric vehicles. Similarly, the current Labour government has announced a relaxation of deadlines for phasing out gas boilers in homes, moving from the original 2035 target to a more gradual approach.

"18% of all UK GHG emissions are attributed to the corporate sector"

These policy adjustments highlight the tension between ambitious climate goals and economic and practical considerations. Such shifts in implementation timelines could significantly impact the UK's ability to meet its GHG emissions reduction targets, particularly in the transport and residential heating sectors which together account for a substantial portion of national GHG emissions. The delayed transitions in these areas may require even more aggressive decarbonisation in other sectors or risk undermining the UK's overall climate commitments. Despite these setbacks, continued investment in charging infrastructure and declining battery costs may still drive adoption of electric vehicles, though possibly at a slower pace than previously anticipated.

Construction materials, particularly steel and concrete, represent some of the most difficult-to-abate GHG emissions in the UK economy. These materials lack scalable low-carbon alternatives that are ready to be deployed at scale, unlike the Transport and Energy sectors where technologies like electric vehicles and renewable energy are already commercially viable. Understanding the proportion of UK GHG emissions that comes from these hard-to-abate sectors is crucial for developing targeted policy interventions.

[12] 2020 UK Greenhouse Gas Emissions, Final Figures

Challenges remain in energy-intensive sectors where GHG emissions have been more difficult to reduce. Industry, in particular, is a major emitter due to its reliance on fossil fuels, while the manufacturing sector contributes through industrial processes and energy use. These sectors face unique challenges that require targeted policy interventions. Strengthening regulations, providing financial incentives for clean technology adoption, and fostering innovation within these sectors are critical steps to ensure they contribute effectively to the UK's climate goals.

The identification of potential positive tipping points—where small interventions can lead to large, self-reinforcing changes—could accelerate the transition in these sectors. For example, continued policy support for electric vehicles could drive down costs through economies of scale, making them increasingly competitive without subsidies.

Recommendation 2: develop targeted policy interventions for lagging sectors and sector specific transition roadmaps

This would include focused research and development investment in hard-to-abate sectors, sector-specific carbon pricing mechanisms, and clear technology roadmaps with interim targets and milestones. Particular attention should be paid to the **7 sectors that account for 94% of GHG emissions**, with specific strategies for those that are furthest behind in decarbonisation efforts.

Supply Chain Considerations and Scope 3 Emissions

Our analysis reveals important sectoral implications and supply chain considerations that are often overlooked:

- Financial Services: While appearing as strong performers in this analysis, their main climate impact comes from financed emissions (Scope 3)
- Retail: Supply chain emissions and product use often dwarf operational emissions
- Technology: Hardware manufacturing and data centre energy use through vendors can be substantial
- Transportation: Vehicle use-phase emissions not captured in current analysis
- Many UK companies have significant overseas supply chains: uncounted extraterritorial emissions give a flattering picture of the decarbonisation of UK domestic activity.
- Current analysis may miss emissions 'leakage' where companies reduce domestic emissions by outsourcing high-emission activities
- Risk of underestimating transition challenges in globally integrated sectors: already in parts of the world exposed to extreme weather events, such as Florida and California, insurance costs are becoming unaffordable.

These findings highlight the importance of considering the full value chain when assessing a company's climate impact. The fact that 88.7% of emissions associated with UK companies occur offshore underscores the global nature of the climate challenge and the need for international coordination.

Recommendation 3: Implement comprehensive supply chain emissions monitoring and establish international standards for carbon accounting

This would include developing methodologies for better tracking and reporting of emissions across global supply chains, creating incentives for companies to engage with their suppliers on emissions reduction, and establishing international standards for carbon accounting to prevent leakage.

Policy Consistency and Government Ambition

Recent policy developments raise concerns about the UK's commitment to its climate goals. The previous government pushed back the ban on new petrol and diesel vehicles, and the current Labour government has watered down restrictions on gas boilers. These policy reversals create uncertainty for businesses and investors, potentially slowing the transition to a low-carbon economy.

The implications for heat pump uptake are particularly concerning, as achieving net-zero targets requires installing approximately 600,000 heat pumps every year by 2028. Policy consistency and long-term planning are essential for providing the market certainty needed to drive investment in low-carbon technologies.

Recommendation 4: Establish a cross-party, long-term climate policy framework with clear milestones and accountability mechanisms

This would include enshrining key targets in legislation, creating independent oversight mechanisms, and developing clear policy pathways that can withstand changes in government. A focus on just transition principles would help ensure that policies are socially equitable and maintain broad public support.

Critical Gap: Scope 3 Emissions

A significant limitation of this study is that it only captures Scope 1 (direct) and Scope 2 (purchased energy) emissions. Scope 3 emissions, which encompass all other indirect emissions across a company's value chain, are not included in the analysis. This is a critical gap, as for many companies, especially in sectors like retail, finance, and technology, Scope 3 emissions can represent over 70% of their total carbon footprint.

The absence of sufficient reliable and robust Scope 3 emissions data significantly restricts the ability to model a company's full emissions profile and may lead to current projections significantly underestimating the true decarbonization challenge. While the TCFD recommends reporting Scope 3 emissions "if appropriate," this creates a loophole that many companies exploit, even when Scope 3 emissions comprise most of their carbon footprint.

To address this gap, there is a pressing need for greater transparency and consistency in emissions disclosures. Enhanced reporting standards and mandatory climate-related disclosures that include Scope 3 emissions will enable more accurate modelling and better-informed decision-making for both policymakers and investors.

Recommendation 5: Mandate comprehensive emissions reporting including Scope 3 emissions for all large and listed companies

This would include developing standardised methodologies for calculating and reporting Scope 3 emissions, establishing verification mechanisms to ensure accuracy, and phasing in mandatory disclosure requirements with appropriate support for companies transitioning to the new standards.

Conclusion

The findings of this analysis have significant implications for policymakers, corporate leaders, and investors. While the UK corporate sector is making progress towards decarbonisation, the current trajectory is more aligned with a delayed transition scenario rather than the more orderly and ambitious pathways needed to minimize both physical and transition risks.

Our analysis highlights significant disparities in decarbonisation efforts across sectors, with energy-intensive industries facing particular challenges. The finding that the total emissions from the worst 10 performing companies is over 1000 times greater than the top 10 leading companies underscores the need for targeted interventions to address the largest emitters.

The critical gaps in current approaches include the lack of comprehensive Scope 3 GHG emissions data, inconsistent policy signals, and insufficient focus on hard-to-abate sectors. Addressing these gaps requires a coordinated effort from all stakeholders.

Policymakers must prioritise the development and enforcement of robust climate policies that drive emissions reductions across all sectors, with particular attention to lagging sectors and the establishment of consistent long-term policy frameworks. Corporate leaders need to integrate climate considerations into their strategic planning and operational practices, expanding their focus beyond direct emissions to include their full value chain. Investors should consider the long-term climate risks and opportunities when making investment decisions, using their influence to drive greater climate accountability and transparency.

To achieve the UK's ambitious climate targets, a concerted effort from all stakeholders is essential. By implementing the recommendations outlined in this report, the UK can accelerate its transition to a low-carbon economy, minimize both physical and transition risks, and capture the economic opportunities presented by the climate transition.

University of Exeter

J O Hambro Capital Management Group

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