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Scoping exercise: The role of banks in reducing GHG emissions of UK SMEs

SMART DATA FOUNDRY

Bankers for NetZero

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Executive Summary

This report is a scoping exercise to address the question:

> How could banks implement, or participate in, a system to gather data from their SME clients, measure greenhouse gas (GHG) emissions in a standard way across the economy and help drive/enable the carbon footprint reductions of their Small and Medium-Sized Enterprise (SME) clients.

Context

At the Paris Climate Agreement of 2015 (COP21), participants agreed to limit global warming to "well below 2°C, preferably no more than 1.5°C above pre-industrial levels", effectively requiring the net-zero by 2050 emissions scenario or similar (UNCC, 2022).

The UK enacted The Climate Change Act 2008 (2050 Target Amendment) Order 2019 which commits the UK to Net Zero carbon emissions by 2050 (UK Government, 2019).

At COP26 in Glasgow, banks committed to play an important role alongside governments and regulators in meeting global Net Zero targets by 2050. The Glasgow Financial Alliance for Net Zero (GFANZ) has four main branches, of which the banking pillar is the United Nations initiated Net Zero Banking Alliance (NZBA). The Bankers for Net Zero (B4NZ) group is the UK country chapter of the NZBA. B4NZ was formed in October 2019 with the aim of galvanising credible, demonstrable leadership from the UK banking sector on climate change. The initiative brings together banks, businesses, policymakers and regulators to define and implement the interventions needed to accelerate the UK economy's transition to net zero.

Banks have a crucial role in providing new finance to green infrastructure, phasing out funding for existing fossil fuel infrastructure and discontinuing funding for new fossil fuel infrastructure (Cojoianu et al., 2020). Commercial banks should focus on GHG emissions stemming from their corporate and business customers. The largest direct impact to GHG emissions will be large corporates and businesses and larger SMEs in the agriculture and manufacturing sectors, but SMEs, in general, are a critical part of the supply chain and require careful consideration.

Banks can also create awareness and educate all companies, including SMEs, with a view to encouraging attitudinal change.

Approach

This report only focuses on the role commercial banks can play in measuring and reducing GHG emissions from their SME clients. The scoping work is organised around three workstreams:

- How can banks assess SME GHG emissions?

- How can banks encourage SMEs to change behaviours and reduce GHG emissions?
- How can banks help to achieve a *just* transition to Net Zero?

Smart Data Foundry led the work over a period of 8 weeks, during which we:

- Conducted desk research on each of the workstreams. This included studying academic papers, recently published reports, and case studies;
- Interviewed experienced academics, involved in researching each of the workstreams;
- Interviewed specialist sponsors from Bankers for Net Zero (B4NZ) and other relevant organisations;
- Ran four workshops, led by academics, to structure the work and discuss each workstream;
- Interviewed several organisations that specialise in countering the climate emergency;
- Explored several cases from providers of market solutions, aimed at tackling different aspects of the problem statement.

This scoping exercise has been funded by HSBC UK.

SMEs in the UK

There are more than 5.9 million SMEs in the UK, collectively employing some 16.8 million people and accounting for an estimated £2.3 trillion in turnover or 52% of the UK Private sector (BEIS, 2021).

While environmental activity among large companies has mainly been driven by investor demand and regulation, many SMEs are exempt from mandatory reporting requirements and some of the pressures large companies face.

There is not yet a dominant standard for SMEs to follow when reporting GHG emissions.

In the absence of specific standards, SME responses to environmental regulation have been ad hoc and uncoordinated, which highlights the need to standardise the approach for reporting GHG emissions.

In addition, there are barriers to transition for SMEs, including scarce financial and human resources, time constraints, lack of awareness, knowledge and expertise, absence of perceived benefits, unsuitability of formal management tools and the complexity of sustainability standards.

On the positive side, drivers of change for SMEs include organisational culture, stakeholder and employee influence, customer preference, brand image, legal compliance, competition, and their networks and communities.

Apart from the obvious positive impact of addressing climate change, the transition to a low-carbon economy will undoubtedly create many benefits such as better insulated homes, cars that are cheaper to drive, cleaner air, quieter streets, more access to green spaces and more opportunities for citizens to improve their health. However, an “unjust” transition—one that leaves workers behind, abandons communities to post-industrial decline, and

deepens inequality—would have disastrous consequences for the UK and the globe. Therefore, we must consider the transition's impacts, specifically its impact on less affluent people, SMEs, larger enterprises, different regions, and industries as part of the UK's Net Zero efforts.

Plan to reduce GHG emissions of UK SMEs

We have organised the work required into a long-term plan and a more immediate set of actions which would inform the long-term plan.

In the long-term plan we addressed the themes of:

- Segmenting SMEs and following a differentiated approach for different segments based on GHG emissions and ease of reduction.
- Defining data standards and a methodology to measure GHG emissions, including the work currently ongoing in this area on an international scale.
- Defining the role banks could play in creating awareness of GHG emissions and incentivising SMEs to reduce emissions, including banks acting as catalysts for community initiatives, the role of banks as market makers for highly reliable, audited carbon offsets that reliably adhere to additionality, and the role of banks in implementing government programs.
- Considering what constitutes a just transition, the potential economic opportunities and downfalls of the transition and the role of banks in supporting a just transition.
- For all of the above, consider the role of government and regulation to ensure consistent measurement, avoid moral hazard and ensure fair treatment of stakeholders.

The immediate set of actions consist of:

Pilot a framework and platform that will:

- Segment the SME market
- Use existing frameworks and technologies to assess SME GHG emissions in a standardised format.
- Test the effectiveness of mechanisms to engage SMEs to reduce GHG emissions.

Define what a just transition entails for SMEs and determine the role of banks.

Draw up a high-level roadmap to enable net zero by 2050

The ambition is to have a working pilot model after 12 months that has the support of all major stakeholders and could be rolled out to SMEs in the UK. This working pilot would also

serve as part of the solution for government and regulators to ensure a level playing field in the transition to net zero.

Context of SME work

Within the Climate Change agenda

The latest (sixth) Intergovernmental Panel on Climate Change (IPCC) report lays out five climate projections based on different levels and mixes of greenhouse gas emissions and associated predicted warming of the Earth (IPCC, 2022). The two most optimistic scenarios are SSP1-1.9 and SSP2-2.6, which have central estimates for warming of 1.5°C and 2.0°C (respectively) above pre-industrial levels. SSP1-1.9 assumes very low greenhouse gas emissions (GHG) declining to net zero around 2050, followed by net negative CO_2 emissions (IPCC, 2022).

At the Paris Climate Agreement of 2015 (COP21), participants agreed to limit global warming to *"well below 2°C, preferably no more than 1.5°C above pre-industrial levels"*, effectively requiring the net-zero by 2050 emissions scenario or similar (UNFCC, 2015).

The UK enacted The Climate Change Act 2008 (2050 Target Amendment) Order 2019 which commits the UK to Net Zero carbon emissions by 2050 (UK Government, 2019).

The UK Committee on Climate Change's Sixth Carbon Budget sets out Parliament's recommended path to achieving Net Zero by 2050 and recommends the UK follows its *balanced pathway* to achieve and require *"a reduction in UK greenhouse gas emissions of 78% by 2035 relative to 1990, a 63% reduction from 2019"* (Committee on Climate Change, 2020). It also notes *that "performance against the budget should be judged based on* actual *UK emissions (net of removals), without recourse to international carbon units (often referred to as 'credits')"* and *that "[t]he budget should cover all greenhouse gas emissions,* including *those from international aviation and shipping, and removals of CO2 from the atmosphere"* (Committee on Climate Change, 2020). We would add that in assessing companies' emissions, it would be better to discount purchased domestic carbon offsets, or at the very least to account separately for gross emissions and any offsets.

The Office for National Statistics states that "*Net zero means that the UK's total greenhouse gas (GHG) emissions would be equal to or less than the emissions the UK removed from the environment. This can be achieved by a combination of emission reduction and emission removal."* Also *"GHG emissions can be removed by the natural environment or by using technologies like carbon capture (usage) and storage (CC(U)S)"* (ONS, 2019).

The SSP1-1.9 pathway requires emissions to peak no later than 2025 and then decline every year until 2100.

UK net territorial emissions were estimated to be 522 $MtCO_2e$[1] and by 2050 this must (according to the Climate Act and the UK's stated commitment) reduce to 0.

While other organisations—including banks—and individuals all have a role to play, only government can legislate, regulate, and raise taxes—the key tools for achieving net zero.

Under the Greenhouse Gas Emissions Protocol (GHGP)'s framework, which was recommended by the Task Force on Climate-Related Financial Disclosures (TCFD)[2], emissions are classed as:

- Scope 1: Direct GHG emissions from activities
- Scope 2: GHG emissions from electricity used in activities
- Scope 3: All upstream and downstream activities associated with the business.

The overwhelming proportion of current emissions come from the use of fossil fuels, which are extracted (mostly in the form of oil, natural gas, and coal) by a small number of large corporations.

The Scope 1 and Scope 2 emissions from the primary extractors of fossil fuels are the greenhouse gases they use (and lose[3]) during operations (Scope 1) and the electricity they use in operations (Scope 2), but all downstream combustion of their hydrocarbon products are Scope 3.

Similarly, electricity generation from fossil fuels is performed by a relatively small number of companies at a relatively small number of sites. Their Scope 1 emissions are primarily the GHG emissions as they generate energy from fossil fuels, and everyone else's Scope 2 emissions are their Scope 3 emissions.

By far the most effective way we know to discourage economic activities are financial incentives (price signals, taxation, grants, loan pricing etc.) and regulation. A carbon tax at source would be economically efficient and hard to avoid but would be inconsistent with a *just* transition if applied without protecting vulnerable people (and perhaps businesses) who would otherwise be unable to feed themselves, cook, heat their homes and travel as required. Both the tax and remediations are mostly in government's exclusive power (at various levels—central, national, regional, and local). Companies and individuals can, of course, reduce their carbon footprint through a myriad of actions, and can both be incentivised to do so (through fiscal measures and regulation) and motivated and helped to do so through education, subsidy, and voluntary action.

Despite the pledges from countries and companies around the world to reduce their GHG emissions and avoid the most dangerous impacts of climate change, global emissions have continued to increase over the past two decades, reaching a high of 55.3 $GtCO_2e$ in

[1] Millions of tonnes of CO_2 equivalent
[2] See TCFD (2021) in 'Sources'
[3] Losses of natural gas are particularly serious as gas is largely methane, a greenhouse gas some 84 times more potent (though shorter lived) than CO_2: so leaking gas is dramatically worse than burning it.

2018(UN, 2019). One reason for this is that despite a record amount of new investment in renewable energy, we have also reached historical highs in funding of fossil fuels (BNEF, 2019; EY, 2014). From a scientific perspective, the stabilisation of global warming under any target requires the achievement of a net-zero emissions economy (Matthew and Caldeira, 2008). For this to be plausible, all currently planned fossil fuel projects would need to be cancelled and up to 20% of existing infrastructure would have to be stranded (Pfeiffer et al., 2018).

Thus, going forward, banks have a crucial role to play in providing new finance to green infrastructure, rapidly phasing out funding for existing fossil fuel infrastructure, discontinuing funding for new fossil fuel infrastructure, as well as creating Paris-Aligned debt instruments which require and reward meaningful reductions, ideally of 7% or more year-on-year across Scopes 1, 2 and 3, across the banks 'most GHG-intensive borrowers'(Cojoianu et al., 2020; UN, 2019).

Given this background and prioritisation of the most impactful activities banks should focus on, there is an additional layer that commercial banks in particular should focus on—GHG emissions stemming from their SME customers. The largest direct impact to GHG emissions would probably be by focusing on the larger SMEs in the fields of agriculture and manufacturing, but banks also have a role to play in creating awareness and educating all SMEs, which helps set the tone for societal change.

Most small and medium businesses have relatively limited ability to affect how their energy is generated, though they can of course seek to reduce energy use in all the usual ways (energy efficiency, alternate transport modalities, upgrading buildings, where possible, and so forth). This is to be encouraged and welcomed but given that virtually all businesses use electricity and some transport, decarbonising electricity and disincentivising fossil fuel use through carbon taxes and regulation will prove to be powerful ways of driving down most small businesses' Scope 1 and Scope 2 emissions.

International Initiatives and SME-related work

Besides discussing the broader climate agenda, it is important to highlight current international efforts focused on decarbonisation, engagement with the banking sector and the SME population.

With the support of investors, non-governmental organisations (NGOs), the public sector, and other stakeholders, the financial industry has made significant progress in recent years. Emerging common standards now quantify the emissions financed by financial institutions and the impact of climate change on the industry's portfolios (GFANZ, 2021).

Acknowledging the progress made helps to frame our report correctly, rather than conveying it as an independent effort. Our analysis, findings and recommendations aim to build on the work of other organisations, and to indicate that progress could be achieved through future collaboration.

The United Nations Environment Programme Finance Initiative

The United Nations Environment Programme Finance Initiative (UNEP FI) is a global partnership between the United Nations Environment Program and the financial sector.

Founded in 1992, UNEP FI was the first organisation to engage the finance sector on sustainability. Its evolution can be tracked back to the Rio Earth Summit in 1992, more specifically in the UNEP Statement of Commitment by Financial Institutions on Sustainable Development, which was the original backbone of the United Nation (UN)'s finance initiative. By signing up to the statement, financial institutions recognised the role of the financial services sector in sustainability and committed to the integration of environmental and social considerations into all aspects of their operations (UNEP FI, 2022a). The organisation currently cultivates leadership and advances sustainable market practice with more than 400 financial institutions, with assets of more than US$80 trillion, headquartered in over 85 countries (UNEP FI, 2022a).

As part of its commitment, UNEP FI convenes financial institutions to apply industry frameworks on a voluntary basis and develop practical guidance and tools to position their businesses for the transition to a sustainable and inclusive economy. More specifically, UNEP FI helps financial institutions to advance practical approaches to setting and implementing targets in areas including GHG emissions, nature, sustainable consumption and production, and financial inclusion to address inequality. Its two main workstreams oversee the implementation of industry-based principles, and the fostering in-depth thematic research, guidance, and communities of practice (UNEP FI, 2022a). [4]

The solutions are designed to establish industry norms and provide a clear blueprint for the financial sector to tackle global challenges and shift towards the sustainability pathway; UNEP FI has established the world's foremost sustainability frameworks within the finance industry to address global environmental and social challenges. Major milestones include the Principles for Responsible Investment (PRI) network, which is now the world's leading proponent of responsible investment and is applied by half the world's institutional investors (USD 83 trillion) as of 2022 (UNEP FI, 2022a). UNEP FI is also facilitating implementation of Principles for Responsible Banking and Principles for Sustainable Insurance, as well as the UN-convened net zero-alliances (UNEP FI, 2022). It is also worth highlighting that progress has been made in areas related to our remit, particularly in encouraging environmental action and collaboration in the banking sector. The UNEP FI alliance most relevant to our work is the Net-Zero Banking Alliance (NZBA), for which the Bankers for Net Zero Group (B4NZ) is the UK country chapter. NZBA Brings together 92 banks from 37 countries representing more than 63 trillion in assets – over 40% of banking assets globally – that are committed to aligning their lending and investment portfolios with net-zero emissions by 2050, as well as with a temperature outcome of no more than 1.5 degrees c by 2100, based on low or no-overshoot scenarios and considering best available scientific knowledge (GFANZ, 2021)

This commitment sees banks setting intermediate targets for 2030 or sooner, using robust, science-based guidelines. NZBA works to reinforce, accelerate, and support the

[4]See appendix A For more information on UNEP FI

implementation of decarbonisation strategies, providing an internationally coherent framework and guidelines in which to operate, supported by peer learning from pioneering banks (GFANZ, 2021). NZBA recognises the vital role of banks in supporting the global transition of the real economy to net-zero emissions. While it is beyond the scope of this report to outline a clear plan for collaboration, further engagement with UNEP FI is something we should consider when engaging UK SMEs and the banking sector.

The Task Force on Climate-Related Financial Disclosures

The TCFD was created in 2015 by the Financial Stability Board to develop consistent climate-related financial risk disclosures for use by companies, banks, and investors in providing information to stakeholders (UNEP FI, 2022b).

Since disclosures are made on a voluntary basis, in devising a principle-based framework for voluntary disclosure the TCFD drew from existing disclosure frameworks where possible and appropriate – so as to not add to the already well-developed existing disclosure schemes. In 2017, the TCFD released climate-related financial disclosure recommendations designed to help companies provide better information to support informed capital allocation. These are based around four thematic areas that represent core elements of how companies operate (TCFD, 2022).[5]

Effect of the TCFD Recommendations and Progress

Following the 2017 recommendations by TCFD, it is now commonplace for financial institutions to disclose climate risks and opportunities using the TCFD framework, and the industry has achieved increased disclosure among the companies it finances (GFANZ, 2021). The voluntary set of recommendations has become part of the regulatory framework in many jurisdictions, including the European Union, Singapore, Canada, Japan and South Africa. New Zealand and the United Kingdom are mandating climate risk disclosures in line with the TCFD by 2023 and 2025 respectively. More governments are expected to shift from recommending the TCFDs as guidance to embedding the recommendations into mandatory legislation and regulation (Deloitte, 2022).

This growing convergence of methods and standards has been facilitated by cross-organisational collaboration. For example, UNEP FI has been working closely with TCFD following the publication of its recommendations, by running a series of pilot projects for banks, investors, and insurers. Almost 100 financial institutions (banks, investors, and insurers) from around the world have participated in these pilots; participants explored physical and transition risks (and litigation risks for insurers), and also pioneered practical approaches for evaluating these risks using climate scenario analyses (UNEP FI, 2022c)

The pilots have generated numerous tools, frameworks, and guides to empower both participating institutions and those throughout the financial industry to better manage and disclose their risks (UNEP FI, 2022c).

The next steps in the TCFD-UNEP FI collaboration include increasing granularity and depth; UNEP FI will expand its regional TCFD programmes to support capacity building for firms

[5] See Appendix A for TCFD recommendations

facing unique challenges in various parts of the world (UNEP FI, 2022c). Highlighting TCFD's work serves to inform our remit and plan. By integrating and expanding aspects of their work, particularly efforts related to measurement and reporting methodologies, we could encourage further convergence in the provision of a clear transition framework for SMEs. Opting for a standard that has increasing in adoption and recognition in the UK and abroad (by companies, institutions, and other organisations) would encourage homogeneity in standards and provide a starting point for future collaboration.

The Glasgow Financial Alliance for Net Zero

The Glasgow Financial Alliance for Net Zero (GFANZ) is a global coalition of leading financial institutions in the UN's Race to Zero that is committed to accelerating and mainstreaming the decarbonisation of the world economy and reaching net-zero emissions by 2050.

GFANZ unites net-zero finance initiatives in the UN's Race to Zero, convened by UNEP FI, into one sector-wide strategic alliance. Its goal is to provide a practitioner-led forum for financial firms to collaborate on substantive, crosscutting issues that will accelerate the alignment of financing activities with net zero, and support efforts by all companies, organisations, and countries to achieve the goals of the 2015 Paris Agreement.[6]

GFANZ also collaborates closely with other mission-aligned organisations such as TCFD and the World Economic Forum to accelerate progress towards common goals (GFANZ, 2021).

Membership includes more than 450 financial firms from 45 countries, responsible for assets of over 130 trillion. This integrates a significant and growing proportion of the global financial industry in a common mission to make climate considerations a part of every capital allocation decision (GFANZ, 2021). However, upward convergence in ambition is needed, and GFANZ will keep pushing for that and for refining the practitioner-led work programme – in collaboration with NGOs, industry bodies, and governments – to accelerate the commitment, engagement, investment, and net-zero alignment required to transform our global financial system to meet the greatest challenge of our age.

GFANZ Progress

GFANZ's progress has been remarkable – building on the vast body of work produced over decades by the sustainable finance community. The organisation is aiming to be an enduring structure in sustainable finance landscape; it plans to reinforce global reach through regional hubs in key geographies, and to embed close links with national and international policymakers as a way for institutionalising the net-zero transition and drive change (GFANZ, 2021). The main branches of GFANZ include workstreams on building commitment from different sectors, identifying and alleviating the future global asymmetries that would be caused by a transition to low carbon, encouraging convergence towards measurement and reporting standards in the global financial industry, and working with financial institutions to segment the global economy by sector, footprint and needs. Since all of these

[6] For example, NZBA is the banking element of GFANZ and Race to Net Zero. As mentioned in the UNEP FI section, NZBA is industry-led and convened by the UNEP FI. A similar relationship holds for all other UN Net Zero alliances.

workstreams are highly relevant to our remit, we should consider collaborating with GFANZ as part of our future plan.[7]

SME Climate Hub

Highly relevant to our report are the efforts of the SME Climate Hub, a global initiative founded by the We Mean Business Coalition, the Exponential Roadmap Initiative, and the UN Race to Zero, in an effort to mainstream climate action in the SME population and provide an official pathway for SMEs to join the UN Race to Zero Campaign.

The Hub aims to streamline the path for SMEs to become climate resilient, by providing a one-stop-shop platform for SMEs to:

1) Make an internationally recognised SME Climate Commitment
2) Access free, practical tools and resources to help curb emissions
3) Unlock valuable incentives

The provision of free tools and resources aims to help SMEs measure and manage their emissions, educate themselves on climate action plans, and communicate on their progress (SME Climate Hub, 2022). The hub's goal is to incentivise and assist businesses to commit to halving GHG emissions before 2030 and reaching net-zero before 2050 (Cambridge Institute for Sustainability Leadership, 2021)

[7] See Appendix A for more information on GFANZ

Tools for SMEs

The SME Climate Hub provides the following tools for SMEs:

Business Carbon Calculator

Developed in partnership with Normative and with support from Google.org, the calculator enables SMEs to measure their carbon footprints and identify emission hotspots. SMEs input accessible data, such as size of their facilities or their spend on electricity, heating, and petrol into a user-friendly form. The resulting footprint establishes a baseline covering the three GHGP scopes, from which SMEs can then act through the suite of tools on the SME Climate Hub.

Climate-Fit Education Course

ClimateFit is a free guide developed in partnership with BSR and the Cambridge Institute for Sustainability Leadership (CISL) to act as practical guide to support SMEs to reduce their emissions. The guide is in module format, allowing complex topics to be easily digestible and for SMEs to identify relevant action areas (Cambridge Institute for Sustainability Leadership, 2022).

SME Climate Disclosure Framework

The SME Climate Hub has launched a simplified SME Climate Disclosure Framework in partnership with the Carbon Disclosure Project (CDP), the Exponential Roadmap Initiative and Normative. The framework lays out climate-related indicators SMEs should be reporting on and use to inform their disclosures; the resource is open-access and it is intended to used directly by SMEs to guide their reporting of climate impacts and strategies. The SME Climate Hub is now developing an interactive tool based on the SME Climate Disclosure framework that will be released in Sept. 2022. SMEs will be able to use this tool to fulfil the requirement to publicly disclose progress, but also for establishing strategy and action (CDP, 2021; SME Climate Hub, 2022).

Financial Support Guide

To increase engagement between financiers and SMEs, the SME Climate Hub have worked with BSR and the Cambridge Institute for Sustainability Leadership (CISL) to launch an online guide that details the financial support available to reduce emissions and how to access it. The guide details the available support not only from banks and corporates, but also public institutions like development banks (SME Climate Hub, 2022; Cambridge Institute for Sustainability Leadership, 2021).

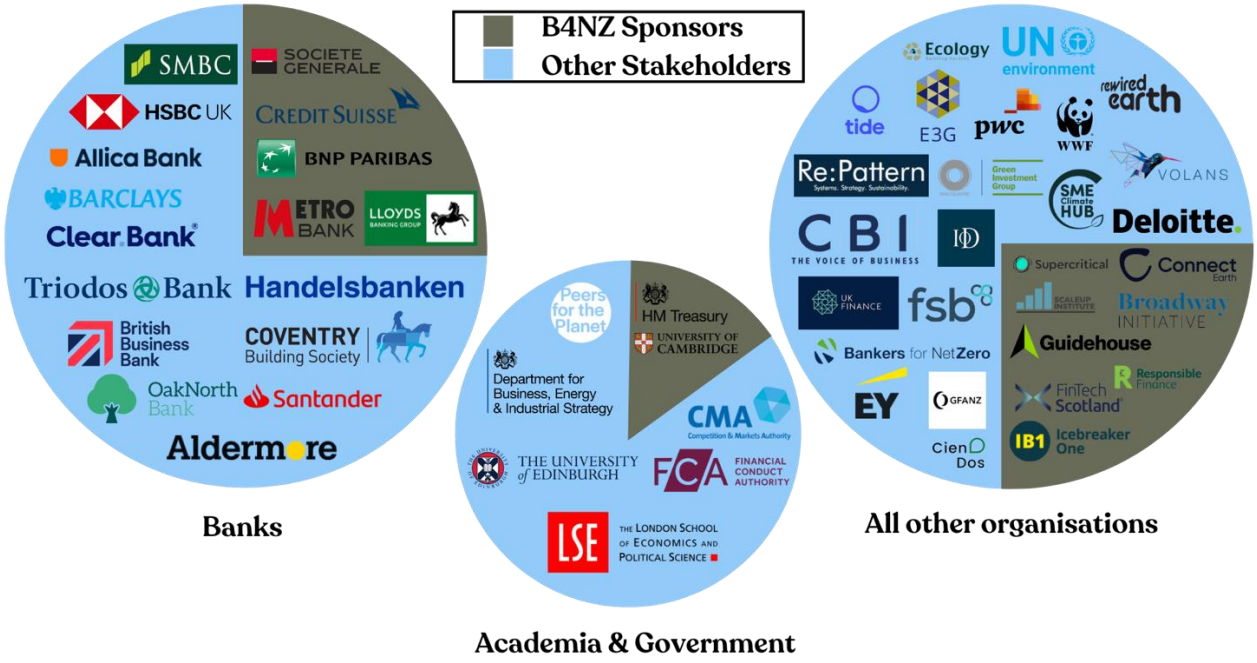
Stakeholder Map

As mentioned in the previous section, GFANZ has four main branches, of which the banking pillar is the UNEP FI's NZBA. The B4NZ group is the UK country chapter of the NZBA.

B4NZ was formed in October 2019 with the aim of galvanising credible, demonstrable leadership from the UK banking sector on climate change. The initiative brings together banks, businesses, policymakers and regulators to define and implement the interventions needed to accelerate the UK economy's transition to net zero.

B4NZ Stakeholders

Map of B4NZ core sponsors and additional stakeholders involved during the scoping exercise:



The B4NZ stakeholder group has a wider reach than just banking organisations, with member organisations in several key industries such as academia, government, regulators, industry bodies, and SMEs.

We engaged most of the organisations represented above to gather views, understand positions, and scope out ideas on how to measure and report SME GHG emissions in the UK, how to change SME behaviours, and how to guide a just transition from a banking perspective.[8]

[8] See Appendix B for detailed stakeholder maps

Synthesis of insights and research and literature review

Desk research

An overview of the current landscape for measuring GHG

Development of Sustainability Measures

The increasing awareness of the potential impacts of climate change on all economic activities since the beginning of the century has led companies across the globe to assess and address the potential threats and opportunities associated with climate change and a transition towards more sustainable solutions. A growing number of firms already measure the GHG emissions generated by their activities and assess their exposure to physical climate change impacts as well as changing market conditions and consumer preferences because of climate change. The assessment and management of actual and prospective climate-change-related impacts has become an essential element of corporate strategy and risk management (Kauffmann et al., 2012).

Moreover, there is an increasing demand from governments, investors, and other stakeholders for corporate information related to climate change. Stakeholder demand for more corporate transparency has been growing through encouraging companies to disclose high-quality environmental information. This is particularly the case for GHG emissions as the scope of monitoring is expanding to cover direct and indirect, current, and future corporate and product emissions (Kauffmann et al., 2012). Demand for climate change information has translated into voluntary and mandatory government schemes that, together with non-governmental initiatives, encourage or require enterprises to measure and report their GHG emissions. These conditions may be part of environmental and other non-financial disclosure requirements, or of instruments that put in place a carbon price, such as carbon taxes and emissions trading schemes (Kauffmann et al., 2012).

The following section provides an overview of the available environmental management tools and standards available for companies to navigate the challenges related to climate change.

Measuring Emissions: Carbon Accounting

Quantifying, assessing, and monitoring GHG emissions are fundamental to the UK's Net Zero journey. Carbon footprinting allows firms (corporates and SMEs) to gain insights, devise a plan with targets and deadlines, monitor impacts, and reduce GHG emissions (Lloyds Bank, 2021). This provides several benefits, such as clarity on priority areas, the monitoring of progress, a financial measurement of commercial benefits and significant public-relations opportunities (Lloyds Bank, 2021).

As part of implementing an environmental management tool, firms internally measure their emissions through carbon accounting: a process of inventorying and auditing GHG emissions (CFI, 2022). This calculation can be used as a baseline, to be compared against future

climate progress thereby enabling firms to understand their impact; something that is vital for sustainability reporting and to achieve a Net Zero transition.

However, measuring sustainability and progress is a challenging task. Firms typically conduct measurement independently and finding support in doing so can be difficult — particularly if the quantification of emissions lies outside the company's operational domain (Lloyds Bank, 2021). Since there was no standard tool in terms of measuring carbon before the 2000s, organisations independent of public authorities seized the opportunity to set standards in terms of exactly what to measure and report (Le Breton and Aggeri, 2018). While this has contributed to the global proliferation of available guidelines and tools, it has also fragmented the environmental management landscape for firms, both in terms of information available and data-related standards.

GHG Protocol and the Three Scopes

The most widely used carbon measurement standard is the GHGP (established in 2001) which provides a method for scoping and measuring GHG emissions and attempts to ensure that some degree of standardisation is adhered to globally. It also enables firms to understand their impact across all scopes of their organisation, which some experts deem vital for reporting and achieving Net Zero.

Multinationals have aimed to improve their environmental performance by setting up their own carbon management accounting system and linking it to external carbon reporting, basing their internal procedures on the GHGP (Gibassier and Schaltegger, 2015).

Under the GHGP, which was recommended by the Task Force on Climate-Related Financial Disclosures (TCFD)[9], emissions are classed as:

Scope 1

covers direct emissions from owned or controlled sources (e.g. fuel combustion, company vehicles, fugitive emissions

Scope 2

covers indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting company

Scope 3

includes all other indirect emissions that occur in a company's value chain (purchased goods and services, business travel, employee commuting, waste disposal, use of sold products, transportation, and distribution (up and downstream), investments, leased assets and franchises

[9] See TCFD (2021) in 'Sources'

For many companies, the majority of their GHG emissions and cost reduction opportunities lie outside their own operations and within Scope 3. By measuring Scope 3 emissions, organisations can:

- assess where the emission hotspots are in their supply chain;
- identify resource and energy risks in their supply chain;
- identify which suppliers are leaders and which are laggards in terms of their sustainability performance.

Problems with current Carbon Accounting and Disclosure

Carbon accounting and disclosure remain voluntary in most parts of the world, leading researchers to express concerns about the quality of carbon disclosures. Indeed, there are data inconsistencies, there is a lack of technical detail and a probability for internal conflicts of interest to affect the data measuring and reporting processes (He, 2021).

The voluntary nature of disclosure and the varied definitions of materiality and carbon performance (i.e., what to measure and assess) has led to inconsistency, and data that does not lend itself to comparability. Therefore, the basis and reliability of the results are questionable when different methods are used, and different motives for measuring influence the internal carbon emission assessment process (He, 2021).

Other factors affecting carbon management practices include regulation, carbon exposure, reputational concerns and protection of economic interest, carbon cost structures, management renumeration plans, and corporate governance structures (He, 2021). According to our stakeholders, reputation is a key factor to consider when evaluating the slow progress in carbon disclosures. Firms may be reluctant to place themselves in a vulnerable position against their competitors; they may be less likely to disclose first or be dishonest if their carbon emissions are particularly high for fear of losing ground against other firms in their market segment.

Relevant Standards, Initiatives and Tools

The increasing demand for emission management measures to be implemented, and the lack of international, mandatory standards, has led to the proliferation of different initiatives across both private and public sectors, both in the UK and internationally. These are described below:

The Science Based Targets Initiative

The Science Based Targets Initiative (SBTi) is part of the World Resource Institute in collaboration with the Carbon Disclosure Project (CDP), the Worldwide Fund for Nature (WWF) and the UN Global Compact.

The science-based targets indicate to companies how much and how quickly businesses need to reduce their GHG emissions to prevent the worst impacts of climate change, whilst setting them on a path towards decarbonisation. These enable companies to tackle climate change while boosting their competitiveness and reaping the benefits in the transition to Net Zero (WRI, 2022).

The SBTi has several functions:

- it defines and promotes best practices in emission reductions and targets in line with climate science;
- it provides target-setting techniques and guidance to companies to do so in line with the latest climate research efforts;
- it is driven by a team of experts that seeks to provide companies with independent assessment and validation;
- it serves as the lead partner of the Business Ambition for 1.5°C campaign: a call from a coalition of UN agencies, business, and industry leaders to mobilise companies

As of 2022, over 3,500 large companies and financial institutions around the world are adopting SBTi's in their transition efforts (SBT, 2022).

Environmental Management Systems

An Environmental Management System (EMS) is one of the most powerful tools an organisation can use to implement an environmental policy. It consists of several interrelated elements that function together to help a company manage, measure (via carbon accounting and its standards), and improve the environmental aspects of its operations (Delmas, 2002).

Companies, particularly large corporates, have adopted and certified their environmental management systems via international standards. Voluntary EMS standards such as the ISO 14001 and the Eco-Management and Audit Scheme (EMAS) have become the most common standards for guiding companies through the design and certification processes; providing all businesses with the means to develop an EMS and improve their environmental performance (Morrow and Rondinelli, 2002; Hillary, 2004).

- ISO 14001: developed by the International Organisation for Standardisation (ISO), this is the main standard for the design and content of an EMS. The standard is part of the ISO 14000 family — a set of tools for developing, implementing, maintaining, and evaluating environmental policies and objectives. The family contains standards for environmental management systems, environmental auditing, performance, labelling and life-cycle assessment.
- EMAS: The European Union's Eco-Management and Audit Scheme is a management tool for companies and organisations in the European Union and the European Economic Area. EMAS provides an opportunity for companies to receive an external "seal of approval" associated with EMAS registration — this is subject to environmental reviews and the establishment of environmental performance statements, among other processes. Some requirements for EMAS are similar to those of ISO 14001.

Due to the greater focus and emphasis placed by researchers on EMS as an actionable tool for enterprises to successfully transition towards sustainability (via an all-encompassing system of emission measurement and control), a great deal of our research and analysis is based on EMS-related work (Johnson and Schaltegger, 2016).

Carbon Disclosure Project (CDP)

By implementing an internal EMS based on standards, companies can use their internal self-reported data to officially disclose their environmental impact via the CDP, a not-for-profit which aims to make environmental reporting and risk management a business norm, driving disclosure, insight, and action towards a sustainable economy. Today, nearly a fifth of global GHG emissions are reported through CDP; in 2021, over 14,000 organisations disclosed their environmental information through CDP (CDP, 2022).

The main purpose of CDP for companies is that much of their environmental data has never been collected and/or verified. The information is becoming increasingly helpful to investors, corporations, and regulators in making informed decisions for acting towards a sustainable economy by measuring and understanding their environmental impact. Therefore, there is a growing pressure internally, and externally, for firms to achieve verification via CDP.

Corporate Social Responsibility (CSR)

Commentators and analysts define CSR as a process whereby companies voluntarily integrate social and environmental concerns in their interaction with their stakeholders. CSR is a contribution that companies can make to sustainable development, requiring them to balance and improve environmental and social impacts. Following the trend towards sustainability, CSR shifts the view of firms solely as providers of goods and services, towards one that also sees firms as social welfare contributors (Williamson et al., 2006).

CSR shares carbon accounting and environmental standards in common with environmental management systems; for instance, firms use ISO 14000 for CSR implementations. While CSR is relevant to this analysis of UK small businesses and the Net Zero Transition, it is beyond the scope of this report to focus extensively on CSR broadly. Given the need for a data-driven solution, this report will focus on tools and/or solutions small firms can implement to measure, monitor, and report their GHG emissions. This provides a narrow focus based on environmental outcomes alone, rather than on all-encompassing metrics such as CSR, which seek to also account for more subjective factors such as culture, values, and relationships in their quantitative performance indicators.

Life Cycle Analysis (LCA)

Life Cycle Analysis (LCA) is a methodology used for assessing environmental impacts associated with the life cycle stages of a commercial product, process, or service. This involves a thorough examination of the energy and materials required across the industry value chain of the product or service, which allows for the calculation of GHG emissions (Muralikrishna and Manickam, 2017).

LCA consists of four stages:

a) goal and scope aim to define how much of a product life cycle will be assessed, and what end the assessment will be serving;
b) inventory analysis to describe the material and energy flows within the product system and its interaction with environment, raw materials, and emissions;
c) details from inventory analysis used for impact assessment;

d) interpretation of a life cycle involves critical review, determination of data sensitivity, and result presentation.

Since LCA is part of EMS standards, such as ISO 14001, we will not examine it further in this report.

PAS 2060

PAS 2060 is an internationally recognised specification for carbon neutrality published by the British Standards Institution. It builds on the existing PAS 2050 and ISO 14001 environmental standards and sets out requirements for measuring, reducing, and offsetting GHG emissions for organisations, products, and events.

A carbon-neutral certification demonstrates a firm's commitment to decarbonisation, and the neutralisation of remaining impact through the support of environmental projects. Gaining a carbon-neutral footprint means that the sum of the GHG emissions produced is offset by carbon sinks and/or credits (Carbon Trust, 2022). Carbon neutrality has a minimum requirement of covering Scope 1 and 2 GHG emissions, while Scope 3 is encouraged (see GHGP section).

Lastly, PAS 2060 does not outline any requirement for a company to reduce its GHG emissions on a certain trajectory in order to be carbon neutral; an organisation must be reducing its emissions along a 1.5°C trajectory across all three GHGP Scopes (Carbon Trust, 2022).

Environmental, Social, and Governance Data (ESG)

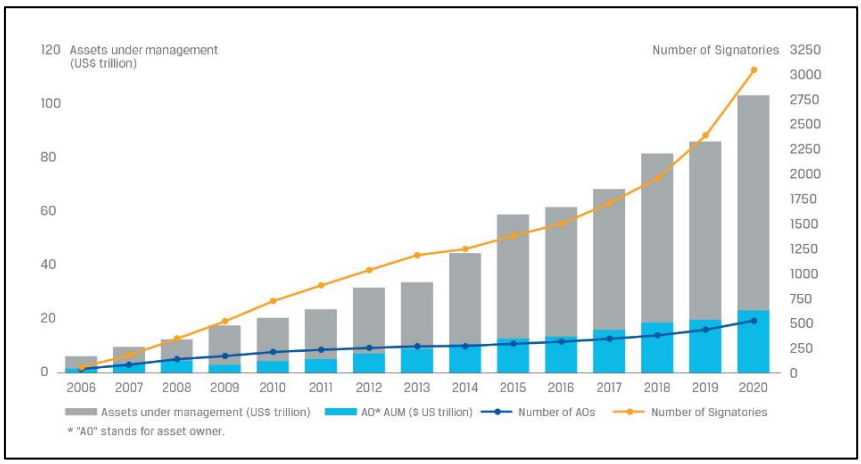
Investors are increasingly applying non-financial factors as part of their analysis process, to identify material risks and growth opportunities. Environmental, Social and Governance (ESG) metrics are not part of mandatory financial reporting, though companies are increasingly making disclosures in their annual report or in their standalone sustainability reports.

Institutions such as the Sustainability Accounting Standards Board(SASB), the Global Reporting Initiative (GRI), and the TCFD are working to form standards and define materiality to facilitate incorporation of these factors into the investment process. Traditional investing delivers value by translating investor capital into investment opportunities that carry risks commensurate with expected returns. Sustainable investing delivers value by balancing traditional investing with environmental, social, and governance related insights to improve long-term outcomes.

Sustainable investing is part of the evolution of investing. There is a growing recognition among industry participants that ESG factors are economic factors, especially in the long term, and it is important to incorporate all ESG indicators (CFA, 2022).

What Drives ESG data and reporting?

The chart below shows the growth of signatories to the PRI. This demonstrates that investment organisations have increasingly been committing to integrate ESG considerations in their processes, at a 16% 10-year compound annual growth rate through 2020.



PRI signatory growth chart. Source: CFA 2022

In the first half of 2020 alone, the number increased by 28%, and the assets under management of these entities grew 20%, to more than US$100 trillion, boosted by demand and strong relative performance. This figure combines the assets of both asset owners and asset managers, and includes some double counting (CFA, 2022).

Key Drivers of ESG data

a) Climate Change

The continued dominance of the environmental element of ESG shows how climate change concerns are at the forefront of investors' minds. According to a Harvard University ESG report, global investors allocate most of their focus to the environment component of ESG, which has increased its share from last year (47% in 2022 from 44% in 2021). Global allocations to the social segment remain unchanged, while the focus on governance has marginally decreased (Harvard University, 2022).

b) Client Demand

The increasing ESG momentum is being propelled by global client demand and external pressures. Harvard University researchers show that more global investors in 2022 say their approach to ESG is driven by client expectations (42% in 2022 vs 37% in 2021). Clients are increasingly requesting investments in renewable energy and are also less sceptical about the motives of asset managers (Harvard University, 2022).

c) The COVID-19 Pandemic as a Sustainability Catalyst

The pandemic has:

- Focused investors on the vulnerability and resilience of the financial system, and intensified discussions around sustainability. COVID-19 has accelerated sustainable investing.
- Revealed the need for systemic thinking and shown the personal consequences of our interconnectedness: our lives rely on economic, environmental, and social systems.

Current Problems with ESG Data

As with carbon footprinting, a major difficulty with ESG data, used in an investment decision process, relates to the lack of standardisation for comparability across firms (Amel-Zadeh and Serafeim, 2018).

ESG information is material to investment performance, but which information is material varies across countries (a country where water pollution is a significant issue versus a country where corruption is a more genuine issue), industries (some sectors pollute more), and even company strategies (the extent to which internal company culture supports environmental impact measurement).

Indeed, research has shown that the vast majority of ESG data for any industry is immaterial to investment performance, and that the material information varies among industries within a sample of US stocks (Khan et al., 2016).

Other issues with ESG include:

a) Varied support for key regulations
b) All ESG data models apply simplified assumptions and reduce the relevance of results
c) The aggregation of data is not always transparent
d) There is a lack of correlation between ESG scores
e) No solution can model all asset classes
f) The lack of available ESG data is a major challenge for providers and financial firms

ESG data will increase in importance as regulatory requirement and investor demands evolve. Challenges around utilising external ESG data are clear — selecting the right vendors, ensuring consistent use across the business, and developing the right data integration strategy and execution. Moreover, EY's comparative ESG data provider analysis shows that the fragmentation of the market in ESG data vendors demands a concerted and careful approach (EY, 2021).

SMEs: Definition and Challenges

An SME is defined as a company employing 250 people or less, which has a turnover not exceeding €50 million and/or a balance sheet total of less than €43 million (Zorpas, 2010; Bankers for Net Zero, 2021).

Implementing an effective environmental management tool to address GHG emissions has proven even more challenging for SMEs than for large corporates. The uptake challenge for SMEs is reflected in current figures on environmental management tool uptake: according to the British Business Bank around 76% of SMEs in the UK are yet to implement comprehensive decarbonisation strategies (British Business Bank, 2021).

A reason for this is that until the early years of the current century, environmental policies and related research activities in the UK had primarily focused on larger public and private organisations; most environmental schemes were for large corporations (Hampton et al., 2022). Whereas the GHGP is a guide that outlines how to report on every part of the corporate value chain, reporting standards tell companies which aspects of their business

operations to report on, which takes SMEs more time and money to implement. **There is not yet a dominant standard for SMEs to follow when reporting GHG emissions** (ESRC, 2021).

National and International Mandatory Requirements

Carbon Reporting Regulation in the United Kingdom

The legal framework for carbon reporting in the UK is based on two legislations:

a) The Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013
b) The Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018

Quoted companies, defined by the Companies Act 2006 as companies whose shares are traded on a stock exchange, are required to report on environmental matters (including the impact of its activities on the environment) to the extent it is necessary for an understanding of the company's business within their annual report, including where appropriate the use of key performance indicators (KPIs).

The 2018 regulations came into force on the 1st of April 2019 and applies to fiscal years starting on or after this date. The regulations brought in additional disclosure requirements for quoted companies. They also introduced requirements for large unquoted companies (not listed on the stock exchange) and limited liability partnerships to disclose their annual energy use and GHG emissions, and related information.

As part of the new 2018 legislation, the UK government has introduced the Streamlined Energy and Carbon Reporting (SECR) policy, which businesses must comply with. The new regulations will require an estimated 11,900 companies in the UK to disclose their energy and carbon emissions. SECR builds on, without replacing, existing requirements that companies may face such as mandatory GHG reporting for quoted companies, the Energy Saving Opportunity Scheme (ESOS), Climate Change Agreements (CCA) scheme, and the EU Emissions Trading Scheme (ETS). SECR extends the reporting requirements for quoted companies and mandates new annual disclosures for large unquoted and limited liability partnerships.

The legislation affects:

- Quoted companies – defined as companies whose equity share capital is on a stock exchange. These must already report under mandatory greenhouse gas reporting regulations, regardless of their size.
- Large unquoted companies and large limited liability partnerships – SECR defines a large firm as a firm that meets two or more of the following requirements: £36m+ turnover, £18m+ balance sheet total or 250+ employees (interestingly, just above our threshold in terms of SME definition – SMEs not currently regulated in the UK)

What must be reported under SECR?

- Global Scope 1 and 2 GHG emissions. Reporting Scope 3 emissions is voluntary.

- At least one emissions intensity ratio. This compares emissions data with an appropriate metric indicator, such as sales revenue or square meters of floor space, and allows for comparability
- Previous year's figures for energy use and GHG emissions
- Energy efficiency actions, with a description of main measures taken to increase efficiency in the relevant year
- Methodology used: recommended to use independent guidelines or standards, such as GHGP
- Reporting of GHG emissions is legally binding for large companies, but the method they choose to use is voluntary

Despite the UK Government's efforts to influence companies to transition towards Net Zero, **there is currently no UK Government SME-specific decarbonisation plan or strategy**, with policies spread across a range of responsible parties, strategies, and frameworks. This has led to numerous policy gaps, a lack of priority given to SME decarbonisation, and disjointed implementation.

Responses to climate change vary across the UK at a national level, both in terms of implementation and effectiveness. To reach the 2050 Net Zero target in England and Wales, and the 2045 target in Scotland, the various UK devolved administrations have introduced several short- and medium-term targets (FSB, 2021). This has resulted in patchy policymaking and outcomes across the UK, with England lagging behind Wales, Scotland, and Northern Ireland. For example, there is no national support and funding programme for SME building energy efficiency in England, other than the £5,000–£6,000 Boiler Upgrade Scheme grant for low-carbon heating. In Scotland, free audits and zero interest loans are available, up to £100,000, and there is a national Business Energy Scotland advice service (Energy Saving Trust, 2021).

Following group and individual-level conversations with our stakeholders, the development of a clear and comprehensive plan from the UK Government was emphasised as a necessary action area to mobilise SMEs across the country. Cohesive policymaking could standardise data practices, set reasonable targets for SMEs, and provide incentives on a sectoral basis.

Regulation in the European Union

To meet the EU's climate and energy targets for 2030 and reach the objectives of the European green deal, it is vital that investments are directed towards sustainable projects and activities. To achieve this, a common language and definition of what is 'sustainable' is needed; this is why the action plan on financing sustainability called for the creation of a common classification system — or an "EU Taxonomy" (European Commission, 2022). The first delegated act was adopted on 21st of April 2021.

The EU taxonomy is a classification system, establishing a list of sustainable economic activities. The taxonomy can provide companies, investors, and policymakers with appropriate definitions for which economic activities can be considered sustainable, thereby helping companies to become more climate-friendly, mitigate market fragmentation and help shift investments where they are most needed (European Commission, 2022).

The taxonomy supplements current EU law, which requires certain large companies to disclose information on the way they operate and manage social and environmental challenges. Directive 2014/95– also called the Non-Financial Reporting Directive (NFRD) – lays down the rules on disclosure of non-financial and diversity information by certain large companies. This directive amends the Accounting Directive 2013/34/EU.

The NFRD helps investors, civil society organisations, consumers, policy makers and other stakeholders to evaluate the non-financial performance of large companies and encourages these companies to develop a responsible approach to business.

Companies that Must Comply to EU Directive 2014/95 (NFRD)

EU rules on non-financial reporting currently apply to large public-interest companies with more than 500 employees. This covers approximately 11,700 large companies and groups across the EU, including:

- Listed companies
- Banks
- Insurance companies
- Other companies designated by national authorities as public-interest entities

Under Directive 2014/95/EU, large companies must publish information related to

- Environmental matters
- Social matters and treatment of employees
- Respect for human rights
- Anti-corruption and bribery
- Diversity on company boards (in terms of age, gender, educational and professional background)

In June 2017, the European Commission published its guidelines to help companies disclose environmental information. These are not mandatory guidelines and companies may decide to use international, European, or national guidelines according to their own characteristics or business environment (European Commission, 2022a).

Proposal for a Corporate Sustainability Reporting Directive

In April 2020, the European Commission adopted a proposal for a Corporate Sustainability Reporting Directive (CSRD), which would amend existing reporting requirements of the NFRD. The CSRD would extend reporting obligations to cover:

- All large companies, whether listed or not, and without the 500-employee threshold.
- SMEs with securities listed on regulated markets (except for listed micro-enterprises). It would not include SMEs with securities listed on SME growth markets or multilateral trading facilities.

The first set of standards will be adopted by October 2022. A total of 49,000 companies will have to report in accordance with the EU taxonomy (European Commission, 2022b).

In the UK, SMEs would be eligible for reporting if the same CSRD thresholds were applied, since the UK definition of an SME is any organisation that has fewer than 250 employees and a turnover of less than €50 million, or a balance sheet total of less than €43 million.

The problem of measuring SME emissions

The Importance of Engaging SMEs in the UK

As the green transformation continues to ramp up across the UK economy, it is important to maintain the major focus on large companies and big polluters whilst also considering how to address the GHG emissions of smaller, less polluting businesses.

Environmental policy in the UK is currently undergoing a process of change, following the country's departure from the European Union (ESRC, 2021). The UK has set a target to reach Net Zero by 2050, and to reduce GHG emissions by around 40% by 2030 relative to today and reducing emissions from SMEs is part of this effort. There are more than 5.9 million SMEs in the UK, which employ 16.8 million people and account for an estimated £2.3 trillion in turnover (approx. 52% of the total for UK Private sector businesses) (ESRC, 2021).

Besides their collective impact on the UK economy and environment, SMEs can have an indirect effect on climate mitigation via their influence on other actors: including suppliers, customers, and other organisations (Halila, 2006; Revell et al., 2010; ESRC, 2021). While environmental activity among large companies has mainly been driven by investor demand and/or regulation, many SMEs are exempt from some of the mandatory requirements and pressures large companies abide by (Conway, 2015). This is increasingly problematic as UK survey data shows that, although 7% of SMEs are already Net Zero and 42% have committed to a Net Zero target, 46% have not committed and are either considering (27%) or not considering (19%) engaging in the transition. Moreover, 4% do not know if their business has committed to a Net Zero target (Lloyds Bank, 2021).

However, there is now growing demand for UK SMEs to begin engaging in a Net Zero transition. This has been highlighted by a recent UK Government consultation on SME energy use, and by its sponsorship of the UK Business Climate Hub (launched in May 2021). The UK Business Climate Hub is the UK interface leading to the global SME Climate Hub. The strategy was developed in consultation with a working group comprising of business representatives from several different sectors and calls for SME owners and managers to sign up to the Race to Zero commitment (ESRC, 2021).

To provide analysis on SMEs and Net Zero, we must first examine SMEs and their environmental management uptake by considering important characteristics of the SME population (both in national and general terms): differences in size, the barriers they face, and the potential benefits they could access by opting for environmental management measures.

SME Characteristics: Size, Heterogeneity and Data

Given the common definition of an SME, the size of the enterprise is important when examining the barriers to and reasons for adopting environmental management practices.

Firm size impacts the probability to successfully adopt and operate an environmental management tool such as an EMS. As outlined in the previous section, voluntary, self-regulatory initiatives such as EMAS and ISO 14000 sought to allow firms to monitor and improve their environmental practices. Although these initiatives claimed to be applicable to SMEs, SME uptake has been patchy and slow over the past decades (Zorpas, 2010; ESRC, 2021). This contrasts with the higher and faster adoption of large companies, which can allocate a greater number of resources to establish well-defined and all-encompassing systems, allowing them to measure and report their environmental impacts, and to reduce their carbon emissions (Perez-Sanchez et al., 2003; Johnstone, 2020). Proper implementation of an environmental management practice is much harder for SMEs to attain due to their smaller size and lower resources. For example, EMSs are comparatively more costly for SMEs to operationalise and downscale to their needs and/or capacities, with results that are not guaranteed (Jenkins, 2004; Stubblefield Loucks et al., 2010).

The relatively smoother adoption of environmental management practices by large companies can be seen in UK ISO 14001 uptake figures. The share of large UK companies (250 employees and above) with an ISO 14001 increased from approx. 45% to 55% between 2006 and 2010. For SMEs, adoption increased from approx. 8% to 12% over the same period (EPE, 2010). The proportion of large companies implementing ISO 14001 standards increased in the subsequent years, reaching 61% in 2013 (EPE, 2013).

A recent Lloyd's Bank report supports this by highlighting that SME uptake of environmental measurement and/or monitoring practices remains at a modest 34% (Lloyds Bank, 2021). The share is more concerning when including SMEs that have measured their carbon footprint in the last 5 years; out of 1,200 participants in a British Business Bank 2021 survey, only 6% claimed to have established carbon footprinting measures (British Business Bank, 2021).

Another important characteristic of the SME population that contributes to these low uptake figures and underpins many of the immediate Net Zero transition challenges, is its heterogeneity - observable both in the UK and globally. SMEs are inherently more difficult to mobilise; they are highly diverse, and their engagement with and approach to sustainability varies, as they can be influenced by their sector, their activities, their size, and their owners/managers. UK SMEs range from construction firms to restaurants and bakeries, to local property agencies, to one of the UK's 5.3m microbusinesses (Broadway Initiative, 2022; UK Parliament, 2022). Increases in the uptake of environmental practices are harder to be achieved for SMEs compared to a group of less fragmented and/or less geographically bound firms (Hillary 2004; Johnson and Schaltegger, 2016).

However, differences in environmental management implementation are not only evident when comparing SMEs to larger firms, but also to each other. For example, a micro-enterprise is defined by the European Commission as employing fewer than 50 people, with a turnover and/or annual balance sheet below 2 million Euros (Zorpas, 2010). Small SMEs can be significantly different compared to their larger counterparts: they are more likely to offer a single service and/or product, they are more vulnerable to economic shocks; they sell to local markets and are more likely to be bound by family traditions and/or informal

organisations. They also have very low management, little access to training and market requirements, and produce high amounts of waste (Zorpas, 2010).

In the absence of specific standards, SME managers and stakeholders have typically responded to environmental regulation in *ad-hoc* ways compared to large companies, reflective of the need to adapt the legislative demands to the needs and capacities associated to their respective sector or region, rather than by following a common approach (Johnstone, 2020). This is shown in the recent proliferation of different tools currently being implemented, also reflective of the flexibility required by SMEs to navigate through different kinds of sustainability issues, depending on their business model and operational context (Johnson and Schaltegger, 2016).

The effect of heterogeneity in the SME population on environmental management adoption rates and on the various approaches to environmental management, has made SME environmental data harder to measure, collect and use compared to that of large companies.

While there are several informal tools and guidelines available for UK SMEs to be mobilised, current emission publishing rates among SMEs are not yet high enough to be able to establish reliable baselines and industry averages. The variation in environmental practices adopted has resulted in a low level of consistency in SME data collection and quality, which makes it hard to generalise environmental impacts and draw potential strategies that could favour SMEs. Uptake of environmental practices is not only harder to quantify, but also difficult to be targeted and improved through interventions.

Besides the need for standardisation, there is a strong call among commentators and stakeholders for the development of a simple, SME-specific, and user-friendly sustainability management tool/practice that can account for the scattered SME population and reduce GHG emissions (Hillary, 2004; Johnson and Schaltegger, 2016)

Another suggestion echoed in recent commercial reports, and by our stakeholders, is the possible segmentation of SMEs by size, geography and/or sector; in terms of data acquisition, proportional measurement frameworks, and incentives to promote a sustainability buy-in (Lloyds Bank, 2021). This could also help to simplify the UK SME landscape and prevent potential asymmetries associated with the transition.

Barriers to Transition

Besides the immediate characteristics of the SME population, there are several internal and external factors preventing SMEs from adopting and developing environmental management tools (Iraldo et al., 2010; Brammer et al., 2012; Broadway Initiative, 2022).

Most researchers have addressed the reasons why it is difficult for SMEs to implement an environmental system through an 'internal and external barriers' framework, which can provide insight into patchy environmental management uptake by SMEs (ESRC, 2021). These directly impact SME data collection, the monitoring of SME outputs and ultimately how easily SMEs can be convinced to reduce their GHG emissions. If addressed correctly, these factors may help unlocking SMEs, and pave the way towards a Net Zero Transition.

Internal Barriers

Internal barriers are defined as the obstacles arising within SMEs that affect EMS implementation (Hillary, 2004).

Scarce financial resources

One of the main barriers SMEs face is the limited resources they can allocate to implementing environmental management measures. This can require disproportionate resources in terms of cost, time, and skills (Hillary, 2004). Depending on the SME, environmental system implementation forces the SME to make up-front investments (for example, in green equipment), to account for longer timeframes (for training and/or to reap the financial returns) and personnel (larger companies may have environmental departments, dedicated specifically to implementing control systems). Research on SMEs from the Broadway Initiative shows that over 80% of surveyed SMEs cited a lack of financial resources as their main barrier with respect to their general operations (Broadway Initiative, 2022).

Financial costs can be divided into three categories: technical, implementation, and third-party certification costs.

Technical costs

Adopting an EMS requires a substantial investment in equipment, plant management, control and maintenance (Iraldo et al., 2010). Depending on the size and/or sector, these overheads can be challenging for SMEs to absorb given their shorter timeframes and restricted financial resources.

Implementation costs

Besides the initial green investments, researchers such as Delmas (2002) show that implementing and maintaining an environmental system such as ISO 14001 is a significant constraint for SMEs. Although maintenance costs tend to decrease with time, SMEs typically rely on external technicians and consultants due to scarce internal resources – the fees for which may be unsustainable for smaller enterprises (Iraldo et al., 2010).

Third-party certification costs

Auditing and verifications costs can strongly impact organisations, much more than other costs such as modification of production processes, or product innovations.

Financial costs are heavier for smaller SMEs as these tend to be focused on day-to-day activities, viewing environmental issues as peripheral and not easily addressed (Brammer et al., 2012). In the UK, 39% of SMEs cited financial reasons (insufficient budget; high initial costs and low return on investments) as the main barrier for their pursuit of Net Zero (Bank

of Scotland, 2021). UK SMEs may be particularly concerned about the payback time for investment in decarbonisation and/or sustainability initiatives; meaning a buy-in can be challenging without visibility on the return on investment (Lloyds Bank, 2021)

Financial concerns may also depend on the UK sector the SME operates in. A recent Energy Saving Trust (2021) reported highlighted finance as a main challenge to adopting sustainability measures particularly in sectors such as hospitality, which have been focused on survival rather than long-term planning given the recent economic shocks (Energy Saving Trust, 2021). This is supported by a concern raised by stakeholders during our workshops regarding the inability of a large proportion of SMEs to consider long-term options such as a switch to a sustainable business model. Small SMEs experience a higher level of uncertainty regarding their future financial position; for some investing in green equipment is not financially viable, particularly during challenging times.

UK SMEs are already facing financial difficulties. Due to the COVID-19 crisis, most SMEs are currently preoccupied with recovery and do not have the capital to invest in measures that require up-front costs, with uncertain or long-term returns (Bankers for Net Zero, 2021). In 2020, working capital to cover short-term gaps was the dominant driver of funding needs, with many SMEs facing cashflow issues. While UK lending to SMEs remains relatively low (25% of all SMEs), of those identifying a need for funding, 78% said cashflow support was a reason for requesting a loan in 2020, up from 49% in 2019 (British Business Bank, 2021b). Moreover, surveys done during the pandemic by the British Chambers of Commerce suggested that the preoccupation with managing its impact had setback earlier efforts to make progress towards transitioning (British Chambers of Commerce, 2021). This highlights the lack of flexibility SMEs generally experience with regard to Net Zero: focus is easily shifted to other issues, particularly if there are underlying economic concerns.

Human Resources and Time Constraints

The scarcity of human resources within SMEs acts as a barrier for EMS implementation. SME employees are usually responsible or at least involved in more than one business function, adopting different roles within the firm (Yadav et al., 2018). Time constraints and the quality of work required to implement an EMS are major obstacles for tracking and reducing GHG emissions; UK research by the Broadway Initiative shows that time constraint is considered a major barrier for 40% of SMEs surveyed (Yadav et al., 2018; Broadway Initiative, 2021).

Moreover, SMEs tend to operate in shorter timeframes according to the week-by-week needs of their business. This is the case in the UK, as insights from reports and conversations with our stakeholders suggest that setting a 30-year strategic plan is both impractical and unrealistic for SMEs to follow. Since SMEs think in shorter timeframes, the target data is currently regarded as distant and unreal, or too short; causing variance in engagement levels as some SMEs might act soon whereas other too late (Lloyds Bank, 2021). The lack of a clear timetable causes confusion amongst UK SMEs and could negatively impact their overall engagement levels; time horizons remain a pertinent issue across the entire UK SME population.

Lack of Awareness of Sustainability issues

An important barrier for implementation, is the lack of awareness SME owners/managers have regarding their companies' environmental and social impacts. SMEs often see themselves as exempt from sustainability policies due to their perception of minimal impacts, leading them to not apply any strategies or tools to rectify unrealised problems.

UK data supports this: while 89% of SMEs claim sustainability to be important for their business, and 74% are aware of the government's Net Zero target, 40% of surveyed SMEs were not aware of what national targets meant for their business (Lloyds Bank, 2021). However, the lack of practical and actionable insight is perhaps more significant as a barrier for UK SMEs than what researchers contended as a lack of environmental awareness. Despite nearly 60% of UK SMEs being reasonably aware of Net Zero concepts, over half (53%) do not deem themselves to be ready to prioritise decarbonisation (British Business Bank, 2021). Therefore, while awareness of environmental issues is reasonably high among UK SMEs, it is not necessarily leading to positive changes in carbon reduction measures; meaning that other barriers to adoption are arguably more significant.

Absence of perceived benefits

Another internal barrier is the absence of perceived benefits. SMEs typically do not realise the vast number of opportunities and programs that are available to educate and support them on environmental issues (Johnson and Schaltegger, 2016). This is even more prominent for smaller companies within the SME category, as smaller companies perceive significantly fewer benefits of engagement with environmental issues compared with medium-sized enterprises.

Since SMEs cannot justify investments in environmental activities because they do not perceive any immediate economic benefits form such activity, larger businesses are more likely to reap comparatively greater benefits from environmental practices. Their size and resources typically allow them to reap economies of scale benefits; they are also more visible and hence able to signal their environmental efforts to stakeholders (Brammer et al., 2012). This is the case in the current UK SME landscape, as 51% of SMEs with sustainability measures in place cited the existence of 'a strong financial case' as the main reason for acting (British Business Bank, 2021). However, NatWest research contrasts this as it highlights a 160bn+ revenue opportunity for SMEs thanks to the drive to tackle climate change (NatWest, 2021). This suggests that, while the future economic benefits from transitioning exist, improving the financial case for SMEs to adopt green measures through greater education and awareness of opportunities, could help to reduce the financial barriers SMEs perceive in the form of a lack of benefits.

Lack of knowledge and expertise

The lack of knowledge and expertise on sustainability issues refers to SME owner-managers having an inexperienced view of their social and environmental impacts. Even if they become more aware of the impacts and possible benefits, they still lack the in-house skills and expertise to deal with these issues (Johnson and Schaltegger, 2016). The need for skills and expertise also varies by sector: a construction SME will require more complex re-training material for their employees compared to a coffee shop (Broadway Initiative, 2022).

This lack of expertise can lead SMEs to not have a clear plan and adopt improvised strategies to emerging environmental and social issues. Recent UK figures reflect this as, according to a report by the Federation of Small Businesses (FSB), while 56% of small businesses believe that the planet is facing a climate crisis, only 35% have a plan to combat climate change. Only 9% of small businesses have measured their carbon footprints – with over 69% pointing to their lack of knowledge on how to do so. This lack of knowledge was more pronounced in high-emitting sectors such as construction (21%) and manufacturing (28%) compared to carbon-light agents in information and communication (36%) and wholesale (35%) sectors (FSB, 2021) Therefore, the lack of knowledge and expertise can be considered an important barrier for SME engagement, and a problematic factor in ensuring a Net Zero Transition.

External Barriers

External barriers are obstacles arising outside SMEs that interfere with EMS implementation.

Insufficient external drivers and incentives

There is a lack of effective external drivers and incentives, from both the UK Government and the marketplace. The low levels of regulatory pressure to adopt sustainability management measures can contribute to a belief among SME managers that the tools and systems related to sustainability are not of much relevance to them (Johnson and Schaltegger, 2016).

Regulation has been highlighted as a main barrier for SME engagement, both in the literature and by stakeholders involved in our research. SMEs are unlikely to take on the burdening responsibilities of an EMS on a voluntary basis if their competitors are not willing to engage; managers believe some regulation would help to even the playing field, as for many SMEs an EMS represents too much of a competitive and/or financial risk (Conway, 2015).

Survey data on drivers and incentives demanded by SMEs shows a clear consensus across all types of businesses (64% of all surveyed SMEs) that an intervention through the tax system, greater information, and clearer standards and regulations would be key enablers in terms of SMEs engaging in Net Zero measures (British Business Bank, 2021). This suggests that the current lack of incentives and drivers in the UK act as barriers.

Unsuitability of Formal Management Tools

Another barrier for SMEs is the gap between formal tools and standards, and their more informal and flexible approach to business. As previously mentioned, prominent tools are more compatible with larger companies; they can be expensive and time-consuming to implement and maintain within SMEs. This is worse for smaller SMEs, for whom current standardised systems such as ISO 14001 seem too burdensome and complex to implement in any capacity (Johnson and Schaltegger, 2016). This is reflected in recent UK SME data provided by the British Business Bank, as survey results show that resource-intensive and complex actions such as implementing energy audits and monitoring systems had some of the lowest rates of adoption (British Business Bank, 2021).

An example of how the adoption of simple tools could influence the likelihood of success for an SME is provided by the Confederation of British Industry (CBI). One of their SME members (a manufacturer of electronic assemblies), saw that by adopting simple and clear sustainability practices their productivity and efficiency could increase. The company invested in an end-to-end software solution, which allowed them to analyse the energy efficiency of their building and the carbon footprint of their purchases (CBI, 2021).

Besides the positive effect an adoption of practical tools could have on setting an SME on the right track towards Net Zero, SMEs appear to need support and guidance as they experience problems gaining consistent information. The lack of sector-specific guidance and material tailored to different sizes of firms, especially very small firms, is an external barrier frequently mentioned. UK SMEs tend to avoid independent advisors due to the high up-front costs, and instead rely on suppliers or hubs for free and low-cost advice (Hillary, 2004; Broadway Initiative, 2022). Therefore, since information has been generalised for various sectors, company sizes, and business models, it can be challenging for SMEs to know what to focus on and how to report. Current tools are arguably less well-suited to the structures, cultures, and contexts of smaller businesses.

The Complexity of Sustainability Standards

The complexity of current sustainability standards is also mentioned as a barrier for SMEs to engage in environmental management. Whereas most sustainability tools and standards were developed to account for national and international issues and were modelled after the needs and resources of large companies, SMEs typically act on a local/regional level and thus require a lower level of complexity with respect to their environmental management tools (ESRC, 2021).

Additionally, the fragmented SME landscape and the vast pool of information and tools accompanying it, has made it overwhelming for SMEs to begin engaging; it can be difficult not only to choose between different sustainability practices and tools, but also from a plethora of environmental accreditations and guidelines; given the high costs in terms of time and financial resources, adoption choice carries with it risk for UK SMEs as choosing the wrong tool could make them financially vulnerable (Broadway Institute, 2022).

This concern was echoed by relevant stakeholders, who propose establishing common UK standards in tandem with the development of simple tools to help SMEs progress through the complex sustainability landscape.

Benefits for SMEs

There are several benefits SMEs can gain from implementing environmental management measures, with effects that are both internal and external to the firm. A convincing way of capturing these benefits is by considering environmental performance as a multidimensional metric: covering operational, financial, environmental, and social elements (Johnstone, 2020).

Some of the benefits highlighted through our research are the following:

- Energy management and financial benefits — the adoption of environmental management measures represents a significant opportunity for GHG emissions savings to

be achieved at low cost. A UK Government report found that SMEs could save up to 25% of energy consumption through cost-effective efficiency measures including: upgrading building fabric, replacing lighting, heating, and cooling equipment, and other process machinery. Many of these measures are estimated to allow SMEs to recoup their investment through savings within a few years (ESRC, 2021). The same study estimated that 37% of the savings could be achieved with zero capital investment, including turning down thermostats, and switching off electronic equipment. Emissions from electricity use can also be reduced by shifting the time of day at which energy-intensive processes are carried out (ESRC, 2021).

- Managing legal compliance — by establishing environmental management measures, SMEs can adhere to regulatory changes and social concerns in a streamlined manner. This provides positive financial benefits such as lower insurance costs via proven risk management techniques (Yadav et al., 2018). Recent UK data on SMEs with sustainability practices supports this, as 25% reported an increased ability to comply with regulations as a benefit (Bank of Scotland, 2021)
- Managing stakeholder relationships — tools can help firms improve stakeholder communications and develop better relationships with regulators and local administrative groups, leading to greater efficiency and more business opportunities (Johnson and Schaltegger, 2016). These benefits have been observed in the population of UK SMEs who have opted for sustainability measures, as 24% reported positive effects to their community, and 21% in terms of their employees, engagement, and talent acquisition (Lloyds Bank, 2021).
- Reduction of complexity — adopting environmental management measures can allow companies to break down the complexities of sustainable development on a firm level, making it possible to measure environmental and social performance. The systematic approaches can also lead to better operationalisation of business strategy, and in turn improve internal efficiencies and growth prospects (Johnson and Schaltegger, 2016)
- Performance and evaluation improvements — tools can help companies' sustainability performance through environmental and social indicators, enhanced internal communication, and better awareness and understanding of business impacts on the environment and society. New environmental performance indicators can help companies gain, and lead managers to make better business decisions given the new available options (Johnson and Schaltegger, 2016).
- Commercial benefits — adopting environmental management measures can unlock positive commercial effects for SMEs. They can help an enterprise to improve their image, marketing, and overall better customer relationships, thereby strengthening their brand and generating greater demand for their products (Hillary, 2004). In a recent survey, 33% of UK SMEs with sustainability practices stated this has been the case for their business in recent years (Bank of Scotland, 2021).

However, several challenges make these benefits hard to be observed, and thus generalised, across the whole UK SME population.

There is difficulty in defining good environmental performance; a common definition and baseline across SMEs is absent, and it is hard to separate a conceptual understanding from how effects are currently being measured. Environmental performance can mean different things across SMEs – from discrete outcomes such as waste or energy management, to social externalities, stakeholder expectations and financial returns. This makes the concept of performance highly dependent on the context the individual SME operates in (Johnstone, 2020).

As previously mentioned, the fragmentation of information and the proliferation of possible solutions also acts as a negative influence on SMEs. According to some of our stakeholders, the vast pool of information and tools currently available, as well as the lack of a clear and defined set of standards with guidelines, make it overwhelming for SMEs to reap the benefits; thereby acting as a barrier to adoption of an environmental management tool. Besides the need for standardisation, there is a strong call to develop simple, SME-specific, and user-friendly sustainability management tools that guarantee clear benefits and account for heterogeneity among SMEs to reduce GHG emissions; a suggestion is for differentiation to be made by size or in terms of sector only in difficult cases.

Lastly, the heterogeneity of SMEs and current approaches to environmental management, mean there is a great deal of variation in how environmental policies are being implemented across SMEs and therefore ambiguity in terms of general benefits. In the case of ISO 14001, there is confusion in terms of setting targets to achieve performance outcomes. For example, ISO 14001 does not state how performance should be measured. The lack of mandatory performance indicators complicates the general understanding of the benefits of an environmental policy for the SME.

Context and Action Areas

Given the heterogeneity of SME characteristics, the barriers and adoption benefits vary by region, generally change through time and are highly context dependent.

A useful way to conceptualise the barriers and the degree of actionability each SME possesses is by considering three general categories. These are:

Intrinsic Characteristics

Age of business, flexibility to transition and growth mindset

Challenges

Technology, skills, in-house resources

Business Opportunity

Sustainable growth opportunities are more pronounced for some SMEs than for others

Research also highlights six action areas to help UK SMEs navigate the Net Zero Transition:

1. Funding access – SMEs require financing options that reflect the societal benefit of delivering climate action to ensure that business initiatives make financial sense.

2. Awareness – SMEs need to recognise the growing opportunity from climate action. This needs to be applied to their specific context and should highlight the key skills to make a successful transition.
3. Knowledge – SMEs need to:
    a. Improve their ability to measure their climate impact
    b. gain sector-specific knowledge on how to reduce their impact.
4. Skills and capabilities – SMEs need re-training and upskilling opportunities, certifications, and accreditations. Management capabilities are also required.
5. Market access – Improved financial certainty of benefits from Net Zero Transition.
6. Navigation – SMEs need support to navigate the complex and evolving landscape.

Each action area has a corresponding magnitude in terms of its effect on unlocking SMEs, which depends on the firm's characteristics and the barriers they face. For example, a longer established SME whose product is intrinsically dependent on polluting will face several challenges in changing/replacing their business model at a reasonable cost whilst maintaining a good position in the market (NatWest, 2021).

To gain a fuller understanding of how UK SMEs can be engaged in the Net Zero Transition, we must provide some analysis of their behaviour, and the potential incentives for environmental policy implementation – a discussion provided in the following section.

Encourage SMEs to reduce emissions.

As outlined in the previous section, the lack of engagement by SMEs is generally due to scarce time and resources, a lack of knowledge and guidance, and the perceived minimal economic significance of environmental issues (Zorpas, 2010; Brammer et al., 2012). Due to heterogeneity in the SME population, the ability to mobilise SMEs is influenced by contextual factors; each SME faces several barriers with various sensitivities to incentives and other possible interventions.

Whereas the engagement of large companies is driven mainly by investor demand or regulation, the behaviour of SMEs is more complex as different factors shape it. The adoption and consolidation of environmental practices is guided by material and immaterial, as well as endogenous and exogenous factors across time. The observed inconsistency and unpredictability of uptake among UK SMEs reflects this, as motivations are fragmented across the population (Hampton, 2018).

Therefore, views on adoption, implementation, and possible incentives to mobilise SMEs must account for the variation in SMEs (their model and operational context) due to the connection between external conditions, strategy, organisational factors, and ultimately performance. This distinguishes SMEs from larger companies, who are more capable of segmenting different functions within and across their firm and for whom transitioning to environmentally friendly models is less likely to generate spill-overs into other internal functions (Johnstone, 2020).

The following section aims to provide insight into the characteristics that define how SMEs typically behave and establish environmental practices. This can be divided into three main

groups: motivations for adoption, their process of implementation, and the role of performance outcomes on the implemented system. Considering attitudes and behaviours with respect to Net Zero and other characteristics can inform our plan in terms of data-driven tools and potential action areas for policy interventions.

Firm Behaviour and Characteristics

Before outlining the different motivations of firms, it is important to discuss two behavioural profiles identified in the literature and how the characteristics of SMEs can inform their attitudes and behaviours with respect to sustainability measures.

Reactive and Proactive Behaviour

Reactive and *Proactive* behavioural profiles describe how SMEs implement environmental measures. Adoption is shaped by both internal characteristics and external factors (such as size and resources, legislation, commercial pressures, culture, sector etc.).

Reactive approaches typically arise due to acute pressures and are more likely to produce *ad-hoc* environmental management tools, as these are designed and operationalised in shorter timescales. On the other hand, pro-active behaviour entails the development of a carefully designed policy that may lead to significant changes at the firm level, involving the company's business model, finance, culture, as well as its awareness and overall attitude towards environmental issues (Johnson and Schaltegger, 2016).

While research suggests that SMEs typically display reactive behaviours, the adoption of environmental measures should not be restricted to two categories, as it is better analysed on a spectrum (Conway, 2015). According to a recent British Business Bank report, attitudes vary among smaller UK businesses, with some displaying more proactive behaviours than others (British Business Bank, 2021). Their analysis segments the UK SME population into four profiles, based on their size, sector, emission level, their attitudes towards transitioning, and their maturity level (essentially, how ready they are for the transition).

The profiles (or personas) are:

Carbon Nimble

low emissions, high transition maturity, small size, services based and proactive

Carbon Exposed

higher emissions, relatively larger size, low transition maturity, primary industry: commerce/transport and reactive

Carbon Complacent

low emissions, low transition maturity, small size, services based, and emissions are not a priority

Carbon Corrective

higher emissions, relatively larger size, high transition maturity, primary industry: commerce/transport, and proactive

Maturity scores were composed of factors with different weights attached: 60% of the score was weighed on the SMEs tangible actions in reducing their carbon emissions, 20% was informed by their awareness and concern regarding the Net Zero agenda, the remaining 20% depended on their knowledge and capabilities with respect to measuring and reducing carbon emissions (British Business Bank, 2021).

The results showed that reactive attitudes accounted for approx. 52% of all surveyed SMEs, whereas 47% held a proactive approach. While the latter typically showed high transition maturity and higher engagement with emission reductions, reactive firms were more likely to have a low transition maturity and did not appear to treat emissions as a priority.

Despite a seemingly small sample size (1,200 participants), the proportion of UK businesses with proactive or reactive attitudes can be assumed to be reflective of the real SME distribution. Given the sheer size of the UK SME population, these profiles and proportions give us an idea of the challenge at hand (British Business Bank, 2021).

Organisational Structure and Decision-Making

While larger companies make climate risk decisions within a sophisticated management structure, SMEs face limitations in their organisational structure and decision-making.

Besides resource constraints, small firms are characterised by informal structures, and are typically managed by either a single or a small number of managers who, as previously mentioned, often hold different responsibilities within the company. As a result, SMEs tend to devote greater attention to personal relationships, and focus on key stakeholder and intrapersonal dynamics when attempting to secure funding for environmental projects (Brammer et al., 2012; Conway, 2015). An important consideration is whether the SME in question is family-owned, as these are more likely to have flexible decision-making and informal systems of management. In such case, decisions may be guided by personal interests and emotions rather than by unbiased, formal systems of control (Johnstone, 2020).

Compared to a large company, the individual choices, attitudes, and informalities within an SME can impact the adoption of an environmental system. Processes involved in environmental management measures are more likely to be influenced by behavioural traits; informed both by resources (or the perception of existing/potential resources) and individual/group subjectivities (ESRC, 2021). Approaches also tend to be more flexible compared to large companies, as managers have more control over the speed and stages of adoption (Brammer et al., 2012).

However, since planning for climate change requires SMEs to make complex decisions under uncertain conditions, these characteristics can lead managers' views and thus outcomes to reflect cognitive barriers based on the real and/or perceived positioning of their business; both in terms of their vested interests and how their firm can navigate and respond to environmental and/or economic changes (Grothmann and Patt, 2005; Brammer et al., 2012).

For example, while the typically shorter planning horizons of many small firms typically influence the willingness of managers to invest in long-term adoption measures, in many

cases there may be viable options managers may not be considering. This means that attitudes and opinions towards business model changes are important in influencing an environmental buy-in. UK SME managers might favour carbon-heavy technology mostly due to a personal or collective unwillingness to attempt a green switch; based on either real and/or perceived negative consequences for their business (Conway, 2015).

Consequently, SMEs with these organisational and/or decision-making predispositions are generally less likely to devise an environmental strategy ahead of time and are more likely to consider transitioning once inaction becomes too costly – perhaps caused by changes in regulatory requirements, supply chain pressures, competitive disadvantages, or negative reputational effects. These external sticks combined with the informal organisational structures and the internal difficulties associated with navigating external pressures, may lead SMEs to adopt *ad hoc* and often reactive approaches to environmental management, as a way to decrease or prevent economic losses.

Nonetheless, in order to understand why and how different SME behaviours manifest, it is important to also examine the drivers (both internal and external) and the processes involved in an SME's adoption of an environmental management tool.

Adoption Behaviour: Internal and External Drivers

Besides the proactive and reactive behavioural profiles, research highlights a number of common and observable factors which influence the SME's adoption of an environmental management tool. Motivation is key to understanding the implementation processes, and performance outcomes when SMEs develop environmental practices (Zorpas, 2010). While there are no clear patterns of motivation, perhaps due to the challenges of surveying the behaviour of an SME population, researchers have typically referred to the existence of *external* and *Internal* drivers that make SMEs engage with environmental practices.

The effect of these drivers on adoption, implementation and outcomes are not mutually exclusive as they can influence each other. For example, the internal development of sustainability culture within an enterprise (internal driver) could be a response and/or reflection of wider socio-cultural values (external drivers) (Johnstone, 2020).

Internal Drivers

Internal drivers are comprised by employees, organisational culture, brand image and reputation, competitive advantage and strategic intent, environment management capability and size of the firm.

Organisational Culture

Organisation culture includes personal values and ethics of owners and managers, moral and social responsibility, management support, and knowledge management. An SMEs values can drive corporate responsibility as, given the previously discussed subjectivities of SMEs, the habit and lifestyle of SME owners directly affect the sustainability activities of their firms (Yadav et al., 2018). Managers/owners may have personal commitments or a sense of moral and social responsibility towards pro-environmental attitudes, which can be key in terms of environmental system performance (Koe et al., 2015). The social responsibility and ethical concerns of top managers can be the most critical driver towards

sustainability practices in SMEs – making organisational culture a key driver (Yadav et al., 2018)

Stakeholder and Employee Influence

Since the adoption of environmental management tools is largely dependent upon the beliefs and attitudes of SME managers, stakeholder pressure can act as an important driver for SMEs to engage. Environmental management tools are particularly beneficial for entrepreneurs that are under strong pressure from stakeholders: they can guarantee awareness and compliance to legal requirements associated, as well as create a business case with cost savings associated with their new, environmentally friendly operations – which increases stakeholder confidence regarding their overall performance. However, this is mostly the case for larger SMEs; small enterprises with few stakeholders will be more likely to carry on with business as usual and have less interest in environmental protection (mainly due to barriers such as a lack of resources and knowledge) (Zorpas, 2010).

Influence to adopt measures of sustainability may also come from employees of the firm. Demand from employees in the form of better working conditions is an important motivation for investing in ecological measures. This is evident in family-owned SMEs, as employees often pressure for pro-environmental measures, as a way of protecting their company and family reputation (Yadav et al., 2018).

Brand Image

Brand image and reputation are considered to be key drivers for the environmental performance of SMEs (Gadenne et al., 2009). Since social capital is important for SMEs, improving their reputation as an ecologically responsible firm can generate economic gains, provide legitimacy, increase sales, and satisfy the demands of internal stakeholders. SMEs who wish to improve their public image can do so by engaging in environmental activities and demonstrating stewardship (Yadav et al., 2018).

External Drivers

Government/Legal Compliance

Environmental regulation has been noted as more burdensome for SMEs than for large corporates; making legislation a primary driver for environmental management amongst SMEs (Williamson et al., 2006). However, legislation can also result in reactive outcomes from SMEs as they may perceive environmental issues as threats rather than opportunities. Legislation is also a primary reason for reactive behaviour because certification systems are difficult to administrate and organise for small businesses (Brammer et al., 2012). As discussed in the previous chapter, an environmental management tool can facilitate legal compliance by simplifying documentation and auditing processes.

Customers

An external driver that has increasingly become more relevant is the pressure that customers exert on firms to become environmentally friendly. Reducing GHG emissions and helping to combat climate change demonstrates a degree of responsibility and has the potential to influence a firm's commercial prospects. There is also growing demand and

expectation from SME customers to deliver more sustainable products and services (Aldermore Bank, 2022). A 2021 Deloitte UK survey on sustainability and consumer behaviour showed that consumers are increasingly adopting a more sustainable lifestyle. One in three consumers claimed to have stopped purchasing brands of products because of sustainable or ethical concerns about them. The most important sustainability indicators for UK consumers were waste reduction (68%) and a reduced carbon footprint (48%) (Deloitte UK, 2021). Given this, an SMEs decision to adopt environmentally friendly measures may be influenced by customer pressure and the potential reputational losses that could be afflicted if customer concerns, especially voiced concerns, are not addressed.

Suppliers

A well-documented driver for adoption comes from the pressure exerted at the corporate level – which is positively related to the size of the SME. Indeed, SMEs operating in supply chains of highly concentrated industries are more likely to experience particular pressures, as larger firms within industries tend to transmit the pressure they receive from customers, regulators, and communities down the value chain. Since SMEs have limited resources, this level of pressure often leads to environmental compliance, as failure to respond to pressures may result in an SME being excluded from larger supply chains (Brammer et al., 2012).

Network and Communities

From conversations with our stakeholder and our research, it is evident that networks in the form of local clusters of SMEs can act as external drivers for adoption - help SMEs overcome adoption barriers, as well as build expertise and knowledge (Johnstone, 2020). Replacing costly consultants with peer-to-peer collaborators means that SMEs can, for example, benefit from cost efficiencies – making the business case for transitioning more appealing. Besides the positive impact of networks on knowledge dissemination among SMEs, they play an important role in building cooperative relationships and trust needed for actors to solve ecological problems (Yadav et al., 2018).

Competition

Changes in the behaviour of competitors can lead SMEs to mimic their strategy. For example, if an SMEs competitor develops greener products and is able to gain a competitive advantage through marketing or cheaper costs of production, the SME will attempt to match its competitor by introducing internal environmental strategies for product performance (Lee and Klassen, 2009; Yadav et al., 2018).

Implementation

Since for many SMEs, energy management tends to be more informal compared to larger firms, implementation must be viewed as a dynamic process involving formal and informal aspects as well as a high degree of external advice and/or collaboration.

Unlike large companies who are typically more likely to be able to separate environmental management from other functions, SME implementation interweaves with other aspects of the business and is continuously shaped by internal and external influences that are social, technical, economic and/or intrapersonal in nature. This means that a holistic approach to

sustainability needs to be developed for SMEs to transition successfully, requiring a balance of social (behaviour, leadership, shared beliefs) and physical (results, process, product, and resources) analytical dimensions.

For example, employee skills, legal knowledge and communication skills are considered valuable for SMEs; sustainability knowledge, in particular, can mediate the adoption of a tool (Johnstone, 2020). Since SMEs lack the in-house expertise to transition, they tend to seek the costly advice of consultants (Johnstone, 2020). This not only highlights the financial constraint of adoption for SMEs, but also the importance of information and knowledge in facilitating the transition. According to British Business Bank, an important aspect of adoption and implementation is to provide clear and actionable information to SMEs with regards to what the key steps are in terms of their transition path. Analysts also deem collaboration between management and employees to be crucial for setting operational objectives at the design stage; a phase that is facilitated for SMEs with sustainability-friendly organisational values, strong employee skills and leadership (Johnstone, 2020).

While organisations with certified environmental systems in place are more systematic and formal in their sustainability efforts, and the flexibility of SMEs could theoretically make formal implementation smoother, in reality a comparable level of formality and environmental success is harder to be achieved for SMEs. Successful implementation and environmental performance for SMEs is contingent not only on formalised, codified procedures, but also intangible employee qualities (Johnstone, 2020).

SME network involvement is an important component in SME adoption and successful implementation of environmental management. Scaling down the focus from a national to a regional level can make engagement more viable, by allowing regional SMEs with similar characteristics and challenges to share information on transitioning and get the tailored aid from local authorities. For example, one in four small businesses in the UK say that more support from their local council or Local Enterprise Partnership would help them become more energy efficient. This is not symmetrical across the UK (one in three in Yorkshire and less than one in five in Wales), due to the different levels of activity from all UK local authorities – as some are engaging more with small businesses than others (FSB, 2021). This is an area, according to conversations with our stakeholders, that could be improved and would provide some help in all aspects of the Net Zero Transition.

Performance

Within the SME population there is a difficulty in defining environmental performance; a common definition is absent, and it is hard to separate a conceptual understanding from how effects are currently being measured. Environmental performance can mean different things to different SMEs - both in theory and practice - from discrete outcomes such as waste or energy management, to social externalities, stakeholder expectations and financial returns.

Given that performance depends on the voluntary design by the SME in question, there is ambiguity in terms of how to set targets and achieve outcomes for certification. While clear target-setting can drive operational effectiveness and efficiency, the lack of mandatory performance indicators with respect to a carbon baseline (either universal or proportional)

complicates environmental management for SMEs. This makes current measures of performance multidimensional and highly dependent on the context of the individual SME.

For example, long-term yield from investment may be contrasted by self-perceptions of resource limitations – especially in the short term. This makes for a complex reality as financial outcomes of SMEs may be contingent on other various performance dimensions, such as internal engagement or awareness of available resources (Johnstone, 2020).

However, since all operational layers of an SME are closely related, outcomes typically feedback into operational aspects, and thus have the power to affect the future design and implementation processes of SMEs. The existence of environmental management path dependencies within SMEs has been noted by several researchers, who contend that future success in terms of implementation and performance depends on previous success (Crick et al., 2018; Iraldo et al., 2010; Gadenne et al., 2009).

Positive results can lead to better environmental management practices in subsequent years. While SME owner-managers often set the path of a system in reaction to external stimuli, environmental management practices are not always reactive and volatile as initial responses could develop into more proactive, formalised models over time (Zorpas, 2010; Johnstone, 2020). This is the case for UK SMEs, as it has been studied that those early, short-term wins (reduced financial and environmental costs from switching energy providers, for example), can lead to greater employee engagement and are key to developing a successful environmental management plan; this means that taking advantage of the SMEs flexibilities could be instrumental in developing a successful approach to sustainability (Bank of Scotland, 2021).

This alludes to an important aspect of environmental practice among SMEs, namely the role of practice and learning. The issue for SMEs is not only about the physical characteristics of the firm or the resources it possesses, but also about the intangible aspects of its development: such as the construction of knowledge through retrospection, performance, and internal communication. Practice is an important part of adoption and implementation of environmental management as SMEs learn, reflect, and discover how energy management can be integrated within their organisational nexus. The more effective and fruitful the learning process, the more likely it is that perceptions will change, and an SME and its managers will favour transitioning to low carbon; this can be mediated by establishing the previously discussed SME clusters for knowledge sharing and sectoral support (Gadenne, 2009; Hampton, 2018; Johnstone, 2020).

The likelihood of an environmental management framework being successful depends on time, as SMEs typically have shorter timeframes (resource and/or financial) and are less likely to be successful in implementing environmental management measures, especially if they face a number of pressures on a month-to-month basis (Lloyds Bank, 2021). Succeeding in early implementation is key for these firms, as it can make a long-term business case such as the adoption of green technologies more convincing despite the immediate resource constraints they may face.

Role of Context

As mentioned in previous sections, context is an important aspect of barriers, benefits and potential drivers that influence environmental practice adoption among SMEs. Findings from our conversations with stakeholders and relevant research, suggest that regional and sectoral aspects of SME behaviour with respect to environmental management require consideration (Zorpas, 2010; Johnson and Schaltegger, 2016).

Location – As discussed in the previous section on the variation of barriers by context, drivers and incentives can also change by region. Whereas from an Irish perspective the lack of customer demand is a primary barrier to EMS implementation, from a broad global perspective customer demand acts as a primary driver for SMEs and EMS adoption (Zorpas, 2010). In the UK, geography is an important factor for determining the incentives and barriers SMEs may face on the path to Net Zero. For example, there may be opportunities for businesses located in regions of the UK where clean energy infrastructure has already been developed (such as windfarms in Scotland). SMEs operating in the regional proximity of highly developed green energy grids, may be able to favour from the switch to low carbon at more affordable financial rates, meaning the green model may be more financially viable for them compared to firms operating in less energy-developed corners of the UK. This means that incentives for buy-in may have to be asymmetrically distributed across the UK SME landscape, as managers operating in some areas may have more stubborn attitudes towards transitioning.

Size and Sector

Since an SMEs transition is contingent on both internal and external factors, motivations for adoption and incentives depend on SME size and its sector - making the business case more tangible for some SMEs than others.

Besides behaviour, the size of the firm can determine an SMEs commitment in respect to environmental practices. According to research, medium-sized firms are more engaged in green practices compared to SMEs on the smaller end of the spectrum (Yadav et al., 2018). For some carbon-dependent SMEs on the smaller side, it may be financially challenging or not at all viable to adopt environmental management measures: the overheads for investment may be too high, and good financial returns may be required in a shorter timeframe for a profit to be made. For example, approximately a quarter of all UK small businesses cite the length of maturation/uncertainty of return on green investment as a main reason for not introducing energy efficient solutions (FSB, 2021). Their motivation to transition, and likelihood of succeeding will therefore be low, meaning greater, more tailored incentives would be required for small SMEs to adopt green practices.

Motivation, behaviour and therefore incentives may also vary by sector. The tangibility of the business sector, which refers to the products and services offered by the SME, has a big effect on adoption of green practices; the greater the tangibility of the sector, the more likely it is that an SME will introduce environmental practices (Yadav et al., 2018). For example, discounts on green vehicles may work as an incentive for SMEs with some financial security, longer timescales and, more importantly, that already operate vehicles; affordability of electric vehicles remains a major barrier for UK small businesses as 46% deem the switch to be too expensive (FSB, 2021).

However, this would likely not induce positive action for a small business with shorter financial horizons that does not heavily rely on vehicle usage.

Internal Skills

The external operating context does not only motivate SME adoption and formal construction of environmental tools, but it can also shape sustainability values and beliefs, as well as knowledge and skills. The internal capabilities of employees depend on resources that are available externally (an example being sustainability workshops or courses), which may in turn vary by sector and/or location.

This counteracts the assumption that SMEs inherently lack resources to make environmental improvements; given the short distance between SME managers and employees, the latter's skills can be developed through external resources to improve the internal functioning of the firm, and its approach to sustainability (Johnstone, 2019).

Rather than solely focusing on the lack of resources SMEs experience, a more useful approach is to also acknowledge the opportunities for already-existing internal resources to be developed further, which depend on the SMEs context. This also emphasises the importance of knowledge-sharing clusters, which would enhance an SME's internal resources (Gadenne et al., 2009; Revell, 2010).

Design and Use

Since there is not a common approach that all SMEs follow, and a relationship exists between external and internal factors, the context an SME operates in will be influential in the environmental management outcome; both in terms of design and performance (Johnstone, 2020).

For example, if regulation in agriculture demanded a specific design or set of procedures, it is likely that agricultural SMEs will use environmental management in a different way compared to other UK sectors. This possibility is echoed by concerns from some of our stakeholders regarding the possibility of further fragmentation of the SME landscape. If regulation is segmented by sector without a set of common standards, there is a risk of complicating the landscape and making the Net Zero Transition more challenging.

Incentives for SMEs to Adoption Environmental Management Measures and reduce emissions

Financial Incentives

Financial incentives in the form of tax discounts, lower interest rates, and government grants have been highlighted both by our stakeholders and in recent UK reports as effective means of engaging the UK SME population. There is some evidence to suggest that both favourable lending rates and/or public grants could promote SME engagement with the Net Zero agenda; according to FSB, some 54% of SMEs say grants or low interest rates would encourage them to become more energy efficient (FSB, 2021).

Access to Finance

Access to finance has been identified as a main incentive for SMEs to comply with Net Zero Transition plans. Due to the pandemic and current economic pressures, SMEs are increasingly more reliant on bank loans for financing their operations. While lending to

SMEs remains relatively low (25% of all SMEs), this number increased from 10% in 2019 (British Business Bank, 2021).

The role of accessing finance as a primary incentive to mobilise SMEs is supported by a recent British Business Bank report into UK SMEs and the Net Zero Transition. Indeed, while 11% have already accessed external finance to support their transition efforts, 22% of SMEs claim to be prepared to borrow in the next five years; this is roughly the share of firms who would be happy to borrow in order to grow (37%) (British Business Bank, 2021). The current demand for finance in the UK SME market is emphasised in a prior British Business Bank 2021 survey on finance intermediaries. While respondents expressed a wish to help their clients with Net Zero projects, six in ten said that the current ecosystem does not assist SMEs in identifying and understanding Net Zero project. More significantly, 39% of respondents believed that there is an inadequate supply of finance dedicated to their region (British Business Bank, 2021).

However, other research shows that SMEs may be more reluctant to take on more debt due to the pandemic's impact (Broadway Initiative, 2022). A solution proposed by several stakeholders is to provide access to favourable loans, with lower rates or longer repayment plans. For example, the Scottish Government offers homeowners free loans to finance energy efficiency improvements with repayments over 20 years against an equity stake in the property. While SMEs often do not own their own premises, and investment efficiency will depend on their landlord, easier access to finance could be a potentially effective incentive (Broadway Initiative, 2022).

More broadly, output from our research and from engagement with stakeholders suggests that the financial community should help SMEs transition in a number of ways.

- Highlighting the dangers of not taking climate action by assessing and communicating risks posed by climate change and providing comprehensive responses to it, such as asset write downs or policies penalising high emitters.
- The financial sector could also offer new products such as green loans or facilitate green working capital support through sustainable supply chain finance.
- Lastly, financial intermediaries could help SMEs connect more swiftly to sustainability experts and to other peers (Cambridge Institute for Sustainability Leadership, 2022).

There is growing demand from SMEs not only to access finance for green projects, but also for expertise and guidance through the Net Zero Transition; according to Aldermore Bank research, 45% of SMEs would like to receive financial help from a partner with experience in funding green projects (Aldermore Bank, 2022).

Given the growing demand for credit from SMEs, and the current pressures they face, comprehensive engagement with the financial community can help SMEs with the Net Zero transition.

Grants

Grants are already being offered across the UK for SMEs willing to transition to low-carbon emissions. However, while there is more support in the devolved administrations compared

to England, there is no national grant scheme for SMEs beyond boiler upgrade scheme (Energy Saving Trust, 2021).

The Austrian AWS Investment Bonus programme provides as example of the impact a successful grant and engagement scheme could have on SMEs sustainability profiles. The programme provides non-repayable grants to subsidise companies' investments, with investment in environmentally friendly technologies subsidised at double the standard rate. The success of the scheme in engaging SMEs can be observed in the uptake: 67,800 between September and December 2020, 93% of which came from SMEs (Energy Saving Trust, 2021).

Legislation

A significant obstacle for SMEs to cut GHG emissions relates to current market regulation. Since regulation remains non-binding, an SMEs' transition decision is heavily based on market conditions, and the extent to which it is feasible and/or desirable to voluntarily implement a change in their internal operations.

For many SMEs, particularly those in carbon-heavy markets, cutting their GHG emissions or opting for sustainable alternatives would make their business model less feasible; compromising their position in the market in terms of price and/or quantity produced. Whether they go ahead with a sustainability model depends on an individual rational choice model (somewhat speculative) of whether potential benefits (better marketing, more contracts, and new customers) outweigh the immediate costs (greater cost margins or prices, potentially lower quantity demanded by consumers, lower profits).

Unless other players in their sector are also willing to adopt more sustainable business models in a similar timeframe, SMEs are unlikely to internalise the associated costs and risks to do so — especially if these outweigh the benefits or uncertainty is too high.

Using regulation to convince SMEs to reduce GHG emissions can work in two immediately identifiable and favourable ways:

i) Forming an agreement among major players in the market on GHG emissions and competition (requires regulatory clout).

ii) Informing SMEs of upcoming regulatory standards (given the UK's pledge of Net Zero by 2050) and using it to influence SME buy-in. This depends on whether a comprehensive strategy/package that tackles major present and future issues is offered to SMEs.

Awareness of New Market Opportunities

Another potential incentive is tied to the market opportunities available to SMEs who wish to cut their GHG emissions.

There is a £160+ billion revenue opportunity for SMEs as a result of the drive to tackle climate change. 130,000 jobs could be created in SME sector alone across the UK if the opportunities to support the transition to Net Zero are harnessed (NatWest, 2021).

Although transitioning may not appear to be financially feasible for a lot of SMEs, 55-70% of business cases to reduce GHG emissions will make sense for SMEs to deliver by 2030 – transport, agriculture and industrial sectors provide the most urgent and immediate positive business cases (these are also heavy-polluting sectors in the UK).

Besides restrictive lending options to cover immediate capital costs, most SMEs are unaware of the potential benefits a transition could uncover. Only 6% of SME respondents to a NatWest survey claimed to see climate action as a potential source of growth (NatWest, 2021).

Besides tools and loans, it is imperative that SMEs are made aware of the opportunities a Net Zero Transition would generate (Brammer et al., 2012). The prospect of economic benefits could motivate their buy-in, particularly in terms of adhering to long-term monitoring, reporting and emission cutting programmes.

Procurement

An interesting push factor identified by researchers, organisations and stakeholders relates to the ability of SMEs to win and/or maintain contracts in the future.

Many SMEs form part of supply chains for larger firms. If these larger firms become more concerned with their environmental metrics or have certain ESG standards to meet, they will likely begin to put pressure on SMEs and other firms within their supply chain to decrease their GHG emissions and the total carbon footprint of their final products (Carbon Trust, 2021)

If contracts between larger firms and SMEs are allocated following good emission scores, or include conditional and legally binding clauses on monitoring, reporting, and meeting standards, then contract allocation competition among SMEs could adopt a dimension based on environmental standards, rather than being solely based on traditional economic mechanisms (Carbon Trust, 2021).

Providing guidance through the Net Zero Transition

Fully transitioning takes a long time and generates significant uncertainties. An incentive for SMEs could be to provide them with a thorough plan of how they will be helped to transition (what a transition to achieve Net Zero by 2050 would look like). This would present an SME with a decision:

i) Transition in a guided way (with a robust financial model and with the guaranteed acquisition of knowledge, skills, and market benefits).
ii) Carry on with business as usual and adopt measures if they do become the market norm in the future.

If banks and other institutions offer SMEs a complete transition package (for example, good lending rates, extensive market insight, knowledge regarding practices and access to knowledge-sharing hubs for similar SMEs), then an SME buy-in may depend more heavily on how SMEs interpret sectoral trends and their degree of risk aversion (assuming environmental regulations continue to be non-binding and there is a chance of stricter regulation in the future), rather than a business/marketing decision alone.

The buy-in would allow for guidance through the changing environment with financial incentives before regulation gets too tough and competitors have already made advances.

There are opportunities to access less crowded markets and perhaps earn first mover advantages in a cheaper and more secure way. SMEs could see this as an investment in terms of transition and future growth; and they may not be able to access similar guidance and financing in the future. An incentive package could include:

- Guidance through regulation at potentially lower rates of what it may cost SMEs in 10 years' time – transitions take time and SMEs will not be able to rush this once Net Zero becomes mainstream.
- Available knowledge about carbon reduction practices; working with banks presents future opportunities to help them finance more expensive, mechanical solutions.

However, as Bankers for Net Zero research emphasises, action areas needed to mobilise SMEs should not be viewed as suggestive of a piecemeal approach to climate action strategy. All action areas are interdependent, and a comprehensive strategy to address all will unlock combinatorial effects to help SMEs go further, faster.

Therefore, it is critical that measures are embedded within a wider Net Zero policy and regulatory framework that sets clear incentives for businesses and households to decarbonise.

A Just Transition

Introduction

Within the environmental sustainability discourse, "transition" often refers to fundamental changes of key production and consumption systems (Robins et al., 2018). The definition of a just transition incorporates core questions of distributional justice, who faces the benefits and costs of the UK's Net Zero journey, as well as of procedural justice by posing the question of how decisions are made (Robins et al., 2019).

> The International Trade Union Confederation (ITUC) state that a just transition is an economy-wide process that produces the plans, policies, and investments for a future where all jobs are green and decent, GHG emissions are at net zero, poverty is eradicated, and communities are thriving and resilient. However, what is just and valued as important will vary, and conceptions of justice will differ across society (Robins et al., 2018).

A just transition will be key to the UK's success in building a zero-carbon and resilient economy (Robins et al., 2019). However, such processes do not happen without trade-offs, conflicts, and resistance, since they disrupt and challenge established investments, jobs, behaviours, knowledge, and values (Heyen et al., 2020). An "unjust" transition – one that leaves workers behind, abandons communities to post-industrial decline, and deepens inequality - would have disastrous consequences for the UK and the globe. A shift to "green jobs" that are scarce, precarious, and badly paid would also be suboptimal (Friends of the Earth International, 2017; Robins et al., 2018). Therefore, we must consider the transition impacts, specifically the impact on SMEs, larger enterprises, different regions, and industries as part of the UK's Net Zero efforts.

Since each agent will have a unique role to play to ensure a just transition, coordination across the UK is key. Any long-term planning should also be coordinated between national and provincial levels and must involve all stakeholders who might be impacted as a result of transition (Weller, 2019; Pai et al., 2020). While the banking sector cannot make changes alone, this section provides greater focus on the role that banks can play, as finance lies at the heart of delivering the just transition. Achieving a just transition will require cooperation between many partners and across many areas; ensuring the provision of appropriate goods and services, suitable regulation, and market development – these will require coordination between banks and other finance providers and stakeholders. It will need new and better information brokerage to help people understand options, and improved infrastructure to support cooperation between economic partners (Robins et al., 2019; Grantham Research Institute, 2019a).

The following sections set out to provide some insight into the just transition, to analyse how UK SMEs will be impacted, and what UK entities (governments, banks and/or regulators) should aim to do to adapt to the far-reaching changes implied in a transition to Net Zero.

Context and Current Landscape

As a concept, the just transition has a long intellectual history with a development spanning over 30 years. It has risen in prominence in recent times and the idea is now officially recognised by UN bodies – after it was formalised in the 2015 Paris Climate Agreement (Galgóczi 2018; Gambhir et al., 2018; Heyen et al., 2020).

Just transition emerged in the late 1970s when the US Oil, Chemical, and Atomic Workers Union sought support for workers whose jobs were threatened by environmental regulation (Gambhir et al., 2018; Heyen et al., 2020). Starting with the Kyoto Conference in 1997, it became increasingly more eminent on a transnational level; ITUC began to include ideas associated with just transition principles in their stakeholder statements to global climate and sustainability conferences (Galgóczi 2018; Heyen et al., 2020). In 2013 the International Labour Organization (ILO), which is the United Nations' agency for the world of work, set out to bring together governments, employers, and workers' organisations to develop a policy framework on the just transition; the imperative of delivering a just transition culminated in 2016, with its formal inclusion in the Paris Agreement on Climate Change (Robins et al., 2018).

This positive trend has continued in more recent times. At COP24 in 2018, the "Solidarity and Just Transition Silesia Declaration" was adopted. This was signed by 53 governments, including the UK, and support for an investor statement backed by over 100 institutions with more than US$6 trillion in assets – more than 20 of which are based in the UK (Robins et al., 2019). Both the 2016 Paris Agreement and COP24 prompted a global recognition of the shift to a resilient, Net Zero economy, as they signal that the just transition will need to be delivered in accordance with nationally defined development priorities (Robins et al., 2019).

Efforts from the COP26 conference endeavoured to emphasise this commitment. In 2021, the Glasgow Climate Pact concluded on the need to ensure a just transitions that promotes sustainable development, decent work and quality jobs, and the eradication of poverty by making financial flows consistent with a pathway toward low greenhouse gas emission and climate-resilient development. This was supported by a declaration from 14 Organisation for Economic Co-operation and Development (OECD) member countries, a set of high-level principles from multilateral development banks and a Just Energy Transition Partnership with South Africa (Robins and Muller, 2021; Curran et al., 2022).

The idea of a just transition has also become global in scope due to the recognition that climate change and green transition efforts will affect developed and developing countries indiscriminately and will require all countries to consider how to best address issues related to international supply chains (Robins et al., 2018; Grantham Research Institute, 2019b). Furthermore, the just transition cuts across all aspects of the climate change agenda and the three goals of the Paris Agreement:

- reducing GHG emissions to net zero levels;
- strengthening adaptation in the face of increasing physical impacts;
- making financial flows consistent with zero-carbon and resilient development (Grantham Research Institute, 2019b).

Therefore, current definitions of a just transition entail both process and performance, and most importantly aim to address how the rapid shift to a zero-carbon economy impacts the workplace and the broader community (Robins et al., 2018).

This need for a systemic approach is hardwired into the Paris Agreement, which commits countries to make 'financial flows consistent with a pathway towards low GHG emissions and climate-resilient development' (Robins et al., 2018). The emphasis on finance as a key factor in ensuring a just transition has led to sustainable finance having a key role to play in delivering it, and in making sure that the shift away from high-carbon, resource-intensive and polluting sectors produces net benefits for workers and communities (Robins et al., 2018).

Whereas current environmental and social dimensions of sustainable finance have been managed independently, considering a Net Zero transition entails understanding it as a process of structural economic change with immediate social consequences. The idea of a just transition facilitates this, as it helps decision-makers in banks and elsewhere to see how the climate agenda fits with the social dimension. Besides being explicitly included within the Paris Agreement, the concept of just transition unites many of the individual UN Sustainable Development Goals (Grantham Research Institute, 2019a).

For investors and other decision-makers, it is important to understand the materiality of the just transition challenge facing the UK. Investors need to determine how the just transition impacts their existing policies for responsible investment and climate change (Robins et al., 2019). At the outset, it is clear that a major topic such as the just transition has consequences for all asset classes: listed equities; fixed income; property; infrastructure; private equity. In addition, it affects all parts of the investment chain, from beneficiaries through asset owners, asset managers and intermediaries to the end users of investment in the real economy and the stakeholders affected by it (Robins et al., 2018). Individual savers and beneficiaries are increasingly demanding better integration of ESG factors into the management of their assets, not only to mitigate risks but also to generate positive social and environmental impacts (ShareAction, 2018; Robins et al., 2019).

Many countries have already taken their own approach to ensuring a just transition; a range of regional and national governments are putting in place strategic initiatives and are introducing national roadmaps for sustainable finance (Robins et al., 2018). Some national governments have implemented further measures to ensure a Net Zero economy. For example, the UK is the first G7 country to make a legal commitment to achieve a Net Zero economy by 2050 (Grantham Research Institute, 2019a). Other initiatives in the UK such as the 2018 'Investing in a Just Transition initiative', are aiding this commitment by working to identify the role investors can play in connecting their actions on climate change with inclusive development pathways (Grantham Research Institute, 2019b). This extends globally whereby a growing number of dedicated just transition initiatives have been established, in Canada, Germany, Scotland and Spain, in most cases to address the specific issues facing the phase-out of coal-fired power generation (Grantham Research Institute, 2019b).

As previously mentioned, the just transition is a relatively new topic and even with projected positive benefits, effective and socially acceptable transition governance should take potential negative effects seriously and address them.

Transitional Effects

An immense shift such as the one implied in a Net Zero transition will come with its effects, both negative and positive. Strong advocates of a just transition do not see a conflict between environmental protection and economic vitality because they contend that more jobs could be created in an environmentally friendly economy, if enough guidance and support is provided (Wang and Lo, 2021). To be successful, the transition will need to be socially inclusive as well as economically efficient and environmentally effective. This will likely begin with implications for workers, but a just transition quickly expands to encompass the impacts of the transition for the community as production patterns change (Robins et al., 2018; Grantham Research Institute, 2019b).

The challenge of the just transition can be regarded as being at the intersection of green finance and social impact investing. This is recognised in the UK Green Finance Strategy, which identifies delivering a just transition as providing sufficient support for workers employed in transforming industries, for consumers and businesses, and that a high standard of living is guaranteed across the UK (HM Government, 2019; Grantham Research Institute, 2019a). Making this shift will require the UK's £20 trillion financial system to effectively manage climate risks, and channel capital towards sustainable activities. The transition will require a massive reallocation of capital, and if companies or whole industries fail to adjust to Net Zero, they will likely cease to exist (Carney et al., 2019; Grantham Research Institute, 2019a).

However, international evidence shows convincingly that the shift to a resilient, Net Zero economy could boost prosperity, generating an additional 37 million additional jobs worldwide by 2030 (New Climate Economy, 2018; Grantham Research Institute, 2019b). The Office for National Statistics (ONS) estimates that 225,000 people are currently employed in the UK's low-carbon technology and renewable energy economy, representing around 0.7% of the total UK workforce. Additional jobs exist in the supply chains of companies directly involved in these industries, meaning that overall employment in low-carbon industries would likely be higher (Committee on Climate Change, 2020). An assessment conducted by the Grantham Research Institute and the University of Leeds has estimated that about one fifth of current jobs in the UK will be affected by the greening of the economy (Robins et al., 2019).

Furthermore, ONS estimates that jobs in the low-carbon and renewable energy economy were around 208,000 in 2016, or about 1% of the total UK workforce (ONS, 2018). The Government has projected that low-carbon growth could support up to two million of what it describes as 'green collar' jobs in the low-carbon economy by 2030 (BEIS, 2018; Grantham Research Institute, 2019b). Benefits are not limited to employment as, according to the Can-do Cities initiative, besides generating 347,500 new job opportunities investing in today's cost-effective measures to cut GHG emissions would save the UK £26.6 billion per year by 2026, through the reduction of household energy bills on average by £256 (PCAN, 2019; Grantham Research Institute, 2019a).

There may also be employment opportunities for the UK from exports if it becomes a market-leader in the production of low-carbon technologies. The Energy Innovation Needs As-

sessment (EINAs) recently conducted by BEIS assessed these opportunities and found innovations in low-carbon manufacturing technologies including carbon capture, utilisation and storage, could support up to 80,000 jobs in the UK by 2050 (Committee on Climate Change, 2020). It is estimated that 10% of the workforce could derive benefits and new opportunities from the transition (transition aligned) and a further 10% are more likely to need reskilling, upskilling or to use skills different to those they currently use in their employment (transition reskill) (Robins et al., 2019; Bowen et al, 2018).

Overall, the position impacts from pursuing a just transition would include healthier working conditions, long-term economic prosperity and jobs depending on the preservation of resources, biodiversity, and ecosystem services, and where high costs of inaction are avoided. Further positive impacts to society could be greater well-being, equality, and inclusion (Heyen et al., 2020). By 2035 homes would be better insulated, cars cheaper to drive, air would be cleaner, streets quieter; there would be more access to green spaces and more opportunities for citizens to improve their health (Committee on Climate Change, 2020).

However, although there is undoubtably scope for job creations, any low carbon transition will lead to some degree of job destruction (Robins et al., 2018). Geography is one of the key components of the just transition, due to the socio-economic asymmetries a Net Zero transition will likely produce and/or exacerbate across the UK and globally. The just transition will not have the same impact on all sectors, individuals, regions, and businesses. Effects will be felt very differently across the UK, in rural communities as well as urban centres. This spatial dimension is particularly important for the UK given the entrenched regional imbalances that already exist. Indeed, the UK already has high levels of regional inequality compared to other OECD countries (Committee on Climate Change, 2020).

The jobs generated by a Net Zero transition are unlikely to emerge equally among different socioeconomic groups, skill levels, and regions (Heyen et al., 2020). Regions currently dependent on high-polluting sectors could struggle with rising unemployment, shrinking tax revenues and public spending - possibly affecting existing and/or planned infrastructure. Areas with older, energy inefficient housing could face higher energy bills. In contrast, rural areas off the gas grid, who typically pay more for heating fuel, will face greater benefits from a switch to low-carbon heating (Committee on Climate Change, 2020). Besides current workers, delivering a just transition will need to encompass the recognition and support of the large number of current and future pensioners who will be negatively affected as a result of transitioning away from a fossil fuel economy; there is a high risk that many fossil fuel companies may claim bankruptcy and therefore place the pensions of thousands of workers in jeopardy (Randles, 2019; Pai et al., 2020).

A key insight of the just transition is that one of the ways to accelerate climate action – and optimise its benefits – is to ensure that it is inclusive. This means taking account of the negative distributional consequences, so that the inevitable negative effects can be anticipated and potentially managed (Robins et al., 2019). The pace of the transition will have to be carefully considered and it is likely that significant policy and market action will both be required. Different technology pathways will affect skills needs and jobs across the economy

(Robins et al., 2019). Until now, the UK's transition to Net Zero has been highly concentrated in the electricity sector, with important positive localised impacts (Committee on Climate Change, 2020).

The benefits of employment and job creation from the Net Zero transition previously mentioned will also not accrue automatically. There will be transitional challenges for workers and communities across the UK and abroad as the shift takes place. For example, it will be important to ensure not just that the transition delivers extra jobs, but also that working conditions at least match those of past high-carbon sectors (Robins et al., 2019). While labour unions advocate for finding or creating decent, well-paying jobs that are equivalent to those lost by fossil fuel workers and others in their communities, environmental groups emphasize the need for a sustainable ecological outcome (Wang and Lo, 2021). A well-delivered, just transition should aim to accommodate both demands.

Overall, the just transition needs to happen at different levels —national, provincial, and local. Industries, businesses, regions, and individuals cannot be treated as homogenous groups (Committee on Climate Change, 2020). Maximising the economic and employment opportunities arising from the transition will require targeting new investment towards areas that are likely to be the most impacted, and to provide thorough guidance to those most exposed to the effects of Net Zero.

Impact on SMEs

SMEs contribute to economic development, employment, innovation, and social cohesion, and they are especially important in economically deprived areas (Lerner, 2010; Grantham Research Institute, 2019a). As explained in previous sections, SMEs are hugely diverse in terms of economic contribution, environmental performance, but also social impact. Indeed, they range from users of high-carbon capital stock (such as diesel haulage) to suppliers to high carbon sectors (such as automotive, aviation, energy, and industry) (Grantham Research Institute, 2019a). Owners of these businesses and their employees could face particular vulnerabilities, as the path to Net Zero does not look the same for all smaller businesses. For example, the agricultural sector, 90% of which are sole traders or family businesses will receive the most extreme impact as changing climate patterns is already affecting food supply and farming communities (Countryside, 2019; Grantham Research Institute, 2019a).

Therefore, the type of actions to be taken, their sequencing, and the capabilities required can be very different (House of Commons Library, 2018; British Business Bank, 2021). Research by the British Business Bank illustrates the distribution of their identified SME personas by region (see 'Firm Behaviour and Characteristics' section). The South of the UK has a significant share of the SME population, 54% in 2020. However, it also has a disproportionately high presence in carbon nimble (58%), and a low presence in carbon exposed and carbon correcting (46%) SMEs (British Business Bank, 2021). This emphasises the big difference in SMEs based on sector and region, and highlights that not all policies will be equally impactful on the carbon footprint of a smaller business, or require the same degree of control, investment, and effort to implement (British Business Bank, 2021). Apart from employment impacts on workers and their communities, many regions that host fossil fuel industries

such as coal mining, power plants, oil production and refining are heavily dependent on these industries for taxes and revenues (Robins et al., 2018).
Therefore, the benefits of the Net Zero economy will need to flow beyond the workplace to the wider community (Robins et al., 2019). Although Net Zero will involve the massive re-allocation of capital from high- to zero-carbon assets and towards those workplaces and communities that are most resilient, the just transition dimension adds in the implications of this for workers and communities, as well as consumers and society as a whole (Robins et al., 2019).

As highlighted by some of our stakeholders, a regional approach to Net Zero and the just transition would help to address these asymmetries across the UK SME landscape. Regions of the UK with heavy-polluting SMEs may also be the ones at higher risk of being economically stranded during or after the Net Zero transition – with cumulative costs that could have huge impacts on the national economy. Therefore, a concerted effort from policymakers is required not only to segment the heaviest-polluting SME sectors of the UK, but also to provide economic support to the least flexible and most vulnerable regions and communities of the country.

The Role of Banks in a Just Transition

Banks will play an important role in influencing the outcomes and effects of the Net Zero transition, by holding responsibilities around financing the transition, supporting skills development and place-based entrepreneurship across the regions of the UK (Robins et al., 2019).

While financing the actions behind the Net Zero target is a task in itself, doing it in a way conducive to a just transition is an additional challenge. The concept of a just transition remains in its early stages and needs to be translated into a digestible framework for banks, their clients, and communities (Grantham Research Institute, 2019a). The main way that banks can play a role in helping to deliver a just transition is in supporting their customers. Banks and other finance providers will need to address questions around the demand for sustainable financial products. This means understanding the requirements of different customer segments (particularly under-served segments), the barriers they face, and the financial solutions that could enable them to succeed in the transition (Grantham Research Institute, 2019a).

Public financial institutions will also play a critical role in closing financing gaps, creating new markets, reducing risk, and crowding in private capital. This means that blended finance is likely to be critical for carrying out a fairer transition (Robins et al., 2019). One example is the British Business Bank, which promotes lending to SMEs through private sector delivery partners. It currently supports £5.5bn of finance through a range of funds, including the UK Innovation Investment Fund, British Patient Capital, and the Enterprise Capital Fund (Robins et al., 2019). Further initiatives from different actors have been launched to help finance SMEs and promote the just transition; in October 2018, the Government announced the launch of the Clean Growth Fund, allocating £20m alongside at least £20m from private investors in a new venture capital fund (BEIS, 2018a). Other initiatives include the Grantham Research Institute's 'Banking on a Just Transition', a pilot project launched in 2019 that aims

to identify how banking can support a just transition towards a Net Zero economy and society across the regions of the UK (Grantham Research Institute, 2019a).

The degree of financial system centralisation will also matter in the Net Zero transition. The UK has a relatively centralised financial system compared with European countries; this profoundly influences the linkages between finance and the needs of cities and regions. The physical location of financing activities affects regions' access to finance: financial liberalisation has improved levels of financial flows but reduced the importance of local and regional governance layers in influencing them (Klagge et al., 2017; Corpataux et al., 2017; Robins et al., 2019). A possible approach could be to differentiate between what needs to be centralised and what can be regionally determined, as a way of stimulating secondary markets (Grantham Research Institute, 2019a). Banks and other finance providers could also disclose the geographical allocation of finance to enhance understanding of inflows to the local and national economy (Grantham Research Institute, 2019a).

However, this will require proactive management of both risks and opportunities in order to deal with the inevitable trade-offs of change. Ultimately, the country will have to manage the threat of not only 'stranded assets' and 'stranded enterprises' but also 'stranded workers' and 'stranded communities' (Grantham Research Institute, 2019a). Consequently, a task of utmost importance is to work out how to scale up flows of equity and debt finance for climate action across the UK (Grantham Research Institute, 2019a). Banks will need to work with policymakers to ensure that effective incentives and regulatory frameworks are put in place to mobilise the banking sector more broadly, to design solutions that reward inclusive outcomes (Grantham Research Institute, 2019a). Development finance will also be vital to help new companies, technologies and business models that are aligned with the transition, to develop in locations that need economic uplift. Responding to place-based priorities will require leadership from locally rooted banks and financial institutions: these institutions need to identify how they can play this anchor role. In an era when the physical presence of banks is declining due to branch closures, innovative approaches will be needed to identify the long-term role that national as well as regional institutions can play in specific places. It will be important for banks to ensure that their regional and local knowledge is retained and shared with others when designing strategies to address the just transition. They will also need to tailor their products to different economic realities (Grantham Research Institute, 2019a).

Just transition: Banks and SMEs

As part of the overall just transition strategy, there is a window of opportunity for banks to work with SMEs to enable them to prepare for the transition. This is challenging as SMEs can struggle to access finance and advice. Banks account for 80% of SME loans but many SMEs are turned down on the grounds of being too risky (Grantham Research Institute, 2019a). It is important that SMEs are consulted, supported, and effectively financed to make the necessary changes in ways that are manageable and sustainable. This means understanding potential risks, upgrading their businesses, and adapting to new markets for Net Zero products and services (Grantham Research Institute, 2019a).

Furthermore, SMEs often have little or no collateral, and no track record for the bank to assess the risks and opportunities an SME poses (Grantham Research Institute, 2019a). About 7% of SMEs are reluctant to seek external finance, citing time and hassle as key reasons (British Business Bank, 2018). These challenges extend to the transition as well, and access to finance alone is not always the stumbling block. For example, funds for energy efficiency upgrades lie unused by many SMEs because of time pressures and perceived risks, caused by the previously discussed barriers (Grantham Research Institute, 2019a).

A first task is to raise awareness of what needs to be done, and then work with SMEs to understand what it will take to successfully transition. Solutions must be found to address the apparent lack of SME demand for loans, and to finance economically attractive carbon reduction opportunities. Innovations in data and technology are likely to play a central role too, especially those designed to access, communicate, and assess companies' needs and potential for using finance. An institution providing advice to SMEs, whose remit could include green finance and the just transition, is a solution - perhaps in the form of a new national infrastructure bank (Grantham Research Institute, 2019a). Lessons can be learnt from other jurisdictions such as in Germany, where its national development bank, KfW, has been a crucial contributor to the Energiewende ('energy transition'), especially through energy efficiency loans to SMEs (Grantham Research Institute, 2019a).

More broadly, the just transition policy framework will need to address the question of how a risk averse banking sector can be incentivised to invest in the just transition, not least to encourage flows of sufficient, affordable finance across UK regions, and to typically riskier clients such as SMEs (Grantham Research Institute, 2019a). This will involve identifying areas that might be most impacted by decarbonisation before official UK policy decarbonisation plans are implemented, in order to avoid a worst-case socio-economic scenario (Pai et al., 2020). The policy framework is still to be formed, and a dimension of it will have to aid better direction of financial flows in the banking system; the banking sector and its stakeholders could help to shape it, so that funding flows to the right activities with greater urgency (Grantham Research Institute, 2019a).

For influential actors within the financial system (including investors) to play their role in the just transition, five key elements are needed (Robins et al., 2019).

These are:

1. understanding the just transition
2. sizing the scale of the challenge;
3. exploring the policy and market context;
4. identifying the areas for action;
5. setting out a checklist for further work;

Investors in particular can determine how the just transition impacts their existing policies by going through three iterative steps: portfolio assessment, stakeholder dialogue and strategic integration. Engagement by investors is a powerful mechanism both for generating a better understanding of corporate performance on the just transition, and for driving improved practices (Robins et al., 2019).

Some tools and resources are already being used in the banking industry and by investors. The World Benchmarking Alliance (WBA) has developed a just transition assessment methodology which can be used by investors. This includes six indicators for evaluating companies: social dialogue; respecting human rights in just transition planning; supporting access to green and decent jobs; retaining and reskilling workers; social protection, and advocating for just transition policies (Curran et al., 2022). The paper 'Just Transactions: A White Paper on Just Transition and the Banking Sector', published by Clifford Chance of the Institute for Human Rights and Business and British International Investment, found that banks recognise the importance of achieving an equitable, inclusive, and sustainable transition; some commercial banks are starting to consider how to incorporate just transition factors into their businesses, as it represents both an opportunity and risk.

However, banks alone cannot ensure a just transition. Building a Net Zero economy will involve a major ramp up of policy efforts - at all levels. Coordination for related activities will be necessary across the multinational bodies, national and local governments. These will need to include climate-related business and investor networks, the development and philanthropic sectors, and the workers and communities most likely to feel the effects of the transition – whether well or poorly managed. Involving a number of different actors should be a priority to support the transition, as it would facilitate a model where development experimentation can happen at scale, one with effective monitoring, evaluation and outcome-sharing practices across different sectors and levels (Grantham Research Institute, 2019a; Robins et al., 2018).

As previously mentioned, the Net Zero transition will undoubtedly create winners and losers. Therefore, it is the role of public institutions and regulators to draw a coordinated action plan to support the most exposed sectors and SMEs and prevent the negative socio-economic effects that could last generations.

Public Policy and a Just Transition

Besides banking and finance, public policy will be crucial to help create the ecosystem of institutions that can take a leadership role in the just transition (Grantham Research Institute, 2019a). From a fiscal perspective, most changes to the Government balance sheet resulting from the Net Zero transition will be relatively gradual, playing out through to 2050. There is time and scope within annual budgets to adjust the fiscal framework and develop suitable policy and funding instruments, to avoid fundamentally changing the burden of taxation. Another example of publicly led initiatives is the new Impact Investing Institute, which will be focused on combining social purpose with financial returns and could work to identify policies that might close the finance gap for the just transition (Committee on Climate Change, 2020). Other financial options include the issuance of public sector bonds for a just

transition, both by local authorities and the central government for example, through a sovereign bond (Grantham Research Institute, 2019a). The broad pathway is likely to be a subsidised transition in the short-run, with a progression towards one that does not require public subsidy in the longer-run (Committee on Climate Change, 2020).

Many of the factors that will affect the transition are determined at the national level or indeed internationally. However, local authorities and enterprise partnerships must incorporate the just transition in Local Industrial Strategies and City Deals, including the development of Net Zero industrial clusters and support for community-based business models. Anchor institutions, organisations whose scale, rootedness and community links are such that they are acknowledged to play a key role in local development, are also important (Morris et al., 2010).

Integrating just transition into policy, planning and regulation will require consideration of multiple forms of justice. Legislation, policy, and regulation will always have differential impacts across affected parties, raising questions around equitable distribution of burdens and benefits of energy-related decisions. For example, worker transition service centres in fossil fuel regions could provide one-on-one service to all workers in need, and there is evidence that such centres have been successful in some jurisdictions. For example, worker transition service centres were created in Latrobe Valley, a coal region in Victoria, Australia; of the 430 displaced workers who registered at these service centres, nearly 60% were employed again within 6 months (Pai et al., 2020). Transition plans could entail a fiscal strategy to address any loss of revenue due to fossil fuel industry closures. One way to address the shortcomings in revenue is by creating a transition revenue and investment plan that includes local revenue strategies, government assistance, and a spending strategy linked directly to economic development goals (Haggerty et al., 2018; Pai et al., 2020).

Lastly, given the key role educational and research institutions could play in shifting a fossil fuel region towards a knowledge-based economy, the national and local level governments could develop policies and provide funding for creating such institutions in areas affected by decarbonisation (Herpich et al., 2018). This will provide support towards more equitable distribution of burdens and benefits of energy transitions, although it would require long-term support from future governments.

Ultimately, it is critical that a fully integrated rather than piecemeal approach is implemented, in order to potentially avoid the worst adverse effects from a Net Zero transition.

Workshop Insights

Overview of the B4NZ workshops

As part of the scoping exercise, we organised four workshops with the core stakeholders of the B4NZ group. The purpose of these workshops was to:

- Get guidance from our stakeholder group and test early thinking
- Rapid assimilation of views, issues, ideas
- Identify new sources to explore, research or interview
- Agree on 1-2-1 follow-ups where we wanted to go deeper on an issue
- Refine the problem statement
- Accumulate hypotheses, needs, adoption barriers about possible solutions to the problem

To guide this discussion, we split the workshops into four main themes:

- Workshop 1: The current landscape of the Net Zero agenda in the UK and abroad
- Workshop 2: How might we start measuring SME GHG emissions?
- Workshop 3: How to engage SMEs to reduce GHG emissions and change behaviours?
- Workshop 4: How can there be progress towards a just transition from a banking perspective?

See appendix C for more information on the workshops.

Plan to address the workstreams

Proposed workplan

We split the workplan into two sections, the first section — *Long-term plan* — defines an overall list of workstreams we identified during the scoping exercise, including the actions and deliverables.

The following section — *Immediate Next Steps* — itemises which of these actions should be prioritised. The objective of this initial phase is to test, pilot and learn from different proposed approaches, analyse insights and outcomes, and propose potential solutions. This phased approach allows the use of an agile methodology to solve the problem statement given its complexity.

This section of the report also identifies the key stakeholders involved in each of the pilot projects, an estimated timeline, and the ask from banks.

It is important to mention that there are organisations that have already made progress on many of our action areas and to emphasize that our suggestion is to integrate these efforts into a cohesive national approach to make engaging with SMEs easy and frictionless. Over the course of this project, we have engaged with many organisations. This report will act as catalyst for other organisations to come forward to collaborate with B4NZ to define, model and roll out the best possible framework to engage SMEs to measure emissions and change behaviours. The focus is initially on the UK, and eventually our learnings could be applied to model a global approach.

Long term plan

Measuring SME GHG Emissions

Workstream	Actions	Deliverables	Partners Identified
Segment the UK's SME market and determine which segments should be prioritised	Define a methodology to segment the SME market, e.g., based on size (turnover) and industry (SIC Codes) Define key segments to address based on GHG emissions and ease of reducing emissions	A proposed segmentation methodology The actual segmentation of UK SMEs An indication of size of GHG emissions and ease of reduction per segment	The Broadway Initiative has been working with BEIS and the SME Climate Hub on methodologies to segment the SME market and provide tailored advice to SMEs based on industry. The Energy Saving Trust have also published some thinking on how to identify sectoral priority groups that we should further explore
Determine a set of data standards for GHG emissions data	Collate and analyse a set of SME data Research methodologies to applying data standards from other areas of work, such as Open Banking standards, to understand best practices and implementation techniques Work to build on ongoing efforts to promote standard convergence, and with experts to build on ongoing efforts to define and propose a set of Carbon Data Standards. These should be made open source to enable a continuous improvement, interoperability and facilitate adoption	A guide on how to develop and implement data standards, and a proposed initial set of data standards for GHG emissions data	This should be done by making use of already-existing efforts to encourage convergence, and in collaboration with important organisations and standard-setting leaders such as CDP, TCFD and GHGP. There have also been some recent developments in this area by consortiums such as the Carbon Data Specification that we should investigate further
Determine the UK's SME GHG measurement standard	Research and analyse the advantages and disadvantages of the most used GHG measurement frameworks Determine how these frameworks can be simplified and adapted to be suitable for SMEs Define which combination of standards banks in the UK should adopt/encourage when measuring SME emissions	A comprehensive analysis of the different measurement standards/frameworks and a recommendation of which standards/frameworks UK banks should adopt going forward	This should account for the international ambitions set out by organisations such as UNEP FI and GFANZ. We should aim to collaborate with and build on the work being done by the SME Climate Hub, CDP, Normative and Exponential Roadmap initiative when working on an SME reporting tool

Improve accuracy of SME emission measurement mechanisms	Analyse current SME data collection mechanisms Test the potential of alternative data sources to improve accuracy of estimates Define who is responsible for data collection, carbon measurements and reporting	A roadmap for enhancing data collection mechanisms and improving the accuracy of SME carbon accounting	There are several organisations working on different data approaches to collecting/measuring SME emissions data. As part of this project, we have researched/interviewed some solution providers. We should aim to pilot some of these approaches and engage further with alternative solutions
Determine a measurement methodology for each SME segment	Analyse findings and determine a suitable carbon measurement methodology for each SME segment Determine a responsible party to authenticate methodologies, to provide accreditation of measurements, and to monitor accuracy and compliance from SMEs	A rulebook of measurement methodologies per SME segment, and a recommendation on the enforcement mechanisms	This should be done in collaboration with all the partners identified above, and include industry and academic experts
Consider the role of regulation in enforcing accuracy and consistency of SME measurements	Study the role governments and regulators should play in enforcing the accuracy and standardisation of carbon accounting for SMEs Define topics banks should work on with the UK Government in terms of standardising and enforcing SME emission reporting	A view on the role of government, regulation, and accreditation agencies in setting, monitoring accuracy and enforcing SME emission reporting	Progress has been made on this topic by the UK Government, and by organisations such as TCFD, UNEP FI, WPI, BEIS, The Energy Saving Trust, and others and we should aim to contribute to their work

How to encourage SMEs to change behaviours

Workstream	Actions	Deliverables	Partners Identified
Define the role banks should play in creating awareness and educating SMEs	Create examples of messaging banks can use to inform SMEs of their GHG emissions Define sources of information and education banks can use for their SMEs Define communication channels to SMEs	A guide for banks to play a role in creating awareness and educating SMEs. This could include examples of messaging to SMEs, sources of information and education for SMEs (some may be public), and an analysis of the communication channels that could be used by banks to connect with their SMEs	This should be based on the progress already made by the SME Climate Hub initiative in generating content and getting SMEs to pledge their commitment to Net Zero initiatives
Create a playbook for banks to use when incentivising SMEs to reduce their emissions	Define characteristics of a "green product" Provide an example list of green products Lay out a logic of differential pricing for loans, to either enable transition to lower carbon operations or reward SMEs who have made the transition (both could be based off capital requirements) Define a list of examples of agreements between banks and third parties, to provide products or services at a discount - e.g., insulation for SMEs who commit to reduce emissions	A playbook for banks to incentivise their SME customers to reduce their emissions, ranging from examples of green products to loan pricing and agreements with third parties	The SME Climate Hub, in partnership with BSR and Cambridge University is developing a financial support guide hub for SMEs. The work done in this area should be represented in our workstream
Investigate the role of banks as catalyst for community/cluster cooperation to reduce GHG emissions (e.g., a cluster of SMEs jointly funding a windfarm)	Investigate examples of community/cluster cooperation and define best practises Obtain input from banks on the viability of acting as catalysts of these arrangements	A guide for banks to set up communities or clusters of SMEs that can jointly reduce their GHG emissions	Responsible Finance has been working on developing a pilot on how banks and community development finance institutions can collaborate to assist SMEs in raising the necessary capital, to ultimately enable investment in community sustainability projects

Investigate the role of banks to act as market makers for carbon offsets	Investigate local and international examples of banks acting as market-makers for carbon offsets Research accreditation of carbon offsets, and the role banks could play in ensuring the credibility of carbon offsets	A view on the role banks can play as credible parties offering and distributing carbon offsets to clients	The University of Edinburgh has been working with commercial partners to develop and test innovative carbon removal technologies; we should look to extend our research into these emerging technologies. Tide has also been doing some work on how to partner with their SME clients to encourage carbon removal investments
Consider if regulation is required to ensure parties (banks, SMEs) are incentivised to adopt carbon measurements and reduce GHG emissions	Determine the risks if no regulation is adopted (e.g., banks not measuring emissions of SMEs are advantaged because of less stringent requirements) Determine the likely regulation that may be required to ensure a level playing field e.g., requirement to measure GHG emissions from SME clients, capital adjustments based on banks' Scope 1, 2 and 3 emissions)	Decision on whether regulation/disclosure of certain information is necessary	The Energy Saving Trust and other organisations have published reports analysing and defining this issue - we should seek to contribute to their or other similar research and analysis
Determine the potential role of banks in implementing government programs to help reduce GHG emissions	Draw up a view of the role banks could play as distribution channels for government programs to help or incentivise SMEs to reduce their GHG emissions, considering the measurement system that banks may administer or use	View on the role banks could play as distribution channels for government programs, potentially leveraging the carbon score or measurement methodology banks implement	Study role of banks in implementing government programs (e.g., BBLs and CBILs during the pandemic), and how we can emulate these processes or utilise the learnings from them

Ensuring a Just Transition

Workstream	Actions	Deliverables	Partners Identified
Defining the Just Transition for SMEs	Define what constitutes a just transition: its key principles, practical applications, risks, and mitigations for SMEs	A report determining the principles of a just transition; defining its practical applications and itemising the mechanisms that must be put in place to mitigate the risks for SMEs	We should aim to collaborate with the Grantham Institute at the London School of Economics and the International Labour Organisation on the work they have done in defining the principles of the just transition
Roadmap to enable Net Zero by 2050	Define key milestones that will enable us to reach our targets Determine a realistic timeline for each milestone, and what mechanisms needs to be in place by when to ensure that banks are not contributing to the creation of 'finance orphans'	A timeline and roadmap with clear and realistic milestones	We should collaborate with all the stakeholders identified in this plan and use the learnings from each of the pilots executed over the course of the next 12/18 months to define a realistic timeline. Other organisations like the Energy Saving Trust have also done a lot of work and thinking on this - we should seek to engage with them in the next stage
Define the potential economic opportunities and downfalls of the transition	Determine the positive impacts of a well-managed transition e.g., how it will encourage innovation and development, create high-quality jobs, reduce inequality, and improve population health and well-being Determine the negative impacts of poorly managed transition: its economic and societal effects, and what it could mean to those left behind	A study analysing the potential economic and societal impacts and opportunities of a just transition from a banking perspective	The Grantham Institute at the London School of Economics has been researching the economic impacts of the transition
Determine the role of government and regulation to enable and enforce a just transition	Determine the role of regulation in ensuring that banks do not disadvantage SMEs in high-carbon sectors Define the role of blended financing and other investment mechanisms, and how banks and government can work together to channel assets to delivering positive impact in key sectors and regions	Decision on whether banks should ask for regulation, and a playbook on how banks and government can work together to enable investment in key sectors and regions	We should analyse the findings from the further work being proposed, and collaborate with all stakeholders to propose to government a set of regulatory measures needed to achieve our roadmap to 2050

Immediate next steps

Pilot a framework to measure SME GHG emissions

Segment the SME market

The heterogeneous nature of the SME market makes it difficult to implement a *one-size fits all* solution.

The UK government definition of SMEs encompasses micro (less than 10 employees and an annual turnover under €2 million (£1.73 million)), small (less than 50 employees and an annual turnover under €10 million (£8.66 million)) and medium-sized (less than 250 employees and an annual turnover under €50 million (£43.31 million)) businesses.

This wide-ranging definition means that each SME will have a different impact on the overall carbon footprint of the UK depending on their industry and size of the business. As an example, a micro tech company or a local customer-facing business like a hairdresser or a restaurant, will have a very small impact on the environment when compared to a medium-sized manufacturing company that distributes their products across the world.

The segmentation should also consider the ease of reducing GHG emissions. Factors like economies of scale, criticality of the segment, and existing and emerging technology to reduce GHG will all play a role. Banks and regulators might wish to take this into account when considering the transition of SMEs to Net Zero. It seems reasonable to focus efforts on measuring, reporting and ultimately reducing the GHG emissions of carbon-heavy SMEs.

Each type of business will have distinct motivations, resources, barriers, and challenges in their Net Zero journey, and these need to be carefully weighed when implementing the mechanisms to support, encourage or regulate the transition to Net Zero by SMEs.

Businesses with low turnover and employee count are not likely to have access to the necessary resources and skills to plan and achieve a successful green transition, but they are also unlikely to have a large carbon footprint. They could be treated like consumers in terms of engagement, where incentives to reduce energy consumption and retrofitting are most likely to have the biggest impact.

On the other hand, the larger, carbon-heavy SMEs will likely face a significant financial cost to transition that may hinder their competitiveness in the market or even their ability to survive, so we must target our efforts and resources to ensure that these segments are supported in their green transition.

Once we have segmented the SME market, we should aim to classify each industry in terms of its carbon usage and potential for carbon reduction. This would allow us to focus our efforts on the actions with the biggest possible impact going forward.

From our research, the Broadway initiative has been working with the SME Climate Hub on this issue - our suggestion is that we should explore further collaboration.

Improve the accuracy of SME carbon measurements

Collecting the right level of information from SMEs is paramount to accurately measuring their GHG emissions and impact on the environment. However, as we have highlighted in this report, SMEs face several internal and external barriers in their adoption of environmental management systems.

This means that not all SMEs have the capability, resources, and motivation to meaningfully engage in the process of measuring GHG emissions.

There are several potential approaches to collecting relevant data that enables banks to have some understanding of their SME clients GHG emissions, with minimal impact on SME resources.

Carbon calculators and other technological approaches have been created to enable SMEs to automate their emission measurements based on simple questionnaires, and by allowing access to key data points in their open banking data. These technologies analyse transactional level data and use standardised carbon modelling databases to estimate the carbon impact of each transaction logged.

Whilst these approaches are not fully accurate, they could provide an initial step in terms of estimating each SMEs impact on the environment, and act as an awareness and educational tool for companies looking to change behaviours. Our hypothesis is that this approach is suitable for most smaller SMEs, but work needs to be done in defining a more tailored and accurate approach to SMEs identified in high carbon segments.

During the B4NZ workshops, there was a suggestion that in addition to the already tried and tested approaches using Open Banking data to measure SME emissions that we could test other sources of information, like cloud accounting or energy data, to complement the detail and granularity of information that we cannot access from open banking data, by analysing the detail of each transaction and using that information to provide a potentially more accurate estimate of the carbon footprint of the transaction. In the next stage we should seek to collaborate with organisations looking at this problem to explore and test their approaches, some of which have been identified during this work like Rewired.Earth, Normative, Ciendos, iSumio, Connect Earth, and Icebreaker One.

Define data collection mechanisms

Once we have defined the most accurate methodology to measure SME data, we need to understand who should be responsible for collecting and reporting this data. During the workshops, several approaches were discussed, as described below:

	Inside-Out	Outside-In	Hybrid
Description	Data reported by SME May be a materiality threshold, similar to VAT reporting May require a form of vetting or auditing to confirm accuracy	Data collected automatically from sources that could be accessed by a third party May require authorization by SME Could be done e.g., by Banks, Credit Reference Agencies or Cloud Accounting Providers	Combination of approaches, e.g., every SME receives an automatic outside-in carbon score, but SMEs could choose to self-report if they disagree with the score
Examples of data	Any data to which the SME has access (internal and external)	Open Banking Data Cloud Accounting Data EPC Ratings for property occupied Number and type of registered vehicles	Combination of described sources
Pros	SMEs involved Can account for special circumstances Theoretically could be more accurate and up to date (in practice SMEs may have an incentive to misreport)	Consistent analysis of comparable data No vetting or auditing required Economies of scale No need to convince or compel SMEs to participate	"Best of both worlds" Appears to be fairer
Cons	Could have an inconsistent application of standards Vetting or auditing required Requires effort from SMEs Have to convince or compel SMEs to participate	Does not account for special circumstances SMEs not involved, and may distance themselves from the result	More complex to administer Could lead to biased outcomes (SMEs who feel they are under-assessed would not offer to self-report)

Determine a set of data standards

The market for products aimed at helping SMEs collect and measure their GHG emissions is growing rapidly; in recent years there has been a steady increase of carbon calculators and other technologies aimed at gathering SME data and providing automated estimates of emission impacts.

The competitive nature of the market means that the data gathered is completely siloed and protected by each of the technology providers. However, to achieve the ambition of becoming a Net Zero nation by 2050 there will likely be a need to understand the data at a UK and global level. For that to be possible we will need to find solutions to overcome these siloes, whilst protecting market competition and respecting IP and data ownership boundaries.

An option to facilitate this could be to determine a consistent approach to the way data is collected and stored that enables it to be accessible, comparable, and linked for a total market analysis. This could be enabled by setting industry wide data standards for SME GHG emissions data.

Data Standards are the pre-requisites to how the data is managed, used, represented, formatted, defined, transmitted, structure and tagged. An agreed documented approach that refers to the technical specifications of how the data should be stored or exchanged across different systems is required. These steps are essential to ensure data quality, improve access to data, and guarantee interoperability in an open market.

Setting industry-wide carbon data standards would enable a collaborative approach to tackling climate issues, allowing governments, banks, academics, climate experts and other stakeholders to easily access and link different datasets together. This would ensure comparability, facilitate comprehensive research, and enable data driven decisions on how to achieve our Net Zero targets.

The creation of data standards should be an open-source effort to ensure interoperability, transparency and facilitate adoption. The financial services industry collectively supporting and using one set of data standards would facilitate global adoption.

Significant effort was made to create an appropriate set of data standards for Open Banking data, and we should be leveraging the experience and learnings from these efforts to model a solution to this problem.

Determine SME carbon measurement standards

Unlike SMEs, large corporations have been widely regulated to report on their Scope 1 and 2 GHG emissions and have had to invest significant resources in establishing Environmental Management Systems that facilitate their carbon accounting.

There is a thriving market for corporate carbon accounting. Significant resources have been invested in establishing emission measurement frameworks, and in defining the standards and protocols to standardise the methods of calculating and reporting GHG emissions across industry However, these are largely aimed at large corporations and the cost of comprehensively implementing these remains prohibitive for the average SME.

Even though there is no active regulation that require SMEs to report on their GHG emissions, some SMEs have made efforts to better understand their carbon footprint, and in the past few years there has been notable growth in the SME carbon accounting market.

This growth has mostly been using innovative approaches to help SMEs measure and manage their GHG emissions by using technology and data to automate the process.

As the market grows, determining industry wide SME measurement standards is essential to ensure fairness, comparability, and to mitigate the risk of greenwashing.

From our research, the community of SME solutions is mostly collaborative. Through consultation and consensus, SMEs use variations of the GHGP to understand what to measure, and carbon modelling databases such as Exiobase to estimate the environmental impact associated with SME activities.

However, further work is required in formalising the measurement standards across the market to ensure fairness and comparability, and banks could play a role in the absence of regulation.

If banks were to collectively state what standards and protocols were recognised when making banking decisions and risk assessments, this could nudge carbon accounting technology providers to adopt the recommended approach, to ensure that their calculations are recognised by banks, and that their products can be integrated with banking products.

Standardisation would enable SMEs, Banks, and regulators to use the same estimations and proxies when calculating GHG emissions, making these estimates comparable across the market and promoting fair competition. It would also allow for interoperability of measurements, ensuring SMEs could easily transfer their measurements and data across providers.

The UNEP.FI and TCFD have been running a series of pilot projects with key stakeholders that have generated several tools, frameworks and guides to support financial institutions in their transition and we should seek to leverage their expertise and learnings to adapt the model to SMEs. Work in this area has also been carried out in recent years by consortiums such as the Software Carbon Intensity (SCI) specification to study and define a set of measurement standards. Later this year, the SME Climate Hub, in collaboration with CDP will be launching their SME carbon reporting tool and we should aim to collaborate with these initiatives.

Define the role of regulation

The collective action of banks can go a long way to facilitate the process of measuring SME GHG emissions in the UK but to achieve our Net Zero ambitions in the long term, regulation to monitor and enforce the accuracy of data collected and the consistency of methodologies used to calculate GHG emissions will be required.

The voluntary nature of carbon disclosure gives SMEs the freedom to decide the level of detail and accuracy of information provided. There will be a need to establish regulated mechanisms to audit the accuracy and completeness of the information disclosed, and to issue penalties to SMEs guilty of greenwashing their GHG emissions, much like it has been done for corporations.

Since there is a risk that carbon accounting technology providers might tweak their measurements or use inadequate proxies and estimates to calculate GHG emissions; we should consider the need to regulate the market to ensure consistent and trustworthy measurement methodologies as to prevent the risk of indirect greenwashing.

The solution to this problem will likely be a combination of several approaches to provide a more accurate snapshot of an SMEs impact on the environment. Whilst this can be technically enabled by a set of consistent data and measurement standards, there's a need for a centralised body that can collect the data from different sources and assess the overall carbon footprint of a company to establish a green rating that is attributed to SMEs and recognised by all parties.

Regulation will also ensure a level playing field so that banks who act first are not competitively disadvantaged. The role of government could be to mandate that all banks must measure each client's GHG emissions by a certain date, and that these measurements are used in their risk assessments going forward.

Further research is required to determine the need and role of regulation in ensuring consistency and accuracy of measurements across all SMEs. As part of the wider B4NZ efforts, WPI Economics have worked on analysing the policy gaps in the UK and we should collaborate with them in the next stages to use the learnings from this pilot to inform future policy recommendations. Other organisations have also been doing research on this matter, and we should engage and collaborate with them and contribute to their work for example, the Energy Saving Trust has published a report on how policy can better support SMEs in the pathway to Net Zero in collaboration Purple Research Market, The Open University and Oxford University, which explores a set of policy recommendations to address the problem statement identified.

Proposed pilot projects

Actions	Stakeholders	Expertise needed
1. Pilot a framework to measure SME GHG emissions		
a) Determine market segmentation framework i. Determine a suitable methodology to segment the SME market and prioritise segments for further analysis ii. Define which data collection mechanisms are needed for each of the segments (i.e., Energy and/or fuel consumption data)	B4NZ, The SME Climate Hubs, The Broadway Initiative, The Energy Saving Trust, ONS, FSB	SME, Data and Climate expertise
b) Test if Cloud Accounting data can improve accuracy of automated carbon calculations i. Define appropriate data sample and categories of data analysis needed ii. Partner with cloud accounting providers and secure access to data iii. Process data (Clean, anonymise/pseudonymise and link data) iv. Make anonymised data accessible for experts in climate accounting to analyse v. Recommend an approach going forward (is cloud accounting accurate enough or do we need to consider other data sources?)	B4NZ, Accounting firms	Data, Accounting and Climate expertise
c) Deepen our research on the current efforts being made globally to develop carbon data and measurement standards and determine next steps	B4NZ, relevant standard setting international organisations (PCAF, CDP, GFANZ, GHGP, SME Climate Hub etc)	Data, Standards and Climate expertise
d) Analyse findings to inform a first hypothesis on what the role of banks, SMEs and government/regulators is in measuring, reporting and ensuring accuracy and compliance	All stakeholders	Data, Policy, and climate expertise

Test the effectiveness of banking mechanisms to reduce SME GHG emissions

One of the most discussed points during our scoping exercise was defining the role of banks in creating the mechanisms for supporting SMEs in changing behaviours and reducing GHG emissions. It was agreed that banks should play an important part, but no clear consensus was reached on the exact role.

Raising awareness and providing education to SMEs

We should work with the SME Climate Hub and The Broadway Initiative to define the role banks can play in raising awareness and providing educational material to help SME clients increase their knowledge of how to plan and implement transition plans.

Providing financing incentives and green products

We should aim to test the effectiveness of banking incentives aimed at driving SMEs to change behaviours and reducing their GHG emissions, some examples of these might be:

- Favourable credit terms for loans enabling the transition to lower carbon operations
- Reduction in service fees for SMEs meeting certain absolute emission levels or improvements in emission levels
- A “green credit card”, with lower interest rates for SMEs with defined carbon emission performance, as verified by the bank
- Lower interest rates on loans for SMEs that emit less GHG emissions or that have reduced their GHG emissions

Define other mechanisms banks can adopt to reach Net Zero targets

There are also other mechanisms that banks could implement to support the transition of their SME clients. These could include banks using their knowledge and influence in local communities to create clusters of SMEs that enable local collaboration; overseeing and managing joint financing of green solutions like local windfarms or even contributing to community financing initiatives to help local SMEs.

Banks can also be a catalyst for carbon offsets and can incentivise carbon removal initiatives by acting as credible partners to carbon removal companies. This could enable SMEs to safely invest in the right type of carbon offsets; banks could also create ‘match carbon removal schemes’ where they match the investment made by their SME clients in carbon removal projects.

Determine the role of regulation and when banks and governments should collaborate

Banks may choose to request to be regulated in order to ensure a level playing field, and to not disadvantage banks that choose to act first. While regulation takes time to implement, the pressure of banks could accelerate that process.

Having an overarching strategy and agreed collaboration between banks and government is essential to maximising the impacts and effectiveness of measures.

As we learned from COVID-19, in crisis situations banks can effectively act as a distribution arm for government policies like the distribution on government incentives, grants and loans.

Proposed pilot projects

Actions	Stakeholders	Expertise needed
2. Test the effectiveness of mechanisms to engage SMEs to reduce GHG emissions		
a) Test mechanisms banks can use to promote awareness and education to their SME clients i. Determine the most suitable sources of tailored SME content ii. Research with SMEs what are their preferred communication channels iii. Pilot effectiveness of messages and communications channels, gather feedback from SMEs and iterate approach	B4NZ, SME Climate Hub, The Broadway Initiative	SME and Climate expertise
b) Test effectiveness of financing incentive mechanisms and green products i. Work with banks to define a playbook of financing incentives and green products ii. Partner with banks and SMEs to test the effectiveness of each mechanism in changing behaviours and reducing GHG emissions	B4NZ, Banks, SMEs	Banking, SME and Climate expertise
c) Define other mechanism banks can adopt to reach Net Zero targets	B4NZ, Banks, SMEs	Banking, SME and Climate expertise
d) Determine the role of regulation and when banks and governments should collaborate	B4NZ, Banks, Government, SMEs	Banking, Policy, SME and Climate expertise

Ensuring a just transition for SMEs

Define a roadmap to 2050

A big concern that was consistently put across by multiple stakeholders during our workshops and interviews was related to the dangers that a poorly managed transition might have on the economy and society.

Given the potential negative socio-economic impacts of a UK Net Zero transition, discussed at length in the longer version of this report, there is a need to establish a realistic timeline, define what mechanisms need to be in place to support SMEs during the transition period and determine quantifiable measures of success for each SME.

Our suggestion is that we start with the immediate next steps identified as soon as possible and analyse the findings to inform and adapt the long-term plan, which might change with more information.

Proposed pilot projects

Actions	Stakeholders	Expertise needed
3. Analyse findings and determine next steps		
a) Define what a just transition entails for SMEs and determine the role of banks b) Draw up a high-level roadmap to enable net zero by 2050	All Stakeholders	SME, Banking, Policy, Data and Climate expertise

Estimated timelines

The estimated timelines are of course dependant on when the project starts, our suggestion is that the proposed pilots would take 12 months to prepare, conduct and analyse findings.

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
1												
1a												
1ai												
1aii												
1b												
1bi												
1bii												
1biii												
1biv												
1bv												
1c												
1d												
2												
2a												
2ai												
2aii												
2aiii												
2b												
2bi												
2bii												
2c												
2d												
3												
3a												
3b												

Resources needed

To execute on the above plan over the next 12 months will require

- Resources to staff a Program Management Office to drive progress in the three pilot projects, monitor impact and adjust the long-term plan
- Owners for each of the three pilot projects that will perform the work and be accountable to produce the outputs
- Academics and industry experts to provide input for the three pilot projects
- Members of BFNZ to engage in meetings and input into the three pilot projects

At the end of 12 months BFNZ should have a working model to test with their members, engage non-members of BFNZ and consider rolling out to all banks. This model could also serve as a basis for discussions with government on regulation.

First hypotheses on outcomes for the three workstreams

The main focus of this work is on scoping the problem, understanding current research, and devising a concrete plan to address the three workstreams (measurement of SME GHG emissions, engagement with SMEs to reduce GHG emissions and consideration of what would constitute a just transition for SMEs from a banking perspective).

As an output of the research, we have provided first hypotheses on the outcomes of the three workstreams. However, detailed recommendations are out of scope, and the below should be read as first thoughts to be further debated and developed or discarded.

1. Measurement of SME GHG emissions

a) Determine market segmentation framework

i. Determine a suitable methodology to segment the SME market and prioritise segments for further analysis

Step 1 segmentation: Segment SMEs into small ("S") and large ("L") businesses using a publicly available existing method e.g., L could be defined by:

- Turnover - all businesses required to submit a VAT return (broadly businesses with more than £85,000 in annual turnover), or
- Requirement to be audited - all companies required to be audited annually

It is anticipated that *S* would broadly correlate with the portfolio-managed SMEs of the larger banks, while *L* would correlate with the relationship-managed SMEs.

Step 2 segmentation: Segment *L* by industry, focusing on the industries that produce the highest GHG emissions. As a start SIC codes could be used to classify SMEs into a few broad industry categories, although we might need more accurate to define a more accurate methodology to segment *L*.

An illustrative segmentation could be:

- L1 – Agriculture
- L2 – Manufacturing
- L3 – Transportation
- L4 - Services
- L5 - Other

ii. Define which data collection mechanisms are needed for each of the segments

Our hypothesis is that for both *L* and *S* categories of SMEs, the default measurement is the described outside-in approach with the caveat that any business that objects to its default outside-in emission score could volunteer to submit a standardised report (inside-out) that would be scrutinised for reasonability (comparing it to similar businesses) and could be audited.

For *L* there would be a few types of calculation, depending on the companies assigned segmentation (*L1, L2, L3, L4, L5*). As an example, for *L3* the number and type of registered vehicles would play an important role in the final score, while for *L2* the source of electricity may be more important.

For *S*, carbon calculation should be very simple, given the large number of small businesses (and low emitters). It could be based on as few as one to two variables (e.g., energy/fuel usage and energy efficiency of premises or offices) and could possibly be done with just assessing their open banking transactions.

The calculation of the outside-in emission score would be performed by accredited Carbon calculators. Accreditation would be based on the accuracy of the carbon score, and the consistency of the calculation method with scientific principles. For example, a requirement may be that the score is based on verifiable and auditable inputs and not stated data (data obtained from a voluntary questionnaire completed by SMEs).

b) Test if Cloud Accounting data can improve accuracy of automated carbon calculations

Our hypothesis is that the accuracy of these calculations can be improved by using Cloud Accounting data and whilst this isn't likely to provide the full picture of an SME GHG emissions quota with full accuracy it might enable us to have an accurate estimation of at least 80% of emissions produced in key segments.

c) Deepen our research on the current efforts being made globally to develop carbon data and measurement standards and determine next steps

Determine a set of data standards

This would be best as an open-source effort to allow for global cooperation, maximise transparency and facilitate adoption.

We should aim to collaborate with consortiums already in existence like the recently formed CDS.

Determine measurement standards

The measurement methodology should meet the following design principles:

- Materially accurate
- Actionable
- Easy to implement
- Leverage existing infrastructure
- Minimise demands on SMEs
- Able to be further developed and improved over time

d) Analyse findings to inform a first hypothesis on what is the role of banks, SMEs and government/regulators in measuring, reporting and ensuring accuracy and compliance

Government (e.g., BEIS), the third sector (e.g., international standards organisations like the International Sustainability Standards Board (ISSB)) or the private sector (e.g., credit reference agencies) could provide accreditation for Carbon calculators.

Our hypothesis is that credit reference agencies working with international standards organisations would be best place to (a) provide accreditation to SME carbon calculators/accountants; and (b) administer the Carbon score, which could be managed like a credit score using existing rails.

For speedier adoption, as a first phase it may be required that for all *L*, the involvement of a credit reference agency is required while for all *S*, a score sourced directly from an accredited Carbon calculator would suffice.

Credit reference agencies are particularly well-suited for administering the Carbon score for SMEs given that they are

- A small oligopoly with existing relationships with all banks – which enable them to focus on determining a consistent score in the absence of regulation
- Experienced in sourcing and working with data from multiple sources, incl. open banking data
- Already connected electronically with all banks

2. Mechanisms to engage SMEs to reduce GHG emissions

a) Test mechanisms banks can use to promote awareness and education to their SME clients

Banks should inform their SME clients on the measurement requirement of GHG emissions and the impact on assessment of risk and pricing of loans.

Banks could also voluntarily point SMEs to credible public information on how to reduce GHG emissions and inform them of government programs to incentivise the reduction of GHG emissions.

Some banks may choose to create their own branded information on how to reduce GHG emissions.

b) Test effectiveness of financing incentive mechanisms and green products

Some banks may choose to provide incentives to SMEs to reduce their GHG emissions, e.g.,

- "Green products" - some examples include:
    - Favourable credit terms for loans enabling the transition to lower carbon operations

- Reduction in service fees for SMEs meeting certain absolute emission levels or improvements in emission levels
- A "green credit card" with lower interest rates for SMEs with defined carbon emission performance as verified by the bank
- Lower interest rates on loans for SMEs that emit less GHG emissions or that have reduced their emissions (this could be a logical consequence of higher capital requirements for banks with higher overall GHG emissions as measured by GHGP Scope 1, 2 and 3)

Banks could also negotiate incentives with third parties (e.g., providers of insulation, electric vehicle manufacturers, clean energy providers) that they then make available to their SME client base as part of their overall offer.

c) other mechanisms banks can adopt to reach Net Zero targets

Aside from providing awareness, education and financing incentives/green products to SME clients, banks could also have an impact in other ways:

Create community and SME clusters around carbon reduction initiatives

Some banks may choose to use their knowledge of local communities and business clusters to act as catalyst for creating green initiatives, e.g., a bank acting as financier for the businesses in a town deciding to jointly build a windfarm to reduce their GHG emissions of support the creation of local climate advice hubs in partnership with local authorities.

Act as market-maker for carbon offsets (incentivising carbon removal)

Some banks may choose to act as credible partners to carbon removal companies and use their existing relationships with SMEs and their distribution channels to sell carbon offsets to SMEs that enable them to meet their emission targets.

An accreditation system for carbon offsets should be part of this equation. Ideally, independent parties would provide this service, although in the short term some banks may choose to build competence in the field and act as adjudicators of the efficiency and sustainability of carbon offsets. In some cases, there may be a conflict of interest, which should be declared.

d) Determine the role of regulation and when banks and governments should collaborate

The role of regulation

Request regulation by Prudential Regulation Authority (PRA) and enforcement by the Financial Conduct Authority (FCA)

While this does not constitute engagement with SME clients, banks would require a level playing field when placing additional carbon requirements on their SME clients to avoid banks who are striving to reduce their GHG emissions being competitively disadvantaged.

Examples of regulation would include:

- Requirement to have an SME carbon emission baseline by January 2024, and to measure GHG emissions annually from that date onwards for each SME
- Significant additional capital requirements based on carbon footprint of banks (Scope 1, 2 and 3 including SMEs) i.e., banks financing larger emitters would have to hold more capital
- Requirement to include GHG emissions in the risk assessment and pricing of lending products for SMEs

While regulation would take time to implement, the credible threat of such regulation would create tacit consensus among larger banks to start executing on initiatives. Banks might determine to request regulation by PRA and enforcement by the FCA to ensure competitive fairness across the industry.

Some regulation may also be required to ensure fairness for all SMEs, e.g.,

- Requiring that banks consider both the absolute levels of carbon emissions as well as the improvement in emissions by SMEs, to avoid unfairly disadvantaging SMEs in high carbon sectors
- Allowing smaller businesses more time to transition

Where banks and governments should collaborate

Act as a distribution arm for government policy

Banks could act as the distribution arm for government incentives, like they did for BBLs and CBILs during the Covid-19 pandemic. E.g., if government choose to provide an incentive for SMEs to switch to electric vehicles, banks could oversee the loans to enable the transition.

Provide blended financing options

Banks and government should also collaborate by providing blended finance options for SMEs to help support the adoption of Net Zero operations by SMEs in regions that are particularly affected by the transition.

Prepare for the economic impacts of a transition

This should be focused on mitigating the risk of jobs loss caused by the phase out of carbon heavy SMEs and how banks and government can collaborate to minimise the impacts that will have on the economy and society. One idea could be that banks and local authorities collaborate to set up a set up local advice hubs with the goal of helping SMEs with their transition plans and helping their staff re-skilling by providing courses, workshops, and educational materials.

3. Ensuring a just transition for SMEs

Define what a just transition entails for SMEs and determine the role of banks and draw up a high-level roadmap to enable net zero by 2050

The high-level roadmap should have clear milestones, define the key players and their role in ensuring that we are on target, determine the mechanisms that need to be in place to support SMEs in their transition and have clear and quantifiable measures of success and determine what is the role of banks in ensuring a just transition for SMEs.

Sources

Aldermore Bank (2022) A Greener Future for SMEs. Available at: https://www.aldermore.co.uk/about-us/news-room/2022/06/a-greener-future-for-smes/

Amel-Zadeh and Serafeim (2018) Why and How Investors Use ESG Information: Evidence from a Global Survey, Financial Analysts Journal, 74(3), pp.87-103

Bank of England (2019) Enhancing banks' and insurers' approaches to managing the financial risks from climate change. Bank of England Policy Statement 11/19. Available at: https://www.bankofengland.co.uk/prudential-regulation/publication/2018/enhancing-banks-andinsurers-approaches-to-managing-the-financial-risks-from-climate-change

Bank of Scotland (2021) From Now to Net Zero: A Practical Guide for SMEs. Available at: https://business.bankofscotland.co.uk/business-resource-centre/insights-and-ideas/sme-journey-to-net-zero.html [Accessed 22 Aug. 2022]

Bankers for NetZero (2021) Mainstreaming Net Zero: Mobilising SMEs for Climate Action. Available at: https://volans.com/wp-content/uploads/2021/07/1583-SME-Decarbonation-Report-v5.pdf

BEIS, Department of Business, Energy & Industrial Strategy (2018a) Clean Growth Fund. Available at: https://www.gov.uk/government/publications/clean-growth-equity-fund

BEIS (2018b) World-first carbon 'net-zero' hub of heavy industry to help UK seize global economic opportunities of clean growth. Press release. Available at: https://www.gov.uk/government/news/world-first-carbon-net-zero-hub-of-heavy-industry-to-help-uk-seize-global-economic-opportunities-of-clean-growth

BEIS (2021) Business population estimates for the UK and regions 2021: statistical release. Available at: https://www.gov.uk/government/statistics/business-population-estimates-2021/business-population-estimates-for-the-uk-and-regions-2021-statistical-release-html#:~:text=UK%20private%20sector.-,At%20the%20start%20of%202021%3A,%C2%A31.6%20trillion%20(36%25). [Accessed 28 Aug. 2022]

BNEF (2019) Clean Energy Investment Trends 2018, Bloomberg New Energy Finance. Available at: https://data.bloomberglp.com/professional/sites/24/BNEF-Clean-Energy-Investment-Trends-2018.pdf [Accessed 20 Aug. 22]

Bowen, A., K. Kuralbayeva and E. L. Tipoe (2018) Characterising green employment: the impacts of 'greening' on workforce composition. Energy Economics, 72(1), pp.263-275

Brander, M. (2012) Greenhouse Gases, CO2, CO2e, and Carbon: What Do All These Terms Mean? Ecometrica. Available at: https://ecometrica.com/assets/GHGs-CO2-CO2e-and-Carbon-What-Do-These-Mean-v2.1.pdf

Brammer, S., Hoejmose, S. and Marchant, K. (2011). Environmental Management in SMEs in the UK: Practices, Pressures and Perceived Benefits. Business Strategy and the Environment, 21(7), pp.423–434.

British Business Bank (2018) Small Business Finance Markets 2017/18 Report. Available at: https://www.british-businessbank.co.uk/wp-content/uploads/2018/02/Small-Business-Finance-Markets-2018-Report-web.pdf

British Business Bank (2021) Smaller Businesses and the Transition to Net Zero. Available at: https://www.british-business-bank.co.uk/wp-content/uploads/2021/10/J0026_Net_Zero_Report_AW.pdf [Accessed 22 Aug. 2022].

British Business Bank (2021b) Small Business Finance Markets 2020/21. Available at: https://www.british-business-bank.co.uk/research/small-business-finance-markets-report-2021/

British Chambers of Commerce (2021) BCC COVID-19 Impact Survey: Cashflow Remains Critical. Available at: https://www.britishchambers.org.uk/news/2021/02/bcc-covid-survey-finds-firms-still-under-the-cosh

Broadway Initiative (2021) What should the Government's Net Zero Strategy say about SMEs? Available at: https://irp.cdn-website.com/ba38e7c3/files/uploaded/SMEs%20and%20the%20Net%20Zero%20Strategy%20October%202021.pdf [Accessed 22 Aug. 2022].

Cambridge Institute for Sustainability Leadership (2022) SME, Finance and the Net Zero Transition. Available at: https://www.cisl.cam.ac.uk/files/banking_environment_initiative_sme_net_zero_incentives_cisl_v2.pdf [Accessed 10 Aug. 2022]

Carbon Trust (2018) Carbon Footprinting: An introductory guide. Available at: https://prod-drupal-files.storage.googleapis.com/documents/resource/restricted/carbon-footprinting-guide.pdf [Accessed 24 Aug. 2022]

Carbon Trust (2021) The Journey to Net Zero for SMEs. Available at: https://www.carbontrust.com/resources/the-journey-to-net-zero-for-smes [Accessed 22 Aug. 2022]

Carbon Trust (2022) Carbon Neutral Certification. Available at: https://www.carbontrust.com/what-we-do/assurance-and-certification/carbon-neutral-certification [Accessed 22 Aug. 2022].

Carney M., Villeroy de Galhau F. and Elderson, F (2019) Open letter on climate-related financial risks from the Governor of Bank of England Mark Carney. Available at: https://www.bankofengland.co.uk/news/2019/april/open-letter-on-climate-related-financial-risks

CDP (2021) SMEs Equipped to Join Race to Net-Zero with Dedicated Climate Disclosure Framework. Available at: https://www.cdp.net/en/articles/companies/smes-equipped-to-join-race-to-net-zero-with-dedicated-climate-disclosure-framework [Accessed 07 Sep. 2022]
CDP (2022) CDP reports record number of disclosures and unveils new strategy to help further tackle climate and ecological emergency - CDP. Available at: https://www.cdp.net/en/articles/media/cdp-reports-record-number-of-disclosures-and-unveils-new-strategy-to-help-further-tackle-climate-and-ecological-emergency. [Accessed 22 Aug. 2022].

CFA Institute. (2020). Future of Sustainability in Investment Management. Available at: http://cfainstitute.org/en/research/survey-reports/future-of-sustainability [Accessed 22 Aug. 2022].

CFI. (2022). Carbon Accounting. Available at: https://corporatefinanceinstitute.com/resources/knowledge/other/carbon-accounting/.

Cha, J. M. (2016). Labor Leading on Climate: A Policy Platform to Address Rising Inequality and Rising Sea Levels in New York State. Pace Environmental Law Review (Vol. 34).

Cojoianu, T. F., Ascui, F., Clark, G. L., Hoepner, A.G.F and Wójcik, D. (2020) Does the fossil fuel divestment movement impact new oil and gas fundraising? Journal of Economic Geography, 21(1).

Cojoianu, T.F., Hoepner, A.G.F., Schneider, F.I., Urban, M., Vu, A and Wójcik, D (2021) The city never sleeps: but when will investment banks wake up to the climate crisis?, Regional Studies, 1–19. Reproduced with permission.

Committee on Climate Change (2020) The Sixth Carbon Budget: The UK's path to Net Zero. Available at: https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

Committee on Climate Change (2020) The Sixth Carbon Budget: The UK's path to Net Zero. Available at: https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

Confederation of British Industry (CBI) (2021) Track and Reduce Your Carbon Footprint. Available at: https://www.cbi.org.uk/media/6926/12673_cop26net-zero.pdf

Conway, E. (2015). Engaging small and medium-sized enterprises (SMEs) in the low carbon agenda. Energy, Sustainability and Society, 5(1)

Corpataux, J., O. Crevoisier and T. Theurillat (2017) The Territorial Governance of the Financial Industry. in Martin R. and J. Pollard (eds.) Handbook on the Geographies of Money and Finance.

Countryside (2019) 'Membership Category of the National Farmers Union (NFU).'. Available at: https://www.countrysideonline.co.uk/food-and-farming/contributing-to-the-economy/

Crick, F., Gannon., K.E., Diop, M. and Sow, M (2018) Enabling Private Sector Adaptation to Climate Change in sub-Saharan Africa, Grantham Research institute on Climate Change and the Environment, London School of Economics and Political Science. Available at: http://eprints.lse.ac.uk/85747/7/Crick_Private%20Sector%20Adaption.pdf

Curran B, Robins N, Muller S, Subramoni A & Tickell, S (2022), Making Transition Plans Just. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science

Delmas, M.A. (2002). The diffusion of environmental management standards in Europe and in the United States: An institutional perspective. Policy Sciences, 35(1), pp.91–119

Deloitte (2022) What is the TCFD and Why Does it Matter? Available at: https://www2.deloitte.com/ch/en/pages/risk/articles/tcfd-and-why-does-it-matter.html. [Accessed 04 Sep 2022]

Deloitte UK (2021) Shifting sands: The Changing Consumer Landscape. Available at: https://www2.deloitte.com/uk/en/pages/consumer-business/articles/consumer-trends.html

Energy Saving Trust (2022) How Can Policy Better Support SMEs in the Pathway to Net Zero? Available at: https://www.theccc.org.uk/publication/how-can-policy-better-support-smes-in-the-pathway-to-net-zero-energy-saving-trust/, [Accessed 22 Aug]

Enterprise Research Centre (2021) State of Small Business Britain 2020. Available at: https://www.enterpriseresearch.ac.uk/publications/state-of-small-business-britain-2020/ [Accessed 25/08/22]

Environmental Protection Expenditure (EPE) (2010) Environmental Protection Expenditure by Industry: 2010 UK Survey. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85845/EPE_Survey_2010_Final_Report.pdf [Accessed 22 Aug. 2022]

Environmental Protection Expenditure (EPE) (2013) Environmental Protection Expenditure by Industry: 2013 UK Survey. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/428862/Final_EPE_Survey_2013_report.pdf [Accessed 22 Aug. 2022].

ESRC (2021). How Can SMEs Contribute to Net Zero? An Evidence Review. Enterprise Research Centre, Economic and Social Research Council (ESRC). Available at: https://www.enterpriseresearch.ac.uk/publications/how-can-smes-contribute-to-net-zero-an-evidence-review/

European Commission (2022a) Directive of The European Parliament and Of The Council. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189, [Accessed 22 Aug. 2022]

European Commission (2022b) Sustainable Finance Package. Available at: https://finance.ec.europa.eu/publications/sustainable-finance-package_en#csrd [Accessed 22 Aug. 2022]

EY (2014) Funding Challenges in the Oil and Gas Sector EY: Innovative financing solutions for oil and gas companies

EY (2021) How Environmental, Social and Governance (ESG) Data Providers Compare. Available at: https://www.ey.com/en_bh/financial-services-emeia/how-environmental-social-and-governance-esg-data-providers-compare [Accessed Aug. 2022].

Friends of the Earth International (2017) Just transition away from Dirty Energy: Decent jobs on a living planet. Available at: https://www.foei.org/just-transition-away-from-dirty-energy-decent-jobs-on-a-living-planet/ [Accessed 10 Aug. 2022]

FSB (2021b) Accelerating Progress: Empowering Small Businesses on the Journey to Net Zero. Available at: https://www.fsb.org.uk/resource-report/accelerating-progress.html

FSB (2021a) UK Small Business Statistics: Business Population Estimates for the UK and Regions. Available at: https://www.fsb.org.uk/uk-small-business-statistics.html [Accessed Aug. 2022].

FSB (2022) FSB Voice of Small Business Index, Quarter 1, 2022, Available at: https://www.fsb.org.uk/resource-report/sbi-q1-2022.html [Accessed Aug. 2022].

Gadenne, D.L., Kennedy, J. and McKeiver, C. (2009). An Empirical Study of Environmental Awareness and Practices in SMEs. Journal of Business Ethics, 84(1), pp.45–63

Galgóczi, B. (2018) Just Transition towards environmentally sustainable economies and societies for all (ILO ACTRAV Policy Brief)

Gambhir, A., F. Green, P. J. G. Pearson (2018) Towards a just and equitable low-carbon energy transition. Grantham Institute Briefing Paper No.26, Imperial College London

Gibassier, D. and Schaltegger, S. (2015). Carbon management accounting and reporting in practice. Sustainability Accounting, Management and Policy Journal, 6(3), pp.340–365

Grothmann, T. and Patt, A. (2005) Adaptive capacity and human cognition: The Process of individual adaptation to climate change, Global Environmental Change 15(1), pp.199-213.

Haggerty, J. H., Haggerty, M. N., Roemer, K., & Rose, J. (2018). Planning for the local impacts of coal facility closure: Emerging strategies in the U.S. West. Resources Policy. Available at: https://doi.org/10.1016/j.resourpol.2018.01.010

Halila, F. (2006) Networks as a means of supporting the adoption of organizational innovations in SMEs: the case of Environmental Management Systems (EMSs) based on ISO 14001, Corporate Social Responsibility and Environmental Management, 14(3), pp.167-181

Hampton, S. (2018) Making sense of energy management practice: reflections on providing low carbon support to three SMEs in the UK. Energy Efficiency

Hampton, S., Blundel, R., Wahga, A., Fawcett, T. and Shaw, C. (2022). Transforming small and medium-sized enterprises to address the climate emergency: The case for values-based engagement. Corporate Social Responsibility and Environmental Management. doi:10.1002/csr.2279.

Harvard University (2022) ESG Global Study 2022, Harvard Law School Forum on Corporate Governance. Available at: https://corpgov.law.harvard.edu/2022/06/17/esg-global-study-2022/

He, R., Luo, L., Shamsuddin, A. and Tang, Q. (2021). Corporate carbon accounting: a literature review of carbon accounting research from the Kyoto Protocol to the Paris Agreement. Accounting & Finance. doi:10.1111/acfi.12789.

Herpich, P., Brauers, H., & Oei, P.-Y. (2018). An historical case study on previous coal transitions in Germany. Available at: https://coaltransitions.files.wordpress.com/2018/07/2018-historical-coal-transitions-ingermany-report2.pdf

Heyen et al. (2020) Just transition in the context of EU environmental policy and the European Green Deal

Hillary, R. (2004). Environmental management systems and the smaller enterprise. Journal of Cleaner Production, 12(6), pp.561–569

HM Government (2019) Green Finance Strategy. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820284/190716_BEIS_Green_Finance_Strategy_Accessible_Final.pdf

Institute for Government (2022) UK Net Zero Target. Available at: https://www.instituteforgovernment.org.uk/explainers/net-zero-target#references [Accessed 22 Aug. 2022]

IPCC (2022) Sixth Assessment Report. Available at: https://www.ipcc.ch/assessment-report/ar6/. [Accessed 27 Aug. 22].

Iraldo, F., Testa, F. and Frey, M. (2010). Environmental Management System and SMEs: EU Experience, Barriers and Perspectives. Environmental Management

Jenkins, H. (2004) A Critique of Conventional CSR Theory: An SME Perspective, Journal of General Management, 29(4), pp.37-57

Johnson, M.P. and Schaltegger, S. (2016). Two Decades of Sustainability Management Tools for SMEs: How Far Have We Come? Journal of Small Business Management, 54(2), pp.481–505

Johnstone, L. (2020). A systematic analysis of environmental management systems in SMEs: Possible research directions from a management accounting and control stance. Journal of Cleaner Production, 244, p.118802

Kauffmann, C., Tébar Less, C. and Teichmann, D. (2012) Corporate Greenhouse Gas Emission Reporting: A Stocktaking of Government Schemes. OECD Working Papers on International Investment 2012/01

Khan, M., Serafeim, G., and Yoon, A. (2015) Corporate Sustainability: First Evidence on Materiality, The Accounting Review, 91(6), pp.1697-1724

Klagge, B., R. Martin and P. Sunley (2017) The Spatial Structure of the Financial System and the Funding of Regional Business: a comparison of Britain and Germany, in Martin R. and J. Pollard (eds.) Handbook on the Geographies of Money and Finance. Cheltenham: Edward Elgar

Koe, W.L., Omar, R., and Sa'ari J.R (2015) Factors Influencing Propensity to Sustainable Entrepreneurship of SMEs in Malaysia, Social and Behavioural Sciences, 172(1), pp.570-577.

Le Breton, M. and Aggeri, F (2018) The emergence of carbon accounting: Sustainability Accounting, Management and Policy Journal

Lee, S. and Klassen, R.D (2009) Drivers and Enablers That Foster Environmental Management Capabilities in Small- and Medium-Sized Suppliers in Supply Chains, Production and Operations Management, 17(6), pp.573-586.

Lerner J (2010) The future of public efforts to boost entrepreneurship and venture capital. Small Business Economics (25)3: 255-264

Lloyds Bank (2021) SME journey to Net Zero. Available at: https://www.lloydsbank.com/business/resource-centre/insight/sme-journey-to-net-zero.html [Accessed 22 Aug. 2022]

Grantham Research Institute (2019a) Investing in a just transition in the UK: How investors can integrate social impact and place-based financing into climate strategies. Available at: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2019/02/Investing-in-a-just-transition-in-the-UK_Full-policy-report_40pp-2.pdf [Accessed 24 Aug. 2022]

Grantham Research Institute (2019b) Banking the just transition in the UK Policy insight. Available at: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2019/10/Banking-the-just-transition-in-the-UK-2.pdf [Accessed 24 Aug. 2022].

Matthews, H.D. and Caldeira, K. (2008) Stabilizing Climate Requires Near-Zero Emissions, Geophysical Research Letters, 35(4)

McKinsey (2022) How Banks can reimagine lending to small and medium-size enterprises. Available at: https://www.mckinsey.com/business-functions/risk-and-resilience/our-insights/how-banks-can-reimagine-lending-to-small-and-medium-size-enterprises

Morris K, Jones A, Wright J (2010) Anchoring Growth: the role of 'anchor institutions' in the regeneration of UK cities. Research Paper 2. The Work Foundation.

Morrow, D. and Rondinelli, D. (2002). Adopting Corporate Environmental Management Systems: European Management Journal, 20(2), pp.159–171

Muralikrishna, I. and Manickam, V. (2017) Life Cycle Assessment, Chapter Five in Environmental Management, Science and Engineering for Industry, pp.57-75

NatWest (2021) A Springboard to Sustainability: £160bn opportunity for SMEs tackling climate change. Available at: https://www.natwest.com/business/insights/sustainability/climate/springboard-to-sustainability-160bn-opportunity-for-smes-tackling-climate-change.html [Accessed 20 Jul. 2022]

Net Zero Climate (2022) What is Net Zero? Available at: https://netzeroclimate.org/what-is-net-zero/ [Accessed 24 Aug. 2022]

New Climate Economy (2018) Unlocking the Inclusive Growth Story of the 21st Century: accelerating climate action in urgent times. Available at: https://newclimateeconomy.report/2018/. [Accessed 10 Aug. 2022].

OECD (2005). Environment and the OECD Guidelines for Multinational Enterprises: Corporate Tools and Approaches (2005) - OECD. Available at: https://www.oecd.org/env/environmentandtheoecdguidelinesformultinationalenterprisescorporatetoolsandapproaches2005.htm [Accessed 22 Aug. 2022].

ONS (2018) UK Environmental Accounts: Low Carbon and Renewable Energy Economy Survey: 2016 final estimates.

ONS (2019) Net zero and the different official measures of the UK's greenhouse gas emissions
Pai et al. (2020) A systematic Review of the Key Elements of a Just Transition for workers

Pai et al. (2020) A systematic Review of the Key Elements of a Just Transition for workers

Perez-Sanchez, D., Barton, J.R. and Bower, D. (2003) Implementing environmental management in SMEs. Corporate Social Responsibility and Environmental Management, 10(2), pp.67–77.

Pfeiffer, A., Hepburn, C.J., Vogt-Schilb, A. and Caldecott, B. (2018) Committed emissions from existing and planned power plants and asset stranding required to meet the Paris Agreement, Environmental Research Letters, 13 (5)

Place-Based Climate Action Network [PCAN] (2019) 'Find your place.' Web page. Available at: https://www.pcancities.org.uk/find-your-place. [Accessed 20 Aug. 2022]

Randles, J. (2019, October 30). Coal Miners' Pension, Health Benefits Under Stress After Bankruptcies. The Wall Street Journal. Available at: https://www.wsj.com/articles/coal-miners-pension-health-benefitsunder-stress-afterbankruptcies-11572427802. [Accessed 20 Aug. 2022]

Revell, A., Stokes, A., and Hsin., Chen (2010) Small Businesses and the Environment: Turning Over a New Leaf?, Business Strategy and The Environment, 19(5), pp.273-288

Revell, A., Stokes, D., and Hsin, Chen (2010) Small Businesses and the Environment: Turning over a new leaf?, Business Strategy and the Environment, 19(5), pp.273-288.

Robins and Muller (2021) Policy Brief – Lessons from COP26 for financing the just transition. Available at: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/12/Lessons-from-COP26-for-financing-the-just-transition.pdf. [Accessed 20 Aug. 2022]

Robins, N., Brunsting, V. and Wood, D. (2018). Investing in a just transition Why investors need to integrate a social dimension into their climate strategies and how they could take action. [online] Available at: https://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2018/06/Robins-et-al_Investing-in-a-Just-Transition.pdf [Accessed 24 Aug. 2022].

Robins, N., Gouldson, A., Irwin, W. and Sudmant, A. (2019). Investing in a just transition in the UK How investors can integrate social impact and place-based financing into climate strategies. [online] Available at: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2019/02/Investing-in-a-just-transition-in-the-UK_Full-policy-report_40pp-2.pdf [Accessed 24 Aug. 2022].

Science Based Targets (2022) Companies Taking Action. Available at: https://sciencebasedtargets.org/companies-taking-action. [Accessed 22 Aug. 2022]

Share Action (2018) Pensions for the Next Generation: Communicating What Matters. Available at: https://shareaction.org/pensions-that-matter/. [Accessed 08 Aug. 2022]

SME Climate Hub (2022) SME Climate Hub. Available at: https://smeclimatehub.org/ [Accessed 6 Sep. 2022]

Snell, D. (2018). 'Just transition'? Conceptual challenges meet stark reality in a 'transitioning' coal region in Australia. Globalizations. Available at: https://doi.org/10.1080/14747731.2018.1454679

Stubblefield Loucks, E., Martens, M., and Cho, C (2010) Engaging Small-and-Medium-Sized Businesses in Sustainability, Sustainability Accounting, Management and Policy Journal, 1(2), pp.178-200

Task Force on Climate-related Financial Disclosures (TCFD) (2021) Guidance on Metrics, Targets, and Transition Plans. Available at: https://www.fsb.org/wp-content/uploads/P141021-2.pdf [Accessed 25 Aug. 2022]

The Glasgow Financial Alliance for Net Zero - GFANZ (2021) Our Progress and Plan Towards a Net-Zero Global Economy. Available at: https://assets.bbhub.io/company/sites/63/2021/11/GFANZ-Progress-Report.pdf. [Accessed 07 Sep 2022]

UK Government (2019) The Climate Change Act 2008. Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111187654/pdfs/ukdsi_9780111187654_en.pdf. [Accessed 24 Aug. 2022]

UK Government (2021) Legislation - Environment Act 2021. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted [Accessed 22 Aug. 2022]
UK Parliament (2022) House of Commons Library: Business Statistics. Available at: https://researchbriefings.files.parliament.uk/documents/SN06152/SN06152.pdf [Accessed 22 Aug. 2022]

United National Framework Convention on Climate Change (UNFCCC) (2015) The Paris Agreement. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement [Accessed 20 Aug. 2022]

United Nations Climate Change (UNCC) (2022) The Paris Agreement. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

UNEP FI (2022a) About Us. Available at : https://www.unepfi.org/about/ [Accessed 5 Sep. 2022]

UNEP FI (2022b) TCFD – Task Force on Climate-Related Financial Disclosures. Available at: https://www.unepfi.org/climate-change/tcfd/ . [Accessed 06 Sep 2022]

UNEP FI (2022c) UNEP FI TCFD Banking Pilot Projects. Available at: https://www.unepfi.org/climate-change/tcfd/tcfd-for-banks/ [Accessed 05 Sep 2022]

UN (2019) Emissions Gap Report 2019. Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/30797/EGR2019.pdf?sequence=1&isAllowed=y [Accessed 28 Aug. 2022]

Wang and Lo (2021) Just transition: A conceptual review, Energy and Social Science, 81(1).

Weller, S. A. (2019). Just transition? Strategic framing and the challenges facing coal dependent communities. Environment and Planning C: Politics and Space, 37(2), pp.298-316.

Williamson, D., Lynch-Wood, G. and Ramsay, J. (2006) Drivers of Environmental Behaviour in Manufacturing SMEs and the Implications for CSR, Journal of Business Ethics, 67(1), pp.317-330

World Resources Institute (2022) The Science Based Targets Initiative (SBTIs). Available at: https://www.wri.org/initiatives/science-based-targets, [Accessed 22 Aug. 2022].

Yadav, N., Gupta, K., Rani, L. and Rawat, D. (2018). Drivers of Sustainability Practices and SMEs: A Systematic Literature Review. European Journal of Sustainable Development, 7(4)

Zorpas, A. (2010). Environmental management systems as sustainable tools in the way of life for the SMEs and VSMEs. Bioresource Technology, 101(6), pp.1544–1557

Appendix

A: Additional Information on International Initiatives

The United Nations Environment Programme Finance Initiative - UNEP FI

As explained in the context section of this report, UNEP FI's efforts have mainly focused on establishing Industry-based principles and on convening 'net zero' alliances around thematic guidance and communities of practice. These are outlined in more detail below:

Industry-based principles

UNEP FI supports the global financial sector principles to prompt integration of sustainability into financial market practice. The frameworks UNEP FI has established or co-created include:

a) Principles for Responsible Investment (PRI) – established in 2006, PRI is now the world's leading proponent of responsible investment, and it is applied by half the world's institutional investors (USD 83 trillion) as of 2022.
b) Principles for Responsible Banking (PRB) – launched in 2019, now signed by approximately 300 banks representing 45% of global banking assets. Signatories are working to align strategies and practices with the Sustainable Development Goals (SDG) and the Paris Climate Agreement.
c) Principles for Sustainable Insurance (PSI) – established in 2012, applied by 25% of the world's insurers. The PSI has developed industry guidelines on integrating sustainability risks in non-life and life and health insurance businesses.

Thematic Guidance and Communities of Practice

UNEP FI assembles financial institutions to advance knowledge and practice in areas including climate, nature, pollution and circular economy, the SDGs and impact and social issues.

UNEP FI convenes three finance sector 'net zero' alliances, and is working with key stakeholders to help members align portfolios with science-based GHG pathways:

a) Net-Zero Asset Owner Alliance (AOA) – launched in 2019, now signed by more than 70 institutional asset owners with over USD 10 trillion in assets – 7% of global investment.
b) Net Zero Banking Alliance (NZBA) launched in 2021 with over 100 banks and USD 65 trillion, about half of global banking industry assets. The majority of NZBA members are PRB signatories setting ambitious climate targets.
c) Net-Zero Insurance Alliance (NZIA) – launched in 2021, convening 25 leading insurers representing about 12% of world premium, working to establish transition to net zero insurance.

NZBA Road Ahead

The NZBA alliance will focus on supporting members in implementing their commitments, providing a forum for banks to come together on technical developments such as carbon accounting, offsets, target-setting, and scenarios. Work programme designed to support the members in setting and achieving their targets for priority GHG-intensive and GHG-emitting sectors.

Signatories first targets for 2030 (or sooner) and 2050 will be published within 18 months of each bank signing the commitment. NZBA will seek to maintain its growth momentum, reaching out to the wider banking industry to build awareness and capacity and bring the industry together to drive collective and consistent progress (GFANZ, 2022).

The Task Force on Climate-Related Financial Disclosures - TCFD

In 2017, the TCFD released climate-related financial disclosure recommendations designed to help companies provide better information to support informed capital allocation. These are based around four thematic areas that represent core elements of how companies operate (TCFD, 2022).

The 11 recommendations are summarised below (Deloitte, 2022):

Governance:

- Companies must describe the board's oversight of climate-related risks and opportunities.
- They must also describe management's role in assessing and managing climate-related risks and opportunities.

Strategy:

- Must describe the climate-related risks and opportunities the organisation has identified over the short, medium, and long term
- Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning
- Describe the resilience of the organisation's strategy, accounting for different climate-related scenarios

Risk Management:

- Describe the organisation's processes for identifying and assessing climate-related risks
- Outline the organisation's processes for managing climate-related risks
- Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management.

Metrics and Targets:

- Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.

- TCFD recommends the use of the GHGP for metrics and target setting
- Outline the targets used by the organisation to manage climate risks and opportunities, and performance against targets.

The Glasgow Alliance for Net Zero - GFANZ

Workstreams

The GFANZ workstreams incorporate the views of a diverse range of financial institutions and geographies – including banks, asset managers, asset owners, insurers and financial services providers – as well as advisers from leading technical experts in the NGO community. Workstreams are divided in the following way:

a) Building Commitment

This workstream focuses on expanding the number and nature of financial firms committed to net zero. Before GFANZ, there was no standardisation of what a credible net-zero commitment should look like in the financial sector.

Uniting subsectors of the global finance industry will help to active the entire value chain of the financial sector and drive systemic chain.

b) Mobilising private capital to EM&DCs

This section of GFANZ supports an increase in private capital flows to emerging markets and developing countries (EM&DCs) for their transition needs through private-sector investments and public-private collaboration (GFANZ, 2021)

While GFANZ members represent at least $7+ trillion assets in EM&DCs, there is potential to increase the financial support for transitioning in those markets. To do so, GFANZ is committed to working with policymakers to create a financial framework that can mobilise net zero finance and investment into countries that are most vulnerable to the impacts of climate change. Much of this is in line with what this report refers to as the need for a just transition. The workstream related to a UK just transition could therefore be aligned more closely with GFANZ's current efforts (GFANZ, 2021).

c) Sectoral Pathways

GFANZ is also working alongside industries to spur alignment between financial institutions and major global industries on sector-specific pathways to reach net-zero emissions. These actionable pathways aim to incorporate work from both financial industry initiatives and sectoral organisations (GFANZ, 2021)

By focusing on sectoral segmentation, this workstream aims to tackle hard-to-abate sectors and fossil fuels. Ongoing activities are in the steel, aviation, and oil and gas sectors, and builds on the large volume of work already being done on this topic. The workstream will also consider approaches to responsibly retire carbon-intensive assets in a way that maximises real-world decarbonisation using science-based targets, whilst also seeking to minimise socio-economic damage (GFANZ, 2021).

d) Real-economy transition plans

This section of GFANZ focuses on accelerating decarbonisation in the real economy by articulating financial sector expectations of transition plans from the companies GFANZ members invest in, insure, and finance (GFANZ, 2021).

It also aims to increase upward convergence in the transition plans of corporate clients and investees by providing both companies and financial firms with BFNZ view of best practice. The workstream is closely aligned with that for sectoral pathways and on financial institution transition plans (GFANZ, 2021).

e) Financial institution transition plans

The aim of this workstream is to drive upward convergence around sector-wide best practices for financial institutions to design and implement credible net-zero transition plans and tackle joint challenges in a consistent way (GFANZ, 2021).

Work with partners to develop and promote the adoption of best practices on cross-cutting technical issues that financial institutions face as they work on their own transition plans, including the use of carbon pricing, the role of carbon credits, and managing issues of double-counting financed (GFANZ, 2021).

Since launching the workstream has compiled an inventory of existing guidance on financial institution transition plans and developed an initial set of principles to encourage upward convergence in the ambition of GFANZ members.

f) Portfolio alignment measurement - Works closely with TCFD

This workstream supports the further development and implementation of portfolio alignment metrics for financial institutions and seeks to drive convergence in the way portfolio alignment is measured and disclosed. Established in response to growing investor and lender interest in measuring portfolios' alignment to Paris Agreement objectives.

Workstream builds on analysis conducted by the Portfolio Alignment Team, commissioned by the TCFD. That analysis is summarised in the team's report on measuring portfolio alignment, along with a technical annex (GFANZ, 2021).

g) GFANZ Policy Call to Action

Workstream advocates for the public policy needed to help build a net-zero economy and meet the goals of the Paris Agreement. GFANZ call to action, launched in 2021 includes specific policies including economy-wide net-zero targets aligned to 1.5 degrees, reform of financial regulations to support the net-zero transition, phaseout of fossil fuel subsidies, pricing carbon emissions, mandatory net-zero transition plans (GFANZ, 2021)

Aims to unlock the trillions of dollars of climate finance required to support developing economies' efforts to transition to net zero, which include working with farmers and businesses to stop illegal deforestation, providing viable alternatives and promoting sustainable regenerative agricultural practices, and supporting a just transition (GFANZ, 2021).

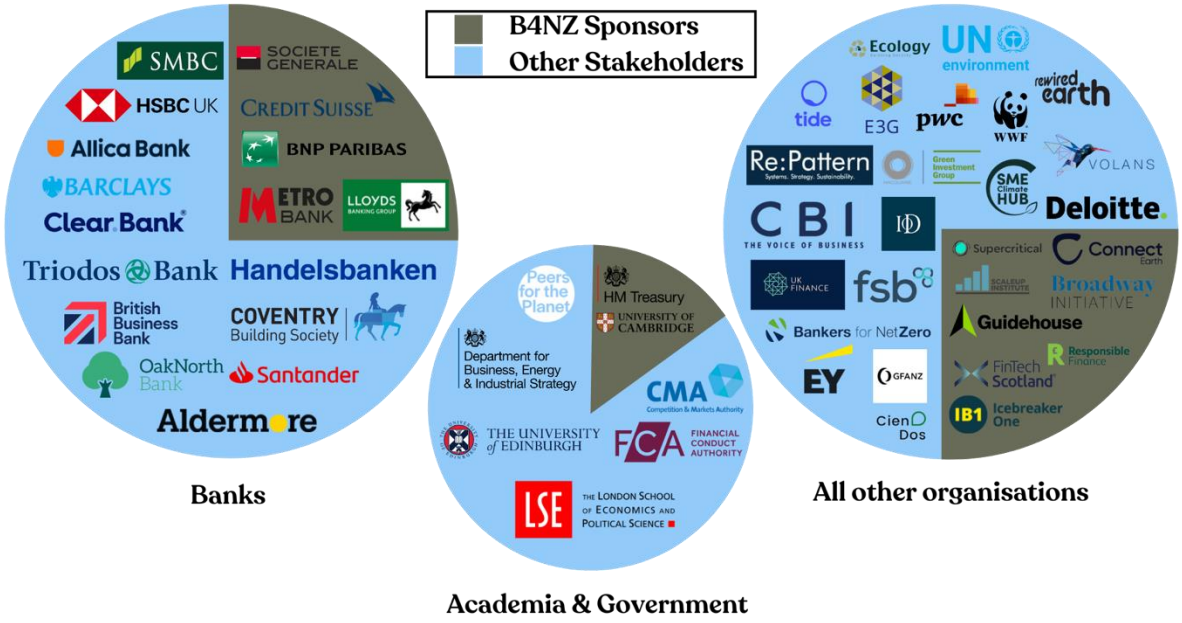
The core of the financial system is mobilising for net zero, and GFANZ's call to action lays out the policy action needed to accelerate that transition.

B: Detailed Stakeholder Map

As mentioned in the previous section, GFANZ has four main branches, of which the banking pillar is the UN-initiated NZBA. The B4NZ group is the UK country chapter of the NZBA.

B4NZ was formed in October 2019 with the aim of galvanising credible, demonstrable leadership from the UK banking sector on climate change. The initiative brings together banks, businesses, policymakers and regulators to define and implement the interventions needed to accelerate the UK economy's transition to net zero.

B4NZ Stakeholders

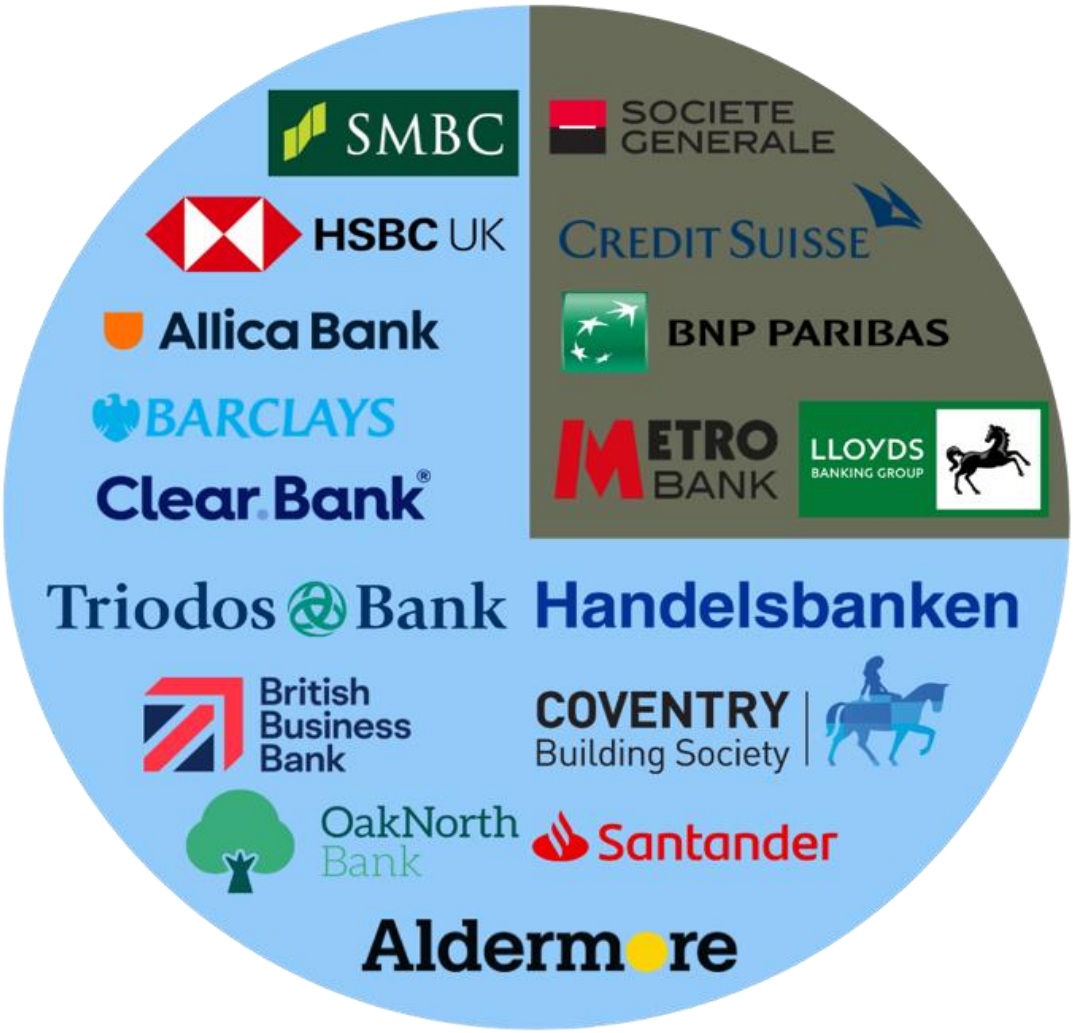


Map of B4NZ core sponsors and additional stakeholders involved during the scoping exercise:

The B4NZ stakeholder group has a wider reach than just banking organisations, with member organisations in several key industries such as academia, government, regulators, industry bodies, and SMEs.

We engaged most of the organisations represented above to gather views, understand positions, and scope out ideas on how to measure and report SME GHG emissions in the UK, how to change SME behaviours, and how to guide a just transition from a banking perspective.

Banks and Financial services organisations



Engaging with other banks

There are over 150 banks currently in operation in the UK, and while many of the key banks are signatories of the wider NZBA initiative, not all of them have committed to B4NZ.

To achieve the necessary strategic alignment of policy goals on a national scale, it would be beneficial to engage with banks that are not currently members of B4NZ, especially banks that have made commitments to the UN's NZBA.

Below is a list of key banks that are members of the NZBA but not B4NZ that we should be looking to engage during the next phase of the project:

- Deutsche
- J.P.Morgan
- NatWest
- Standard Chartered
- Nationwide Building Society
- Goldman Sachs
- Virgin Money
- Wells Fargo
- Citi
- Morgan Stanley

Academia and Government organisations

Academic expertise

To help guide the discussions and scope of the recommendations, Smart Data Foundry collaborated with a group of academics that specialise in researching the climate emergency, working with the University of Edinburgh, London School of Economics and Cambridge University.

All other organisations engaged

To gather a more comprehensive view of the problem and the potential solutions, we have worked with organisations that focus on engaging SMEs and researching the environmental impacts that businesses have on the planet.

C: Detailed Insight from Workshops

Workshop 1

Topic

The current landscape of the Net Zero agenda in the UK and abroad.

Presentation

Smart Data Foundry provided an analysis of the current landscape of the problem: an overview of the ESG/carbon framework models already in place as well as insight into technological approaches, currently being developed and/or implemented. A review of different national and international initiatives was be covered.

Discussion guide

Discussion around key topics related to the Net Zero Transition, carbon accounting, the lack of standardisation in environmental management and the varying degrees of carbon disclosure: conflicts of interest, lack of oversight in terms of data accuracy and emission compliance.

Key topics discussed

- Defining the scope: Is this just a framework to support financing or are we looking to help manage SMEs through the transition?
- Are we making recommendations just to the banks or government and regulators?
- Issuing sustainable/green financing relies on knowing data about the SME that doesn't exist now and is costly to collect.
- There are multiple ways of measuring carbon but no agreed approach
- Some form of standard data model likely to be needed
- SMEs are very diverse populations in terms of size, sector and carbon impact, can't have one approach to all
- Needs to take a proportionate approach; some kind of SME segmentation is key
- Any system should focus on the 'E' but be extendable to the 'S' and 'G' of ESG
- We can't risk creating financing orphans if we restrict access to financing to carbon heavy companies, concerned for the integrity of sustainable financing

Workshop 2

Topic

How might we start measuring SME GHG emissions?

Presentation

Dr Theodor Cojoianu from the University of Edinburgh delivered a pro-bono independent presentation of the EU Taxonomy & Corporate Sustainability Reporting Directive and how further investor disclosure requirements (e.g. SFDR in the EU), could impact the SME market. Evidence was also provided on the distribution of UK SMEs and how they map on the 1st Climate Delegated Act of the EU Taxonomy.

Discussion guide

Discussion on why it is vital to engage with SMEs, what the consequences of not doing so could be, and what the main internal and external barriers are in collecting and measuring SME data, what mechanisms and industry standards are required to collect consistent, reliable GHG emissions/ESG data across SME sectors, data availability/gaps across the UK SME market, regulatory developments prompting information disclosure and the financial products that need to be built on SME GHG emissions data.

Key topics discussed

- Data collection should have minimal impact on SMEs, an outside-in approach by accessing cloud accounting and open banking data and make assumptions from that.
- Different SMEs have different shares of carbon emission – depends on whether you scale it by employee count, gross value added or turnover.
- Many SMEs operate across several different industries. Very hard to be segmented because of Standard Industrial Classification (SIC) code limitations
- We need a segmented approach to the market, SIC codes aren't effective, we need an alternative approach based on industry, turnover and size.
- Cost of measuring GHG emissions is a barrier to small business
- Questions about incentives will only come after the data is being collected.
- Are we trying to reduce SME GHG emissions or improve access to finance?
- Do we need more levers than just finance?
- SMEs are asking for a set of rules and measurements they can easily follow
- There is pressure from stakeholders to act, there's a big role to be played by government but we can't wait for them to act.
- There's a need to standardise carbon calculators and to connect them to the sourcing of finance. SMEs should only have to do it once and have their measures connect across banks/platforms
- Can we map the different gathering data models and see how they work?
- Whose role is it to monitor and enforce data quality and accuracy? Do we need a third party to provide a recognised green rating system?

Workshop 3

Topic

How to engage SMEs to reduce GHG emissions and change behaviours?

Presentation

Dr Luca Taschini from the University of Edinburgh talked about how to effectively engage SMEs to change behaviours and reduce emissions, his talk focused on three key points: awareness: SMEs need support to recognise the strengthening opportunity from climate action, knowledge: SMEs need help to improve their climate action knowledge and funding access: SMEs require financing options that reflect the societal benefit of delivering climate action to ensure that business initiatives make financial sense.

Discussion guide

Discussion around different methods and approaches to encourage SMEs to reduce their carbon footprint, the advantages, and disadvantages of incentives and regulations in influencing behavioural changes and promoting cultural shifts and how we can run effective informational campaigns to make SMEs aware of their role and the importance of changing behaviours; how should banks set their baselines, set targets and track against these.

Key topics discussed

- How can customers let the market know what matters to them? As it stands, price and quality are the only ways to differentiate in the market
- Energy and fuel consumption is the easiest and most accurate measure to start with
- Changing SME behaviours is about more than financing, the role of education, information, and skill transfer. Only a small percentage of SMEs is seeking financing and we can't leave the others behind
- It's not the role of banks to provide advice on reducing GHG emissions but maybe they can signpost to information and advice hubs
- Community financing might be easier and fairer method than individual SME incentives/financing.
- Banks could help creating local advice hubs by providing financing and skills/resources to educate SMEs on the ground
- To get to Net Zero we will also need to consider the role of carbon removal and how banks can invest/finance new technologies
- Government must play a part in providing incentives for SMEs to change behaviours, providing access to public financing, grants, and tax incentives
- Reducing business rates is a logical way to start as it would immediately reward good behaviour
- Policy will kick in as soon as there is a change in the market behaviours and demand

Workshop 4

Topic

How can there be progress towards a Just Transition from a banking perspective?

Presentation

Brendan Curran from the Grantham Research Institute discussed how the Just Transition can act as a systematic enabler of achieving the world's Net Zero ambitions, discussed the opportunities and downside risks of the transition and gave an overview and wider moves already made and what is the progress still to be made in confronting the tough issues. Brendan also described his views on the role of finance in supporting the just transition and offered a guide for investor action as defined by the Just Transition Alliance

Discussion guide

Discussion around how we can drive adoption by creating a 'win' for all parties (banks, SMEs, government) and help towards ensuring a just transition for UK SMEs; how could

emission permits and carbon taxes help to even out proportionality issues and contribute to a just transition; how we think about establishing a timeline that does not over burden SMEs but moves us closer to our goals.

Key topics discussed

- Corporates and banks can't transfer the issue down the supply chain to SMEs
- What is the value case for an SME to measure their GHG emissions?
- How do we create a market signal that actually brings an advantage to the SMEs measuring and doing something about their GHG emissions?
- Public finance and policy need to step up otherwise there's a risk SMEs won't engage
- We should invest in place-based financing and blended financing to make an impact in key regions
- A big concern is that we withdraw financing away from high carbon industries and create financing orphans which will cause big negative impacts for communities in terms of loss of jobs
- How can we learn from banks establishing transition units and can that be accessible for SMEs?

D: Case Studies from 121 Interviews

As part of this scoping exercise, we had several interviews with providers of SME solutions for measuring GHG emissions, establishing a framework of incentives and ensuring a just transition.

To give an idea of the market for SME solutions and the breadth of options available, we asked each of these organisations to provide some content describing their solution, a case study, and a pilot proposal.

Note that the following section were not produced by the Smart Data Foundry, and this shouldn't be seen as an endorsement of either solution or as a complete list of all the solutions available but rather as a list of potential options for further testing, research, and consideration.

Rewired earth

Rewired Earth aims to help companies create a business case for sustainable action. In other words, it allows them to be properly **rewarded by markets** for having a positive impact on the planet and society, in the same way that they are rewarded for having attractive financial performance.

It is not trying to reinvent the wheel, but simply trying to make markets work for sustainability, as well as they do for financial matters.

Why is this necessary?

Until we get this right, most companies will struggle to put sustainability at the heart of what they do; so it will continue to be seen as:

- A cost - i.e. something that is a drag on profits, taking time, attention and money away from business priorities.
- A cumbersome requirement - something that they are told they must do with minimal or no upside; often this leads to people doing close to the minimum necessary to meet the requirement.
- A philanthropic action - something that needs doing because it is the right thing to do. That may be the case, but this can be very hard to justify to people if the only conversation that's happening is financial and purely profit focused.

There is lots of work going on to measure things (carbon emissions, equality metrics, deforestation) but nothing that really helps companies understand the rewards they can receive when they measure those things and improve them.

This is where **Rewired Earth** is different.

A voice + A choice = A reason to change

Rewired Earth gives companies and their stakeholders (investors, customers, employees, etc) a way to talk about sustainability efforts, in the same way they discuss financial statements and performance.

To make this effective, it means:

1. Giving people a way to express what they care about in terms that companies can understand and respond to - they have a **voice**. This is the demand side of the market and allows companies to take the sustainability priorities of their stakeholders into account when making decisions.
2. Giving companies a way to communicate with these same people about the actions and impact they are actually having, so that they have a **choice** on who to buy from/invest in/work for. This requires a fair, trustworthy and consistent playing field for reporting how they are actually doing, so people can't hide or distort what is really happening (e.g. by "greenwashing").

By putting these two things in place, companies that can demonstrate they are taking those sustainable actions that people tell them they value, will be rewarded. This reward drives everyone to want to do better - it is their **reason to change**. Not because they are told they

ought to, not just because they think it is the right thing to do, but because there is real value in doing so!

How does this help B4NZ?

The current landscape of carbon reporting is highly complex for SMEs in particular, who are time poor and not necessarily able to calculate complex bespoke metrics, yet without them corporate reporting will only ever be an estimate and this presents strategic risk to holders of scope 3 emissions such as banks; particularly when combined with many making pronouncements concerning pathways to reductions. Organisations including SMEs are facing multiple asks, often in limited and closed ecosystems.

This leads to 5 challenges around data quality and the means of capturing them, which we believe B4NZ can help to solve.

Moving to solutions - Measurement		
Challenges	1. Solutions in silos are not interoperable 2. Audits are of approaches not standards 3. Models are used to assess impact 4. Multiple different data asks 5. Estimation occurs	**= DATA NOT DECISION GRADE**
Approach	• Collaborate on a framework, then compete for products and services. This ensures the approach doesn't quickly become obsolete and drives maximum SME value. • Use an approach based on the UN SDGs so it plays domestically as well as internationally, where all parties have presence and much of the supply chain is located. • Insist upon real measurement, but of simpler consistent metrics at first and build complexity over time. • Aim to ask the same question once for every use case. • Build appropriate assurance model in tandem to ensure that the outputs are verified.	
Outcomes	1. Broad interoperability and a true systemic solution 2. Auditable standards build trust in output 3. Actuals are used to assess impact 4. One single asked, mapped in different ways 5. No unintended consequence of estimation	**= REAL DECISION GRADE INFORMATION**

This enables corporates including SMEs, to measure and report their emissions and other impacts ***throughout*** the supply chain to ensure a rapid shift to accurate metrics and away from riskier estimation. Link into existing reporting solutions including general ledgers and banking apps in order to support SMEs with an easy to use one-size-fits-all approach which minimises burden whilst maximising value.

In addition, sustainability is generally seen as being at-odds with value. It is often narrowly focused on carbon, missing the emerging broader themes and the factors needed to ensure a just transition.

The is a lack of a well-articulated reason for corporates and SMEs to want to measure well, as it cannot currently be linked to a value case, and this produces risk to the organisation and the Board as the mandate from stakeholders around sustainability are not well understood. This can be resolved however by addressing these challenges alongside rewired.earth, Bankers for Net Zero has an opportunity to move the debate forward, simultaneously helping banks with their scope 3 journey, providing real value to SMEs, and opening up innovative product solutions.

Moving to solutions – Driving value		
Challenges	1. Largely focussed only on carbon 2. SME's locked out of economies of scale 3. The more you look, the worse you look 4. Lacking demand signals 5. Low control of equity story	**= SUSTAINABILITY IS AN OVERHEAD**
Approach	● Capture clear demand signals in the same way as you measure impact, to provide the value-pools and the "why" for measuring and improving impact. ● True measured impact linked to demand allows control of the equity story to pass back to the Company in dialogue with stakeholders, as it should be. ● This unlocks the normal functioning of markets, mobilising them as a protective rather than destructive force. ● By considering the broad range of impacts other than carbon, ensure that the solution supports a broad range of outcomes and helps deliver a just transition to a zero-carbon future.	

Outcomes	1. Broader factors ensures a just transition	2. Market-wide solutions available at size	3. Supply chain transparency is rewarded	**= SUSTAINABILITY IS A VALUE DRIVER**
	4. Strong demand signals evidence value case	5. Control of equity story helps fund transition		

Use the unrivalled network effect to offer solutions at scale to groups of SMEs, leveraging thinking and connectivity which would not be otherwise available to them.

Armed with real emissions information, banks can meet their own objectives whilst innovating in their provision of products and services to support corporates either directly, or indirectly by funding the scale projects across multiple recipients.

Who are we already working with?

Supporters and users of **rewired.earth** include Microsoft, PwC, Costain, St.James's Place, Natwest TDS, the IoD and the ICAEW, to name but a few.

How does it work?

Creating a strong demand signal – A VOICE

Today, individuals have no consistent way to tell the market what they care about when they are investing, consuming, voting or deciding who to work for.

Equally, the demand signals for sustainability are weak despite large shifts in actual demand. Bloomberg estimate that by 2025 $50tn of assets will have some sort of ESG mandate, but reliable insight into what ESG actually means to those asset holders is significantly lacking.

By creating a user-friendly, web-based app, rewired.earth now allows millions of individuals to use the common language of the UN Sustainable Development Goals to prioritise the sustainability areas they care about most. Collating the aggregated data will allow rewired.earth to quickly assess what groups of stakeholders truly care about and where businesses need to focus their attention, if they want to continue benefiting from their custom, investment or talent. Knowing that 90% of your potential investor universe (of $50tn per Bloomberg) cares about “Climate Action” underpins the creation of a $45tn value pool for those companies that can demonstrate climate sustainability in a reliable way.

This can be done across populations generally, or for an organisation’s own specific stakeholders.

Measuring impact right through the supply-chain – A CHOICE

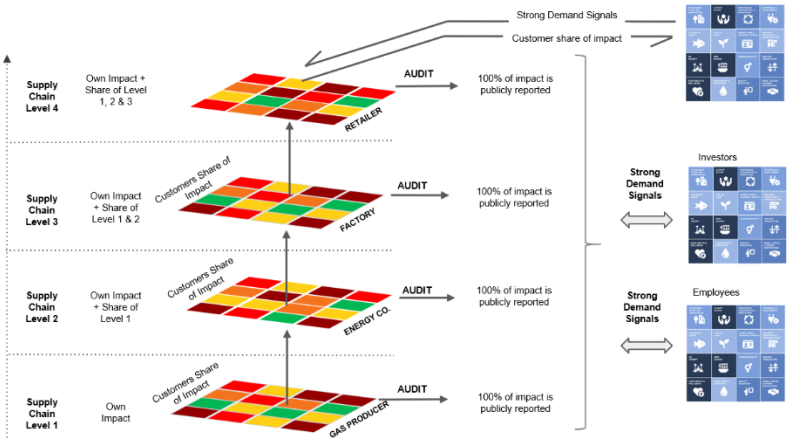
For rewired.earth to work, we also need to fully understand the impact of investments and purchases. This cannot be just at the company level we are investing in or buying from. It has to include the full supply chain that enables the product to be produced or for the financial return to be generated. It also needs to be auditable so that it has the same quality as the financial data.

Rewired.earth have developed the framework and technology backbone that allows identification, extraction, and aggregation of a number of data points that correspond to the same UN SDGs, but this time with a scoring system, depending on a company's actual impact throughout their supply-chain. Importantly, without an understanding of the supply chain impact each square will only every be red. This means that to become green on the front-end impact square a company's supply chain needs to be understood. At the moment, the more an organisation looks at their sustainability profile the worse they seem compared to an equivalent company who has not risked looking.

Products and services in today's world are highly complex, with many different parts and actors through supply chains. By building the data bottom up, rewired take a different approach. Each audited entity globally already collects data that would enable us to produce the first version of the sustainable transparency square. Indeed much of it is audited or captured by a third party. Capturing the data from inside the company, uploading it into a platform where only the corporate and the auditor can see the full data and then sharing apportioned data for the square to the customer base through the supply chain, would enable a simple approach to deliver transparency.

This approach harmonises sustainable and responsible reporting across all industries, and enables the consumer to understand the impact of all of their decisions in the same way, be it purchasing a box of cereal or choosing where to invest their pension. This stack can then be layered further to roll up to entire companies, investment funds, countries and the world, providing a far richer picture of our economies than simplistic GDP metrics.

As data improves rewired will move from entity level to product level.



True trustworthy comparability between what people care about & how companies are actually impacting people and the planet - A REASON TO CHANGE

This enables individuals to buy from, invest in and work for companies that properly match their sustainability priorities. Bringing a whole new level of transparency to the market, the rewired demand and impact squares will create a quick and easy way for citizens to hold businesses to account. Equally, it will provide companies with a true business case for investing in sustainable activities, because they will understand the potential value / the market opportunity of appealing to certain cohorts.

Why get involved?

For companies or organisations:

- True staff engagement. Other partners are finding this is a unique way to rapidly engage staff around sustainability, helping you understand more about your employees and demonstrate your purpose with them.
- A business case for sustainable action. By opening up a dialogue with stakeholders including investors, Rewired Earth gives company boards a clear mandate for sustainability decisions, offering them improved value and much reduced risk.
- Creating a shared language for comparability. By communicating with the world in a consistent manner, your actions can be fairly measured against your competitors; and your messages can resonate with a much broader audience.
- Significantly simplifies your reporting burden, while providing a business opportunity from the increased transparency on sustainability.
- Uncover and defuse unidentified time-bombs in your supply-chain now and have a clear story to tell, rather than waiting and it being too late.
- By working with us to improve how markets operate, you help ensure your company leaves a sustainable legacy you can be proud of.

For individuals:

- Make your voice heard! Tell companies what you care about and together we will help them transition to protect the planet and improve society.

- Enable proper comparison. Rewired Earth will help you understand how companies fit with your values when choosing what to buy, how to invest and who to work for. No more guess work, you'll see exactly how much impact a company is having on people and the planet.
- Your participation helps drive direct change. As well as helping companies value sustainability, your voice is valuable - Rewired Earth is a not-for-profit organisation and any extra money earned from your views will be used to fund real change based on what you care about.

Connect Earth

Intro to Connect Earth

Connect Earth is an environmental data company based in London. They have developed an API product that banks can embed in their retail and business banking products, empowering consumers, and SMEs to understand their carbon footprint based on their spending habits, as well as other data inputs. They work with some of the largest banking groups in Europe.

They strongly believe that it must be as easy as possible for SMEs to measure and reduce their GHG emissions, which is why they go directly to where their consumption data already is in their transaction history. Banks can now exponentially increase the amount of SMEs tracking their GHG emissions by integrating Connect Earth's product.

The problems Connect Earth have found with emissions reporting

1. From a reporting perspective:
    - It takes too long for small companies:
        - They have to read and understand materiality guides and the entire GHGP.
        - Guidance is designed to be comprehensive, not compact.
        - Reporting standards must be designed with ease of data collection at their core. They must acknowledge the limited resources that many companies are able to commit to it.

    - The GHGP has been designed to allow a huge range of businesses and business models to report emissions in a single way. This has led to its widespread adoption amongst corporates. Many other carbon accounting standards actually use the GHGP as the basis of their accounting methodology.

    - Since the information has been generalized for lots of different industries, company sizes, and business models, it is often quite difficult for SMEs to know what to focus on and how to report. The GHGP is a framework that outlines how to report on every aspect of the corporate value chain, whereas emissions reporting standards tell companies which aspects of their business operations are most important to report on. There is not yet a dominant standard for SMEs to follow when reporting emissions.

    - **The reporting ecosystem revolves around disclosing climate risk to investors and other stakeholders. This means it is inherently geared towards large companies, where climate risk and investor interest are greater, and that SMEs have been overlooked.**

2. From a data application perspective - this is important because Connect Earth believe that building high-quality products with this data is the way to motivate more companies to report

- The time investment for reporting emissions is simply not worth it for the majority of companies. Emissions reporting should be looked at not only as a way of assessing climate risk but also as an educational tool to highlight areas for emissions reduction. The latter is far more relevant for SMEs, and is far more overlooked by current reporting standards.

- There are a large number of bodies offering reporting standards, e.g., GRI and SASB, which all define materiality in a different way. Hence, companies reporting with different standards cannot easily be compared using the maximum granularity of information they have each published.

- **Current emissions publishing rates amongst SMEs are not yet high enough to be able to establish proper industry averages. This lack of comparable data reduces the incentive for new companies to report, compounding the issue further.**

Methodology and how Connect Earth helps SMEs

Estimating the carbon emissions of SMEs can be tricky due to the effort required, availability of data, and cost/education needed. The Connect Earth services make this much simpler by integrating directly into financial platforms.

They can automate GHG emissions accounting for all consumption information that is present in their banking transaction data. E.g. Scope 2 emissions from electricity purchased and Scope 3 emissions from purchased goods & services, business travel, etc..

They use official MR-EEIO data sources like Exiobase (the same one cited by the European Environmental Agency). These factors are the same used in the carbon accounting of many large companies and the spend-based emissions factors take into account the flow of GHG emissions between suppliers in different industries and countries.

After this, users then input more data in order to complete their carbon accounts.

The Methodology is outlined as follows:

1. Onboard carbon quiz - capture key sustainability behaviours of SMEs (example: what is their energy provider, do they use green energy, what is the complexity of their supply chain, what vehicle types do they use, etc.). This data adds a layer of granularity to the GHGP, which allows for more actionable insights.

2. Estimate emissions of transactions automatically using Connect Earth API (Part of Scope 3.1) in the banking application using spend-based EEIO emissions factors for 44+ countries.

3. Prompt users with open banking (if available) to connect other financial accounts for larger data completeness. Estimate emissions of these transactions using Connect Earth API.

4. Overall review of GHG emissions accounts and prompts the user to enter more specific data on purchases where required (example: Scope 2 - utility purchases replace with real figures, Scope 1 - Petrol purchases replace with real figures, etc.)

5. Carbon questionnaire to fill in other parts of the GHGP (Scope 1, Scope 2, and rest of Scope 3).

6. The ability for users to connect with a certified carbon accountant to have a 3rd party audit their GHG emissions estimate and verify their GHG emissions

7. The ability to purchase carbon offsets via one of our partnered offset providers

How Connect Earth currently engages with SMEs

Connect Earth launched a PR campaign with Tide using Connect Earth's data to show their SME customers how they can reduce their emissions. This is an example of how banks can help SMEs reduce GHG emissions. Even though their solution wasn't fully integrated into the Tide platform, the same data that would be used in a full-scale integration was used during this campaign. Connect Earth helped SMEs understand which renewable energy provider they can switch to, or how they can do their website hosting in a more sustainable way.

They are also working with 2 of the biggest banking groups on a full-scale integration of the SME carbon insights solution at the moment.

There are also some examples outside of banking. Connect Earth are currently working with a leading accounting firm to empower their SME customers to do CO2e tracking and benchmarking within a software product. Connect Earth collects corporate emissions data on thousands of companies, which enables SMEs to benchmark themselves against this data. Banks can make use of our data or similar data to not just help SMEs reduce emissions, but also compare themselves to similar companies. This helps show the SMEs' GHG emissions in relation to others and further motivates them to reduce their carbon footprint.

iSumio

Neoni Greenhouse Gas Accounting Software

Currently, organisations use a research methodology to estimate the effect their decisions have on the direct emissions of others in the value chain. This research relies on estimates and averages. These may generically orientate organisations, however they are not accurate enough. Estimates and averages cannot be used to make targeted decisions about reducing GHG emissions within specific value chains and business operations.

The need for better greenhouse gas accounting is acknowledged – the current practice is not sufficient. The GHGP is the global standard for reporting, but the way it is usually applied is inefficient. On average, only 10% of an organisation's total the emissions are directly generated by the organisation itself – whilst 90% of emissions are indirect i.e. directly emitted by others. Yet each organisation that tries to calculate its total GHG emissions has to calculate their own direct emissions and also estimate the direct emissions of all other parties in their value chain. Then their customers do the same, and their customers again, across an ever-expanding value chain. This duplicative effort is crippling the task of decarbonisation. iSumio's approach removes the research effort for organisations. Using our software, Neoni, organisations only need to directly account for the activities they have direct control over, and then request greenhouse gas reports from suppliers to accurately account for their indirect emissions. Neoni is designed from a value chain perspective so that organisations allocate their direct and indirect emissions to products, then send specific and secure reports onwards to their customers.

This is easy to repeat at every stage in the value chain. Neoni software embeds an accounting mindset, which offers key benefits:

1. Connecting with organisations' existing business information systems makes it easier and cheaper to obtain insights than current methods.
2. Improving the accuracy of GHG emissions data means that decision-making for decarbonisation is more informed.
3. Having audited GHG accounts means that buyers can trust the emissions data of suppliers without having to duplicate efforts. Where specific data are not yet available, then Neoni can be used to estimate emissions using current methods and sector averages.

FAQ's

What is Neoni?

Neoni is a greenhouse gas accounting software suite that enables organisations to understand their GHG emissions accurately and comprehensively. At launch it will include tools for organisations, particularly in the manufacturing sector, and public sector analysts.

Why is iSumio developing Neoni?

Decarbonisation is the next big competitive advantage for organisations and countries. iSumio has heard from many businesses, especially small and medium enterprises, that they are keen to decarbonise but they don't know where to start. Those who have started to decarbonise then find it hard to turn their progress into a competitive advantage. The lack of comparable information makes it difficult to substantiate claims about GHG emissions reduction. The highest percentage of an organisation's footprint is usually attributable to their value chain.

This is because most GHG emissions are embedded in the materials, products, and services bought. Getting accurate information about value chain emissions is difficult. Around the world, governments do not yet require this level of disclosure. This results in a lack of the data required to make informed decisions, both for organisations trying to optimise their production as well as governments seeking to design better policies. Neoni provides the data and the tools to generate insights simply and quickly.

How is Neoni different?

Many other GHG reporting tools estimate indirect GHG emissions (Scope 3) based on average emissions for specific types of economic activity, goods, products, or services bought. Neoni takes a different approach - it enables organisations to identify their direct GHG emissions and share these reliably across value chains. Neoni automates this process to reduce the effort and cost for organisations. The methodology also enables more accurate greenhouse gas accounting that is traceable and verifiable. A further differentiator is our edition for public sector analysts. This is designed to meet the needs of decision makers addressing decarbonisation targets at a macro-economic level. These data are not available elsewhere in the market. The functionality has been tailored to meet the specific needs of developing regulation and public policy, as well as investing public funds.

How can Neoni be used?

Neoni is a commercial software-as-a-service (SaaS) solution. Organisations that want to track their own total GHG emissions begin by adding information from their financial accounting system, and enterprise resource planning software if applicable. Manual data entry is also supported.

Can banks use Neoni?

Neoni includes an analyst edition. Future releases of Neoni will be available for banks, investors, and other financial sector institutions. The beta release of the Neoni analyst edition is initially available to select public sector analysts. iSumio is interested in hearing from any financial sector institution who would like to pilot the analyst dashboard. They expect this to be of particular interest to institutions who are designing financial products linked to decarbonisation targets – reliable and auditable data are needed to comply with the requirements of a highly regulated industry.

Can auditors use Neoni?

Yes. An accounting mindset is at the heart of Neoni so naturally iSumio are developing an edition for auditors. They think there is an opportunity for auditors. As the "big 4"

accounting firms come under increasing pressure from regulators to separate their audit and consulting business 3, the practice of auditing greenhouse gases needs to avoid repeating the mistakes of financial audit. Common standards and rules are required. iSumio is interested in hearing from financial accountants who recognise that auditing the GHG emissions of organisations will be a new business line for them, distinct from consulting. They are also interested in hearing from leading auditors who would like to help establish and improve common standards for greenhouse gas accounting.

When will Neoni be released?

A beta version of Neoni will be released before the end of 2022.

Ciendos

Initiative Background

Governments across the globe are making Net Zero commitments, with 196 signatories to the legally binding Paris Agreement (2015). Admirably, the UK Government have taken a lead in their ambitions to reach carbon neutrality by 2050, and in 2021 the UK enshrined into law a revised target to slash emissions by 78% by 2035. This is the highest reduction target made by a major economy to date.

However, in recent months, the practical steps needed to fulfil our Net Zero obligations – the annual Carbon Budget and subsequent proposals and policies to enable these budgets to be met – have come under increased scrutiny. In a recent court action by Friends of the Earth (among others), the UK Government came under scrutiny due to the lack of quantitative measures necessary to demonstrate how the proposals and policies for GHG emissions reduction will meet the Government's legal obligations and Net Zero Strategy.

The court ruling, stating that there is a legal obligation for government to undertake quantitative analysis to adequately report how it intended to meet its legal obligations has further highlighted that the current lack of accurate, consistent, and accessible GHG emissions data – particularly from SMEs operating in the UK – must be resolved, and quickly. Action needs to be taken to bridge this data gap across the corporate landscape to enable the government to underpin their Net Zero Strategy with policies and proposals that have clear, quantifiable, and time-constrained outputs towards measurable carbon reduction.

Both the UK Government the international GFANZ initiative have recognised this issue and, agree with our approach that the financial services sector is a key conduit to galvanise action across the UK corporate sector – with particular focus on SME engagement. The combined Fair Business Banking All Party Parliamentary Group (APPG) and Bankers for Net Zero (B4NZ) consortium are actively working on the UK Country Chapter response to this issue. CienDos has been engaged to propose a pilot solution which will contribute to the acceleration of the UKs economy to Net Zero.

Approach

They approach of CienDos is to broker a value exchange between commercial banks and corporates (with specific focus on SMEs). Corporate banks are under governmental, regulatory and stakeholder pressure to demonstrate both the emissions reduction impacts of their sustainable lending and green finance and the embedding of climate risk management across their operations and value chain – both of which require accurate and consistent emissions data for their customers. By providing their emissions data, corporate customers receive an accurate and actionable NetZero Pathway alongside a reduction to their lending rate or cost of banking services – with the reduction directly correlating to the breadth of the data points shared and their year-on-year performance against their NetZero Pathway.

The Pilot will provide access to the CienDos eMap Platform across a pre-selected sample of corporate customers. This enables customers to easily provide their data points during the banks' onboarding process, or on an ad hoc basis throughout the Pilot period. Banks will

have access to the simple-to-use platform, which automatically 'scores' and bands the emissions performance of their customers and tracks this performance year-on-year.

Banks will also have access to the CienDos proprietary corporate emissions dataset, which calculates the estimated emissions impact of *any* corporate registered in the UK. During the Pilot this will provide banks with an estimated view of the emissions impact of their entire lending book from day one.

CienDos' approach provides a cost-effective and mutually beneficial solution to this essential data collection requirement. It removes the need to invest in additional headcount, complex data capture and systems to manage, track and report emissions for each customer. All data capture, tracking, auditing, performance metrics and reporting are included in the CienDos offering, enabling banks to offer genuine green finance products through a low-risk and cost-effective tool.

The CienDos platform will drive up the number of companies that measure their GHG emissions because they will be financially incentivised to do by their bank. Companies will be further incentivised to reduce their GHG emissions year-on-year, in line with their calculated eMap NetZero Pathway. The level of incentivisation offered is easily controlled by the bank, which retains their competitive differentiator and banks can independently vary their incentive offering based on industry, sector, location or size – becoming an extension to their existing product development and pricing processes and tools.

Pilot Scope

Participants

Preferably the eMap platform will be piloted across 2 participating banks, with access to a pre-defined segment of around 500 customers per participating bank. Participating corporate customers should contain a cross-section of large companies (as defined by the UK Government), mid-market companies and small businesses.

Running the Pilot across multiple banks concurrently will enable CienDos to pilot test the platform usability and our proprietary emissions performance rating capability, whilst ensuring banks are able to retain their product differentiation through the eMap tool.

Timeframe

The Pilot should be split into the following phases (estimated timescales):

- Scope and Planning (1 month)
    - Define and plan the pilot implementation with the APPG/B4NZ steering committee and participating banks, including agreeing customer segment, roles and responsibilities, communication planning and key success factors.
- Pilot roll-out (3-4 months)
    - Execute the communication and implementation of the eMap tool across the defined customer segment. This stage will require regular team-huddles to ensure any issues are identified and tackled quickly and effectively. A weekly stakeholder meeting is also recommended to review the implementation progress and tracking against key success factors.

- Post Pilot Review (2-3 weeks)
    - Conduct user feedback sessions with a selected subset of the customer segment and with the internal banking users administering the eMap set up and management reporting components.
    - Complete a review of performance against the key success factors and an action-plan to close any identified performance gaps.
    - Define 'Next Steps' for the post-Pilot roll-out and prepare feedback report for the APPG/B4NZ steering committee.

Roles and Responsibilities

It will be the responsibility of the APPG/B4NZ steering committee to define and agree the scope and key success factors of the Pilot implementation.

The APPG/B4NZ steering committee is responsible for the recruitment of the participating banks and ensuring the senior-level engagement and ownership of the Pilot initiative.

The participating banks will each appoint a Project Sponsor, responsible for oversight and ownership of the Pilot implementation.

The Project Sponsor is responsible for ensuring CienDos is given adequate and timely access to an appropriate segment of participating customers, including customer data, existing customer communication channels and the appropriate relationship manager resource.

The Project Sponsor is responsible for coordinating access to relevant departments and roles that CienDos need access to during the Pilot. This list will be defined once the participating banks have been identified as part of the scoping phase.

It is anticipated that management of the Pilot implementation will the combined responsibility of CienDos and an appropriate representative from each participating bank.

If deemed necessary, end-user training will be provided by CienDos and the preparation of training materials will be the responsibility of the participating bank.

CienDos will be responsible for end-user support throughout the duration of the Pilot period.

Over and above the project management resource requirements, each participating bank is responsible for providing 4-5 suitable qualified resources to perform platform administration and management reporting tasks throughout the Pilot period.

Responsible Finance

Pilot Proposal: Partnerships to extend access to finance and expertise to SMEs for a Just Transition to Net Zero

Summary

SMEs contribute a substantial proportion of the UK's GHG emissions, but they also play a significant role in employment creation, economic growth, innovation and social cohesion. If the UK is to have a Just Transition to Net Zero, it will be vital to empower SMEs to transition, pivot, reskill staff and make sustainable innovations.

Costs, and in particular upfront costs, are most commonly cited by SMEs as a barrier to Net Zero action. And access to finance and information are two of the most commonly cited enablers to action. Finance and advice will therefore be critical, and banks will play a significant role in providing this. However, banks are unable to directly serve all SMEs due to their more limited capacity to take on risk.

At the moment 1 in 5 SMEs cite access to finance as a barrier to growth, and there is a risk that more SMEs will become excluded and be unable to access the finance they vitally need to transition to Net Zero as lenders look to decarbonise their loan books.

Community Development Finance Institutions (CDFIs) are regionally based, relationship focused lenders. 90% of their viable SME customers have previously been declined by a mainstream bank. CDFIs can lend because they build relationships with SMEs and consider qualitative factors in loan decisions, like assessing the quality of the SME leadership team, or taking into account the impact of the loan such as job creation and sustainability. But CDFIs lack access to capital to on-lend.

There is therefore a natural partnership for banks and CDFIs to work together to provide a greater breadth of SMEs with access to finance and advice to produce and act on credible transition plans.

Responsible Finance therefore recommend conducting a regionally focused pilot partnership between a bank, a CDFI and a Net Zero specialist organisation to provide SMEs with the finance and information necessary to enable them to take action on transitioning to net zero.

The intended long-term impact of the pilot, when expanded across the UK, will be enabling the UK's SME community to reach Net Zero GHG emissions by 2050 in a way that is just and avoids mass business closures and job losses.

Proposal

Who: Banks, Community Development Finance Institutions and a specialist Net Zero organisation.

What: Extending access to finance and expertise to SMEs for a just transition to Net Zero emissions.

The problem:

- In aggregate SMEs contribute a significant proportion of the UK's GHG emissions.
- They also play a significant role in employment creation, economic growth, innovation and social cohesion in all regions of the country.
- All SMEs need to meet the legal requirement for net zero emissions by 2050 and empowering them is crucial to ensuring that the UK has a just transition.
- The most commonly cited barriers for SMEs are costs, in particular upfront costs, and feasibility. And two of the most commonly cited enablers to action are external finance and information (British Business Bank, 2021).
- Therefore many SMEs will need access finance and advice to enable them to transition.
- The categories of SME finance demand in relation to Net Zero are:
    - **Green solutions:** for SMEs offering solutions and technologies to support a just transition.
    - **Green adopters:** for SMEs seeking to decarbonise their operations.
    - **Transition exposed:** SMEs in high-carbon sectors to help them to re-skill and pivot operations
- Currently half of SMEs report reducing their environmental impact as a business priority, and 22% would consider taking on finance to help them to transition (British Business Bank, 2021; Enterprise Research Centre, 2020).
- Banks have a vitally important role to play in meeting this demand, but they aren't able to directly finance all SMEs due to banks' structure and capacity to take on risk.
- At the moment, 40% of business loan applications to banks are unsuccessful (FSB, 2022).

The solution: Community Development Finance Institutions

- CDFIs lend to viable SMEs unable to access mainstream finance. They are situated across the UK, and have a strong presence in the North and the Midlands.
- Over 90% of their customers have already been declined by another lender, yet around 90% go on to successfully repay their loan.
- They use a relationship-based approach to lending and provide support to give the business the best chance of succeeding. This enables them balance the impact of making the loan with the risk.
- CDFIs make 90% of their loans outside of London and the South East, and nearly 50% are made in the UK's most deprived areas.
- They also lend disproportionately more to women and Black, Asian and Minority-ethnic led businesses.
- CDFIs support over 3,000 SMEs each year with nearly £100m in finance. But they could do more with greater access to finance to on-lend.
- The average loan size by a CDFI to a start-up is £10,000, the average loan size for an SME is £70,000. Two thirds of borrowers have 9 or fewer employees.

The pilot:

- This pilot will trial a partnership between:
  - A bank
  - A CDFI
  - A net-zero specialist organisation

Provisional high level process:

1. Identify net-zero specialist partner organisation. Funding will be required for this role – this could come from the government or the bank, or be paid for by the SME as part of its loan.
2. Bank invests in CDFI with capital for CDFI to on-lend in a dedicated net-zero fund. The investment is made using Community Investment Tax Relief (CITR), giving the bank a 25% tax-relief on profits spread over 5 years[10].
3. Banks and CDFIs market SME Net Zero fund specifically for all types of SMEs (green solutions, green adopters, transition exposed).
4. Applicant SMEs work with Net Zero organisation on business plan and loan proposal as part of application to Net Zero fund.
5. Once a credible transition plan has been made, bank assesses loan application, in the event of an approval bank lends.
6. In the event of a decline, bank refers SME with certified Net Zero loan proposal directly to CDFI.
7. CDFIs use capital raised from bank to make loans to SMEs that meet their affordability and viability checks.
8. Loans are backed by the Government's Recovery Loan Scheme Government guarantee[11].
9. Monitoring and evaluation is built into the net-zero plan proposal to track the impact of the pilot and enable CDFIs and banks to monitor Scope 3 GHG emissions.
10. Monitoring consists of KPIs including GHG emissions, business turnover growth, job creation.

[10] More information on CITR can be found here: https://www.gov.uk/government/publications/community-investment-tax-relief-citr

[11] CDFIs are currently being accredited for the next phase of the scheme. More information: https://www.british-business-bank.co.uk/ourpartners/recovery-loan-scheme/

Inputs	Activities	Outputs	Outcomes	Long term Impacts
Bank loan to CDFI through Community Investment Tax Relief for on-lending in dedicated net-zero fund Direct bank referrals of declined SMEs to CDFIs Funding for specialist SME net-zero support partner	Specialised support for SMEs on net-zero transition plans from net-zero specialist organisations Bank and CDFI loans to green adopter SMEs with certified net-zero transition plans Bank and CDFI loans to green solution SMEs Bank and CDFI loans to transition exposed SMEs	SMEs have credible Net Zero transition plans Increased amount of finance provided to SMEs to support the transition to Net Zero More SMEs enabled to transition to Net Zero Unbankable but viable businesses supported High proportion of loans made outside of London and the South East High proportion of loans made to women and ethnic minority-led SMEs	New SME green solution providers created Business growth through realising the commercial potential of the transition to Net Zero New jobs created in sustainable businesses Jobs safeguarded through funding to retrain staff in transition exposed SMEs Businesses safeguarded against closure by implementing future proofing in anticipation of future government net-zero regulation	The UK's SME community reaches net-zero GHG emissions target in time for 2050 in a way that is just and avoids mass business closures and job losses

List of Abbreviations

AOA	Net Zero Asset Owner Alliance
APPG	All Party Parliamentary Group
B4NZ	Bankers for Net Zero
CBI	Confederation of British Industry
CCA	Climate Change Agreements Scheme
CDFI	Community Development Finance Institutions
CDP	Carbon Disclosure Project
CDS	Carbon Data Specification
CISL	Cambridge Institute for Sustainability Leadership
CITR	Community Investment Tax Relief
CSR	Corporate Social Responsibility
CSRD	Corporate Sustainability Reporting Directive
EINAs	The Energy Innovation, Needs Assessment
EM&DCs	Emerging Markets and Developing Countries
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
ESG	Environmental, Social, and Governance Data
ESOS	Energy Saving Opportunity Scheme
ETS	EU Emissions Trading Scheme
FCA	Financial Conduct Authority
FSB	Federation of Small Businesses (UK)
GFANZ	The Glasgow Financial Alliance for Net Zero (GFANZ)
GHG	Greenhouse Gas
GHGP	Greenhouse Gas Protocol
GRI	The Global Reporting Initiative
HALO	High Ambitions, Low Obstacles
ILO	The International Labour Organization
IPPC	Intergovernmental Panel on Climate Change

ISO	International Organisation for Standardisation
ISSB	International Sustainability Standards Board
ITUC	The International Trade Union Confederation
KPI	Key Performance Indicator
LCA	Life Cycle Analysis
NFRD	Non-Financial Reporting Directive
NGO	Non-Governmental Organisation
NZBA	Net Zero Banking Alliance
NZIA	Net Zero Insurance Alliance
OECD	Organisation for Economic Co-Operation and Development
ONS	The Office for National Statistics (ONS)
PRA	Prudential Regulation Authority
PRB	Principles for Responsible Banking
PRI	Principles for Responsible Investment
PSI	Principles for Sustainable Insurance
SaaS	Software-as-a-Service
SASB	Sustainability Accounting Standards Board
SBTi	Science Based Targets Initiative
SCI	Software Carbon Intensity
SDG	Sustainable Development Goal
SECR	The Streamlined Energy and Carbon Reporting Policy
SIC	Standard Industrial Classification
SME	Small and Medium-sized Enterprise
TCFD	The Task Force on Climate-Related Financial Disclosures
UN	United Nations
UNEP FI	The United Nations Environment Programme Finance Initiative
WBA	The World Benchmarking Alliance
WHO	World Health Organisation
WWF	Worldwide Fund for Nature