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# Accelerating the transition to Net Zero: current perspectives

## Literature review and stakeholder research

**Authors:** Bernard Steen, Sylvie Craig, Rezina Chowdhury

**Date:** April 2022

**Prepared for:** Our 2050 World (Commissioned and Funded by BSI)



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NatCen Social Research  
35 Northampton Square  
London EC1V 0AX  
T 020 7250 1866  
[www.natcen.ac.uk](http://www.natcen.ac.uk)

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# Executive summary

The Intergovernmental Panel on Climate Change (IPCC) has shown that many of the worst consequences of climate change could be avoided by limiting global warming to 1.5°C. In order to achieve this, global anthropogenic (human-caused) emissions would need to reach Net Zero by 2050. However, it remains unclear what Net Zero means in practice for non-state actors (including companies, charities, educational and financial institutions, regions and cities). The research aimed to identify how Net Zero is understood as applied to non-state actors, to understand the main barriers to achieving Net Zero emissions for non-state actors, and to explore the role that standards can play in Net Zero.

The research comprised an extensive literature review and qualitative in-depth interviews with a broad range of stakeholders.

## Standards can play a crucial role in driving the transition to Net Zero

The research identified a range of ways in which standards can help to overcome barriers and facilitate progress towards Net Zero.

### Establishing a consensus on what Net Zero means operationally

There is some consensus around the definition of Net Zero as applied to global emissions, but little consensus as applied to non-state actors. The research identified seven key dimensions of variation in the way that Net Zero is understood, which are discussed in detail in Chapter 2. Three of these stood out:

- The role of **offsetting** in achieving Net Zero was the key definitional issue for interviewees. Offsetting is the practice of paying for emission cuts or removals to 'compensate' for emissions which are not eliminated. Whilst there was consensus that eliminating emissions should take priority over offsets, there was a broad range of views on what this meant in practice.
- The **scope** of emissions included in Net Zero targets varied widely. Scope 1 emissions are those from activities directly undertaken by the organisation, such as burning fuel. Scope 2 are those from consumed electricity or heat. Scope 3 includes all other emissions that take place in the value chain of the organisation. Whilst there was broad consensus that Scopes 1 and 2 should be included, views on whether Scope 3 should be included were mixed.
- There was variation in the **timeframes** used in Net Zero targets. Networks and forums for target setting often define timeframes loosely in order to achieve a wider range of signatories. Targets are typically defined as percentage reductions in emissions from a given baseline, but there was wide variation in how these baselines were defined.

Standards can help to create consensus by setting out a clear definition of Net Zero for non-state actors.

### Creating consistency in target setting, and in measuring and reporting of emissions

Related to this lack of consensus, there is significant variation in the form that non-state actors' Net Zero targets take. There is also a lack of consistency in approaches to measuring and reporting emissions, and for reporting progress towards targets. These inconsistencies make it difficult to assess whether the planet is on track to achieve Net Zero, and to assess which actors are under or overperforming. Standards can help to create the consistency that is needed.

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## Helping organisations to navigate a shifting policy landscape

Frequent changes in policy and inconsistencies between different areas of regulation, or different parts of the world, can make long-term decision making for the transition to Net Zero difficult for non-state actors. Regulators often look to existing standards when writing legislation or formulating international agreements. By following standards, non-state actors can be confident that they are meeting their legal requirements and getting ahead of any possible future regulation.

## Altering the landscape of financial incentives and disincentives

A key barrier to achieving Net Zero is a lack of financial disincentives for high-carbon activities and incentives for transitioning to low-carbon approaches. There are several ways in which standards can help to shift the landscape of financial incentives and disincentives:

- Standards can create norms and expectations amongst investors and customers. Standards for climate risk disclosure can help drive sustainable investing, and standards for carbon labelling can enable customers to make sustainable choices.
- Companies can often make cost savings, and thereby sell products and services at more competitive prices, by using high-carbon approaches. If the use of standards is relatively high, it can help to remove the competitive disadvantage associated with reducing emissions.
- Compliance with standards can bring direct financial benefits – lowering emissions can lead to increased efficiency.
- Using standards alongside regulation to manage risks around new technologies can help lower the cost of bringing innovative climate solutions to market.

## Embedding climate action throughout a business' operations

National Standards Bodies have a substantial portfolio of standards that can affect all aspects of a business's operations. By embedding climate action within these standards, standards bodies are in a position to accelerate the transition to Net Zero. Many organisations are looking for advice and guidance on how to achieve Net Zero and leveraging the wider set of standards in this way could facilitate this.

## Are new standards needed?

Despite consensus that standards have a critical role to play, there were opposing views about whether *new* standards are needed: one view was that standards bodies should develop new standards for Net Zero, whereas another view was that existing standards are sufficient. Existing standards included the Science Based Targets initiative (which recently released a dedicated Net Zero standard), and standards for measuring and reporting including ISO standards and the Greenhouse Gas Protocols. A prominent view was that one way for standards bodies to make a valuable contribution to the landscape would be to co-ordinate, synthesise and refine existing standards in order to help non-state actors make sense of the complex and inter-connected system.

## Increasing the uptake of standards

Potential customers for standards face a confusing set of choices: a huge number of standards are available from a range of organisations, with limited centralised guidance about what is available and what would be most beneficial. There is a clear need to make standards easier to understand and easier to use. For some actors, especially smaller organisations and those in low- and middle-income countries, there is an argument for reducing the cost of standards.

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## Engaging with diverse stakeholders

It will be crucial for standards bodies – and the international standards system in general - to engage fully with a diverse range of stakeholders, and also to balance the view of large companies and elite organisations in high-income countries. The perspectives of smaller businesses, organisations in low- and middle-income countries, and society more broadly (including indigenous groups), should all be considered when planning the role of standards in the transition to Net Zero. These groups have markedly different circumstances, face unique challenges, and have distinct needs.

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# 1 Introduction

This research was commissioned and funded by the British Standards Institution (BSI) to support 'Our 2050 World', a new initiative to address the urgent climate challenge through the convening power of standards. Our 2050 World is a collaboration between BSI, ISO and the UN's Race to Zero campaign, as well as national standards bodies from Canada, Kenya and Trinidad and Tobago. The initiative commits to halve carbon emissions by 2030 and achieve Net Zero by 2050 by centring the use of standards and supporting non-state actors to accelerate their Race to Zero.

Our 2050 World recognises that there are variations in sustainability-related standards and in the way that Net Zero is conceptualised. Globally, businesses are publicly committing to achieving Net Zero carbon emissions.<sup>1</sup> However, findings from a survey of nearly 700 listed firms in 14 countries from 2015 to 2019 published by Arabesque, a sustainable finance company, show that only a quarter of the world's largest listed companies have taken action to limit global warming to 1.5 Celsius.<sup>2</sup>

This research was commissioned to gather and review evidence on these variations and identify the key barriers faced by non-state actors. Through identifying areas of alignment and divergence, the Our 2050 World collaboration will be able to identify unifying standards, sentences or words that they can use to influence and accelerate global climate action.

It is clear that industry needs guidance to meet their Net Zero ambitions. Alignment on common standards that are adopted globally could contribute substantially to providing this guidance and accelerate the progress by non-state actors, including companies, organisations and cities around the world.<sup>3</sup>

## 1.1 Research questions

The main aim of this research was to understand what definitions of Net Zero are currently in use and to identify barriers and facilitators to the adoption of an aligned global approach to reducing emissions. Consequently, the research focused on the following areas:

- The barriers and facilitators to reducing carbon emissions and thereby contributing to Net Zero.
- How Net Zero is defined and the key challenges to reaching broad consensus on one definition.
- The types of commitment needed globally to advance a consistent approach to centring standards as a key driver to climate change mitigation as well as identifying the key challenges.
- The range of organisational, sectoral, and political challenges in setting out a consistent set of core metrics aligned with Net Zero standards and a common approach to calculating carbon emissions.

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<sup>1</sup> <https://www.investmentweek.co.uk/opinion/4040965/corporate-net-zero-pledges-value>

<sup>2</sup> [https://www.ft.lk/sustainability\\_environment/Most-major-companies-failing-climate-targets-Arabesque/10519-716679](https://www.ft.lk/sustainability_environment/Most-major-companies-failing-climate-targets-Arabesque/10519-716679)

<sup>3</sup> <https://www.bsigroup.com/en-GB/about-bsi/media-centre/press-releases/2021/november/cop26-our-2050-world-pledges-to-accelerate-non-state-actors-in-the-race-to-zero-using-standards/>



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The research also sought to identify levers that could be used by Our 2050 World to reduce carbon emissions.

## 1.2 Methodology

The research adopted a qualitative methodology and a literature review to scope out the prevailing definitions of Net Zero and the barriers to achieving it. Qualitative research is an interactive and generative process, which made it ideal for uncovering the barriers and challenges on the most complex issues. The literature review helped us to understand existing levels of knowledge and the range of evidence that is currently out there. Importantly, the research process was planned in a way that would allow interim insights from the literature review and the qualitative interviews to be fed into the initiative launch at COP26 (the UN's climate change summit which was held in Glasgow, Scotland, United Kingdom from 31 October 2021 - 13 November 2021).

The literature review was targeted at evidence focused on non-state actors<sup>4</sup> and included both academic and grey literature sourced through systematic database searches, stakeholder recommendations, web searches and citation tracking. Eighty-one studies were included in the final review which captured rich detail, as well as the range and diversity of thought. We produced a thematic framework to allow systematic extraction of information and detailed synthesis of the literature uncovered.

As part of the qualitative research we conducted 21 in-depth interviews with a range of stakeholders around the world representing government, national standards bodies, charities, businesses, media and consumer bodies. A concerted effort was made to recruit a diverse range of respondents, representing different sectors and different parts of the world.

All interviews were conducted online using MS Teams, with the aid of a topic guide and lasted 45 minutes on average. The interviews were audio recorded and analysed thematically using the Framework approach (Ritchie et al, 2014). In addition to this, during the fieldwork period NatCen researchers delivered brief summaries of each interview to the Our 2050 World team to help inform the COP26 briefing preparations.

More detailed information about the methodology can be found in Appendix A.

## 1.3 Limitations

The literature review was designed to uncover and synthesise a large amount of highly relevant information in a short space of time. This means that evidence reviewed was selected systematically on the basis of relevance and some evidence was excluded from the extraction process. It is possible that relevant evidence was excluded or not identified through the search. Though the scope of the evidence search was global, only evidence in English was reviewed, potentially excluding certain perspectives. Similarly, though an effort was made to include a diverse range of stakeholders in the qualitative research, the sample is not necessarily reflective of all eligible professionals working in relevant fields. Individuals from Standards Bodies and from European countries are prominent in the sample, as those were the groups which were easiest to make contact with during a short fieldwork period. Further research should seek to better represent perspectives of those in low-and-middle income countries. Additionally, not everyone we sought to interview was available (particularly given the coinciding of COP26 with this project). As such, this report should not be read as a summary of all relevant evidence on the topic.

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<sup>4</sup> Including academia, national standards bodies, charities, businesses, media and consumer bodies.

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## 1.4 Structure of this report

This report brings together the findings from the literature review and the qualitative stakeholder interviews for Our 2050 World, and includes findings based on all data and evidence collected between 24 September – 24 November 2021.

The report is structured as follows:

- **Chapter 1** presents an overview of the methodology.
- **Chapter 2** presents the definitions currently in use around Net Zero and the key dimensions of variation.
- **Chapter 3** presents the key barriers to achieving Net Zero including disincentives and obstacles and how transformative change could be made easier.
- **Chapter 4** covers the role of standards, the key barriers to centring standards and the key priorities for standards bodies in the immediate future.
- **Chapter 5** presents the recommendations for future research.

## 2 Defining Net Zero

In this chapter, we discuss the range of definitions of Net Zero in use, including related concepts and how they are thought to differ. We identify seven key dimensions of variation, which are discussed in turn. Finally, we discuss some of the consequences of definitional variation and the key barriers to consensus.

### 2.1 Global Net Zero and organisational Net Zero

The term 'Net Zero' was originally defined within climate science literature<sup>5</sup>. The term was subsequently used in policy documents, and, more recently, is beginning to be applied to non-state actors. Although there is consensus around the definition of Net Zero at the global level, there is still much debate about what Net Zero means at the non-state level.

At the **global level**, **Net Zero** emissions are achieved when emissions of greenhouse gases (GHGs) from human activities to the atmosphere are balanced by anthropogenic removals, meaning withdrawal of GHGs from the atmosphere as a result of deliberate human activities over a specified period (IPCC).



**There is no standardised definition at the sub/non-state level.** The Race to Zero network considers an actor to have reached Net Zero when it “reduces its emissions following science-based pathways, with any remaining GHG emissions attributable to that actor being fully neutralized by like-for-like removals [...] exclusively claimed by that actor, either within the value chain or through purchase of valid offset credits”

Net Zero was perceived to be an important concept, which allows people to understand sustainability on an 'intuitive' level, by demonstrating the importance of absorbing more carbon emissions than we are emitting, and in doing so providing consensus on otherwise fragmented thinking about sustainability. However, stakeholders and reviewed documents expressed the view that 'Net Zero' lacked a clear, agreed upon definition at the non-state level. This was reflected in the considerable variation of definitions identified within both the literature and interviews.

One view was that Net Zero emissions make sense at a global level, and therefore at the organisational level it only makes sense to talk of *contributing* to Net Zero. According to this model, individual entities do not *all* need to reach a balance of emissions and removals, as long as that balance is reached globally. Amongst some who held this view – that the important concept is the global one – it was argued that definitions like carbon neutrality make more sense at the organisational level. For others, definitional variation did not negate the importance of the concept of Net Zero at the organisational level. Rather, the implication of this variation was that agreeing a definition should be a priority.

<sup>5</sup> *Net Zero: A short history*. Energy and Climate Intelligence Unit. Retrieved from <https://eciu.net/analysis/infographics/net-zero-history>

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*“True Net Zero is a planetary concept, it's not an individual company concept”*

## 2.2 Net Zero vs. Carbon Neutrality

Most companies use the term ‘carbon-neutral’ over ‘net zero’, but the latter is thought to be *“increasingly popular”*. Whilst carbon neutrality is an internationally recognised standard, the aforementioned lack of consensus on the definition of Net Zero makes it difficult to pinpoint the supposed differences between the two concepts. Indeed, the UNFCCC use the term ‘net zero’ within their definition of climate neutrality: ‘climate neutrality refers to the idea of achieving net zero greenhouse gas emissions by balancing those emissions so they are equal (or less than) the emissions that get removed through the planet’s natural absorption’<sup>6</sup>. Those who considered ‘carbon neutrality’ and ‘net zero’ to mean the same thing did so because they are based on reducing emissions in line with the Paris Agreement. For many organisations, the concepts also mean the same thing in practice. However, there was also a widespread view that Net Zero targets were more demanding than carbon neutral targets in several ways. It is argued that Net Zero has, or should have:

1. Reference to an organisation as a whole rather than a product or service
2. A wider scope, taking into account supply chain emissions to some degree (see 2.3.2)
3. A stricter requirement to make emissions reductions instead of buying offsets. Opinions diverge on whether this should mean a requirement to reduce emissions as far as possible and offset a smaller proportion of them, or a requirement to reduce emissions to zero without using any offsetting (see 2.3.1)
4. A requirement to include all GHG emissions rather than just CO<sub>2</sub>

One perspective expressed in both interviews and the literature was that Net Zero should be seen as the end state, and that carbon neutrality was the mechanism through which this was reached:

*“Carbon neutrality is the pathway to Net Zero. People should be working along that pathway now, to get to either 2030 or 2050, or whatever your company, your government or country has picked as the Net Zero end point. Net Zero, to us, is the end point.”*

On this view, carbon neutrality is *‘an intermediate recurring goal ensuring that corporate efforts are consistent with the achievement of the global Net Zero goal’*.

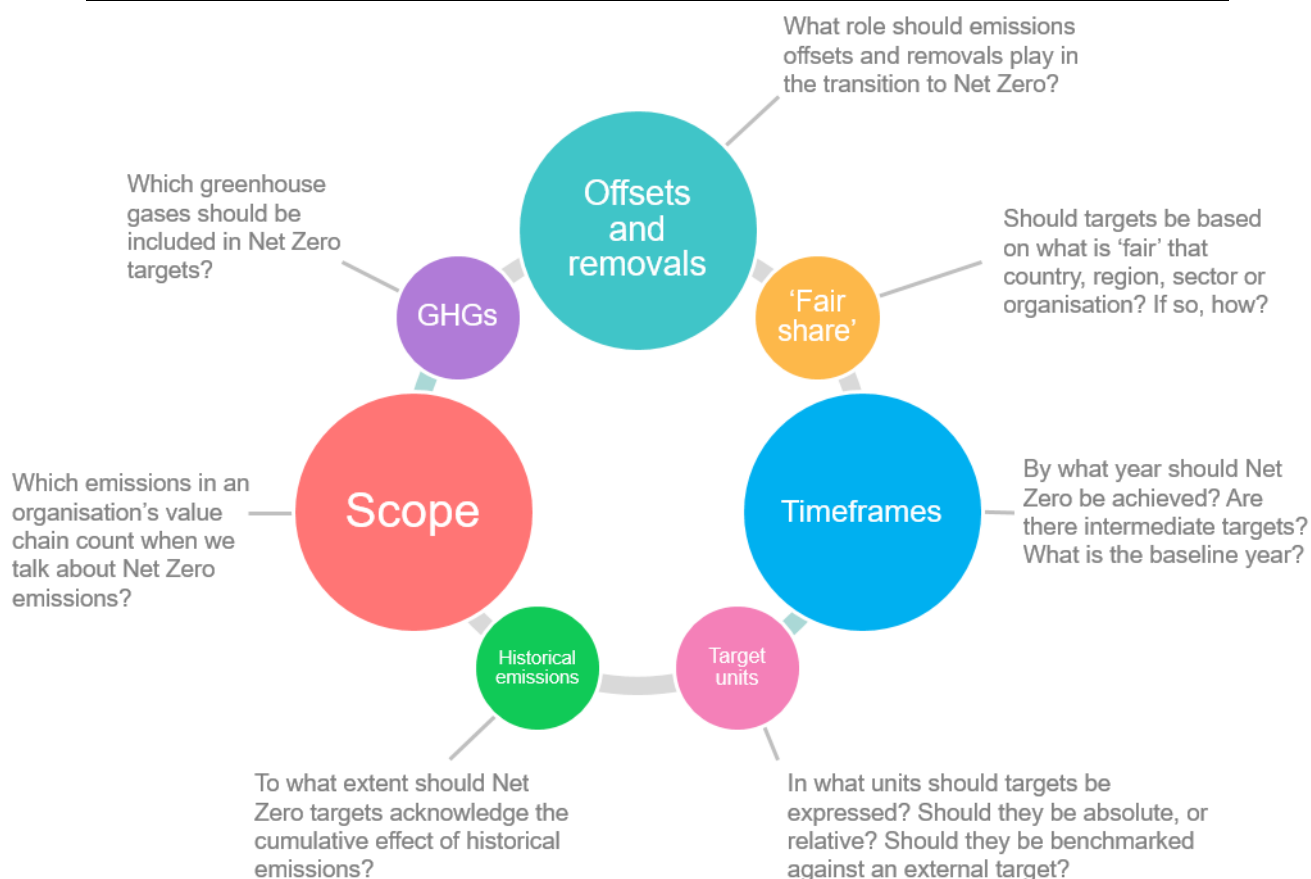
## 2.3 Key dimensions of definitional variation

In this section, we discuss seven dimensions in which definitions of Net Zero were found to vary. The most important of these scope, offsets, and timeframes (Figure 1). For each one, we outline different approaches taken and briefly consider the implications of these approaches where relevant.

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<sup>6</sup> *A Beginner’s Guide to Climate Neutrality*. UNFCCC. <https://unfccc.int/blog/a-beginner-s-guide-to-climate-neutrality>

**Figure 1:** Dimensions of variation in Net Zero definitions



### 2.3.1 The role of offsets

The role of offsets was the key definitional issue for interviewees. Offsets – the practice of paying for emission cuts or carbon removal, often in countries in the Global South – are used to ‘compensate’ for emissions which are not eliminated. Offsets can be categorised into two main types:

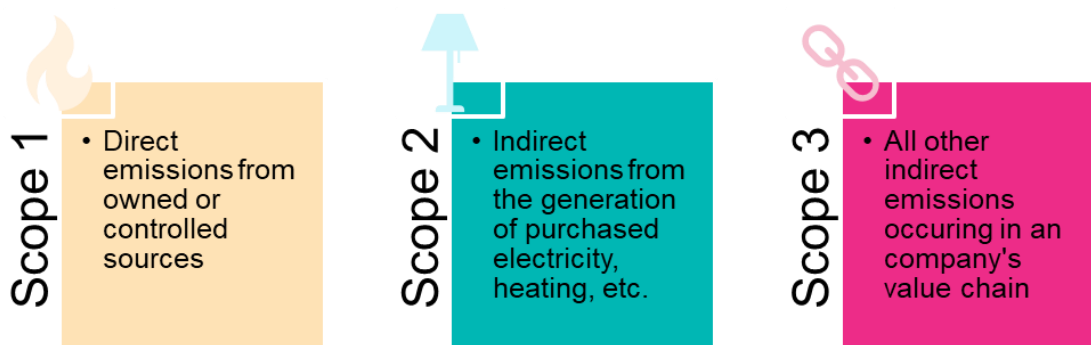
- **Avoided emissions** projects are those which reduce fossil fuel consumption and therefore lower emissions, for example introducing renewable energy where fossil fuels would have otherwise been used.
- **Removal** projects remove GHGs from the atmosphere and are either ‘nature-based’ (such as reforestation) or rely on engineering solutions (carbon capture and storage, or CCS) which are currently in development (see 3.2.2).

A range of views on the role of offsets was identified. At one end of the spectrum, Net Zero was defined in a way that was impartial on the role of offsetting and argued that ‘good practice’ was to exhaust reductions first. More stringent perspectives were more specific about exactly what constitutes an exhaustion of emissions reductions for different sectors (see 2.3.5). At the other end of the spectrum, it was argued that inherent in the definition of Net Zero is that forms of offsetting or compensation are not good practice (see 3.2.2 for further discussion of reasons for this view).

Across both interviews and the literature, there was widespread agreement that reductions should always be the priority. Defining what counted as ‘residual emissions’ – the proportion of emissions considered too difficult to eliminate, and therefore candidates for offsetting – is a key question for those in the field of Net Zero. Participants expressed a disconnect between, on the one hand, a broad consensus

that these residual emissions will exist at the global scale, and will need to be permanently removed in order to reach Net Zero, and on the other, a lack of clarity as to how this plays out at the non-state level. The Race to Zero group (a coalition of Net Zero initiatives) do not impose a definition of what constitutes residual emissions but ask actors to justify their approach to emissions which they do not consider feasible to eliminate. Whilst it was argued that different sectors should be allowed to assign a larger or smaller role to offsets depending on their capability to reduce emissions, a contrasting view was that standardisation was needed: *“It needs to be equal rules for all when they can count in [sic] offsetting in their targets”*.

### 2.3.2 Scope



Deciding the scope of emissions which should be accounted for in an organisation's emissions calculations for Net Zero was considered to be a central, and contentious, question. The Greenhouse Gas Protocol defines three “Scopes” that relate either directly or indirectly to an organisation:

- **Scope 1** or ‘direct’ emissions are those from activities directly undertaken by the organisation. These are mostly from burning fuel, but also include fugitive emissions (refrigerants or nitrogen fertilisation).
- **Scope 2** or ‘indirect’ emissions are those from consumed (purchased) electricity or heat.
- **Scope 3** or ‘value chain’ emissions are also indirect emissions and include everything not included in Scopes 1 and 2. This includes both ‘upstream’ and ‘downstream’ emissions, namely, those which come from suppliers to the actor and those which arise after a product or service has been made/provided and sold. For example, a clothing company would have to count all emissions involved in producing raw materials like fabrics and the emissions produced in transporting those materials to them (upstream emissions). Downstream Scope 3 emissions for that clothing company would include emissions from transporting the final product, any leased assets such as stores, as well as emissions from any investments that the company has made. For financial services, downstream Scope 3 emissions could encompass entire investment portfolios.

Whilst there is broad consensus that Scopes 1 and 2 should be included, views on whether Scope 3 should be included in calculations for Net Zero diverged within both the literature and the stakeholder interviews. As things stand, very few companies incorporate Scope 3 emissions within their calculations, and those that do vary considerably in what activities they include.

A widespread view was that Scope 3 emissions must be considered for Net Zero commitments to be effective. In some industries, notably finance, Scope 3 emissions make up a large proportion of overall emissions, thereby making Net Zero commitments which ignore Scope 3 considerably less ambitious. In many industries, a significant proportion of emissions come from third-party (subcontracted) suppliers

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which falls under Scope 3. Small suppliers may not routinely collect and calculate the requisite information; complications may arise when, for example, third party vehicles carry products from multiple companies. A further complexity arises when considering how companies' Net Zero targets might interact: one company's Scope 3 emissions are another company's Scope 1.

Others argue that there are situations where accounting Scope 3 emissions should not be a binding commitment. The view was expressed that for smaller organisations, short term targets for Scope 1 and 2 emissions reductions are more achievable and therefore more meaningful than longer term commitments that cover the whole value chain. In line with this, one perspective encouraged a pragmatic approach to Scope 3, which would involve tailoring commitments to what is achievable for different actors and industries, in order to ensure buy-in.

However, it was also argued that this approach should not result in Scope 3 emissions reductions becoming 'optional'. A preferred approach was that the category of Scope 3 should be broken down into more detailed sub-categories, and a hierarchy of these elements should be agreed.

### 2.3.3 Timeframes

Net Zero targets do not always clearly articulate timings, often by design. For example, networks and forums setting targets for a group of actors may want to be inclusive and attract a wide range of signatories, which is easier if the targets are loosely defined and therefore more achievable. However, setting clear target dates and baselines were widely considered to be important in order to allow for consistent assessment of progress, and particularly as Net Zero commitments will be under increasing scrutiny. Where timings were clearly specified, they varied in:

1. which year they aim to achieve Net Zero; and,
2. the baseline year selected (where relative rather than absolute targets are set, see 2.3.4) and whether intermediate targets are set.

#### Target years

Within the influential Science-Based Targets Initiative (SBTi) scheme, companies pick the target year themselves. 2050 is a common target year: a survey of businesses with neutrality commitments found that the vast majority have 2050 commitments, and a comparative analysis of targets set by 327 European cities found that the average target year for reaching carbon neutrality was 2045.

Emphasis was widely placed on the importance of earlier targets. Different pathways to Net Zero by 2050 will lead to different levels of GHGs in the atmosphere in 2050, depending on the speed of the reductions:

*“You can have the same date for Net Zero in the future...[but] you can have two curves that go towards that... You want the deep reductions now. The difference in carbon between [different pathways to Net Zero] is huge. Net Zero is clouding... that [the] issue of the speed of reduction... is the critical thing.”*

#### Baseline years

Relative targets require a 'baseline year', that is, a year against which future emissions reductions are measured. Considerable variation was found in baseline years. In the literature, these ranged from 1990 to 2019. Many organisations chose baseline years of 2017, 2018 or 2019 because of the IPCC report which came out in 2018 that motivated many pledges. Others choose 1990, the baseline year for the Kyoto protocol, and some use the more ambiguous term 'business as usual'. Choice of baseline year

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may also be a result of data availability: it was noted that few organisations have data going back many years.

### 2.3.4 Target references

Net Zero targets also vary in the way they quantify emissions reductions and removals.

They can be **absolute or relative**, that is, they can commit to reduce emissions by a specified number of tonnes, or by a given percentage. For example, members of the Alliance of States and Regions<sup>7</sup> committed either to reducing emissions to below 80-95% below 1990 levels, or below two metric tonnes per capita, by 2050. The evidence reviewed suggests that most Net Zero targets are relative.

Targets can be **benchmarked** against an external target, such as the Sustainable Development Goals. A benchmark relates the target of an actor to some overarching objective. Many organisations set a “science-based” target which requires them to decarbonise per the Paris Agreement (in line with the trajectory that limits warming to 1.5C).

### 2.3.5 Fair share

A further dimension of variation identified was the extent to which targets are adjusted based on assessments of what is ‘fair’ for that region, country, sector or organisation. This relates to the idea outlined in Section 2.1 that Net Zero functions only as a global concept, which smaller entities merely contribute to. This was operationalised at the Paris Agreement, when countries agreed ‘Nationally Determined Contributions’ (NDCs) (emissions reductions at the national level) based on different national circumstances and capabilities. Implicit in the concept of NDCs is:

- a) An ethical argument, namely that wealthier countries have more of a responsibility to decarbonise than low- and middle-income countries, given that they have profited from high-carbon activities which have left emissions in the atmosphere.
- b) A pragmatic argument, namely that countries in different circumstances do not all have the capabilities to decarbonise at the same rate. Rather, countries should set achievable goals which ‘add up’ to global Net Zero.

Where this concept of a ‘fair share’ has been implemented at the non-state level, it has primarily been in accordance with the pragmatic argument. The notion of a “fair share” is used in the Race to Zero pledge. RTZ does not have a specific requirement as to how this should be implemented, but rather an acknowledgment that “*different sectors and different actors will move at different speeds, reflecting their unique opportunities and constraints*”. For instance, the Science Based Targets initiative (SBTi) has modelled sectoral pathways to 1.5C, and on that basis assigns participating companies a target based on their market share in that sector. Sectoral pathways are based on ‘*inherent differences among sectors, such as mitigation potential*’.<sup>8</sup>

Whilst some approaches to assigning a ‘fair share’ of reductions are calculated in terms of how difficult it is to abate emissions in particular sectors, others focus on capacity to reduce in terms of the stage of development a particular entity is at. For example,

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<sup>7</sup> The Alliance of States and Regions was a group of sub-national governments across the globe coordinated by The Climate Group. The project is now finished and has been replaced by the Under2Coalition.

<sup>8</sup> Science Based Targets Initiative (2015) *Sectoral Decarbonization Approach (SDA): A method for setting corporate emission reduction targets in line with climate science*  
<https://sciencebasedtargets.org/resources/files/Sectoral-Decarbonization-Approach-Report.pdf>



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within the C40 network of cities pledged to making emissions reductions, pathways look different in the Global South than in the Global North.

*“Because many cities in the [Global South] are still growing, they are on slower pathways to halving emissions”*

There was a view that 'hard-to-decarbonise' sectors such as aviation will have to have a higher ratio of removals to reductions than other sectors. That is, despite being a sector responsible for a very high proportion of emissions historically, a 'fair share' for that sector might allow for a lower share of reductions given its inherent reliance on fossil fuels (see 2.3.6, and 3.4.2). Until significant technological developments are made that would end that reliance, a 'fair share' model would see other actors compensating for those emissions such that the global balance was still on track to reach Net Zero.

### 2.3.6 Historical emissions

Historical emissions – those which have been put into the atmosphere over the years by particular actors – are starting to be considered as key to Net Zero commitments by some stakeholders. The idea is that actors should take responsibility for the emissions they have added to the atmosphere over time, given that they have profited from the activities which resulted in those emissions:

*“If a customer kept going to their favourite store and leaving with goods without paying, then started paying for goods after a certain number of visits, the shopkeeper would reasonably expect the customer to settle their old tab at some point.”*

Historical emissions were attributed varying levels of importance across the literature and interviews. In some instances, they were highlighted as a central issue:

*“All these companies have been reporting [emissions] for ten to 15 years. They know what their carbon emissions are in the atmosphere. Nobody is talking about them [...] we're not doing anything about them.”*

The evidence suggested that historic emissions were not often accounted for in Net Zero commitments at the non-state level. Where organisations did opt to compensate for historical emissions, it was a significant commitment. For example, Microsoft has committed to including its entire value chain and historical emissions in its Net Zero calculations, *'more than quadrupling the tonnage of carbon that the company needs to compensate for'*.

### 2.3.7 GHGs

The final dimension of variation across definitions of Net Zero identified was which greenhouse gases (GHGs) were included. Whilst some entities count only CO<sub>2</sub>, others include all GHGs.

Participants and literature referred to both CO<sub>2</sub> and GHGs, often without establishing a reason for why they had chosen the term. In an analysis of 482 companies' neutrality targets, it was found that around one in five had not made clear which GHGs were covered in the commitment. It was noted that a lack of consistency in which gases are included can lead to confusion for actors setting targets. A dominant perspective was that it was important to include all greenhouse gases and make this commitment explicit.

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## 2.4 Consequences of variation

Definitional variation was considered problematic for several key reasons. Firstly, a lack of an internationally agreed definition was thought to lead to confusion for stakeholders attempting to make Net Zero commitments, in turn resulting in delays to progress and/or uncertainty around whether genuine progress is being made.

*“If you don't have a commonly accepted framework, then how do you know that the benefits are being realised? How do you compare yourself across the globe to make sure that you are reporting on actual progress? I think [...] having a multitude of systems creates a lot of disruption. It could lead to delay, it could lead to inefficiencies... Just having common systems, common language, common metrics I think would be critical for a global effort towards climate change.”*

More specifically, uncertainty and a lack of consensus was thought to lead to inaction, or unintentionally ineffective actions. This could be a result of, for example, finding the terminology daunting or being unaware of where scope boundaries should be drawn:

*“When does my responsibility stop and it moves to someone else? I don't think there are clear regulations, guidelines, or even decisions,. [...] If you think globally, it's one big system, at the end of the day, if you think about all the supply chains, their interconnectedness, so then we get to the tragedy of the commons, which leads to inaction.”*

A further problem identified was that ambiguity could be exploited by actors seeking to make unambitious commitments (where this is done to improve organisational reputation, it is referred to as “greenwashing”). For example, a widespread view was that the ‘Net’ in Net Zero could allow for business-as-usual to continue without making any significant changes to their mode of operation. This is primarily due to an overreliance on offsets, and the fact that the proper role of offsetting has not been universally agreed upon (2.3.1). For example:

*“[Two companies] said they wanted to be Net Zero by the end of the year and they had not measured anything. That demonstrates a complete failure of understanding about what Net Zero is. Another company had reduced nothing, but had spent a lot of money on offsets and believed that they were already carbon-zero. Neither of those positions is remotely tenable”*

There was a perception that lack of clarity around what constitutes Net Zero also threatened to undermine the concept generally: investors and other stakeholders may struggle to identify genuinely ambitious commitments if the term Net Zero becomes diluted in this way. Without consistency in how Net Zero targets are set, and progress monitored, investors are less likely to trust what they are investing in, compounding the problem by leading to a lack of investment.

Relatedly, there was a concern that variation in definitions across the world could result in inefficient allocation of funding from institutions such as the World Bank. That is, if a funding body makes access to funds dependent on the adoption of a particular definition, institutions which use other definitions stand to lose out.

## 2.5 Key barriers to consensus

Two key barriers to reaching consensus on Net Zero were identified. The first was that actors in different countries could have different ideas about what Net Zero and related concepts meant, could face language barriers and could have varying requirements

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based on national contexts. The second was that even within national contexts, the diversity of needs, motivations and constraints amongst non-state actors threatened to make any all-encompassing definition too broad to be useful. Relatedly, progressive actors must contend with vested interests seeking to dilute the ambition of Net Zero targets.

### **Variation in needs between parts of the world**

A widely held view was that variation in circumstances and contexts across different parts of the world was a key barrier to agreeing a fair, universally agreed upon and understood definition. Firstly, language differences could cause difficulty, particularly where concepts changed meaning when translated. Secondly, both the literature and participants pointed out that the context in low- and middle-income countries, and African countries in particular, is different: only 30% of the continent is connected to energy grids. Adaptation to climate change may be seen as a greater priority than mitigation, given low emissions and high risk of feeling the worst effects of climate change.

It was emphasised, however, that the difficulty in considering these drastically different contexts should not lead to the exclusion of marginalised and indigenous voices from the debate:

*“I think there's a huge amount to be said for listening to indigenous voices on what sustainability looks like, marginalised voices, the idea of a just transition, there's a million books out there on that. Not many in the technical space; they're more in the social sciences space, but they still could be valuable.”*

### **Variation in needs and priorities between non-state actors**

Beyond variation at the national level, much variation exists at the non-state level as well:

*“I think we do have to be mindful that certain businesses are going to have to approach Net Zero in different ways... We could have a small transport firm whose emissions relate entirely to their fleet, or a manufacturing firm whose emissions relate entirely to the industrial processes that they have in place. There's lots of variations there that we need to be careful of.”*

A tension was identified between the need to acknowledge these differences, and the concern that attempting to meet the needs of a large and disparate group would result in a watered-down definition, lacking in specific detail like agreed timeframes. In some cases, this tension arose because Net Zero goals ended up being conflated with, or seen as a lower priority than, other goals such as food safety, climate justice or plastic reduction. In others, it was because different actors wanted to define Net Zero in a way that suits their needs. That is, defining Net Zero has an inherent political aspect as well as barriers which relate to achieving consistency across sectors and cultures. There is a balance to be achieved between flexibility and accountability. On the one hand, it is not possible to ignore these key differences across sectors and the unique barriers individual organisations face (see 2.3.5). On the other, it was widely argued that this should not allow vested interests to compromise progress and fairness:

*“Definitions are political. That's really what I'm trying to say. Definitions are hugely political. You really need to think about who wants what definition and why. Each company will want different definitions that will suit its particular plans for the future.”*

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There was a perception, for example, that the concrete and steel industries had more influence than the timber industry on standards committees, resulting in a definition of Net Zero which favoured their interests. Participants also identified more pernicious manifestations of this kind of problem, whereby businesses sought to legitimise continued excessive emitting because their business model relied on it. In these situations, vested interests have an interest in 'lowering the bar' of standards, making it possible to outwardly adhere to a concept of Net Zero without making an ambitious commitment.

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## 3 Key barriers to achieving Net Zero

Non-state actors face a broad range of challenges in achieving Net Zero. In this chapter, we first present a conceptual framework for considering these challenges and the measures that might be used to overcome them. We then discuss in detail each of the challenges identified in the literature and stakeholder interviews.

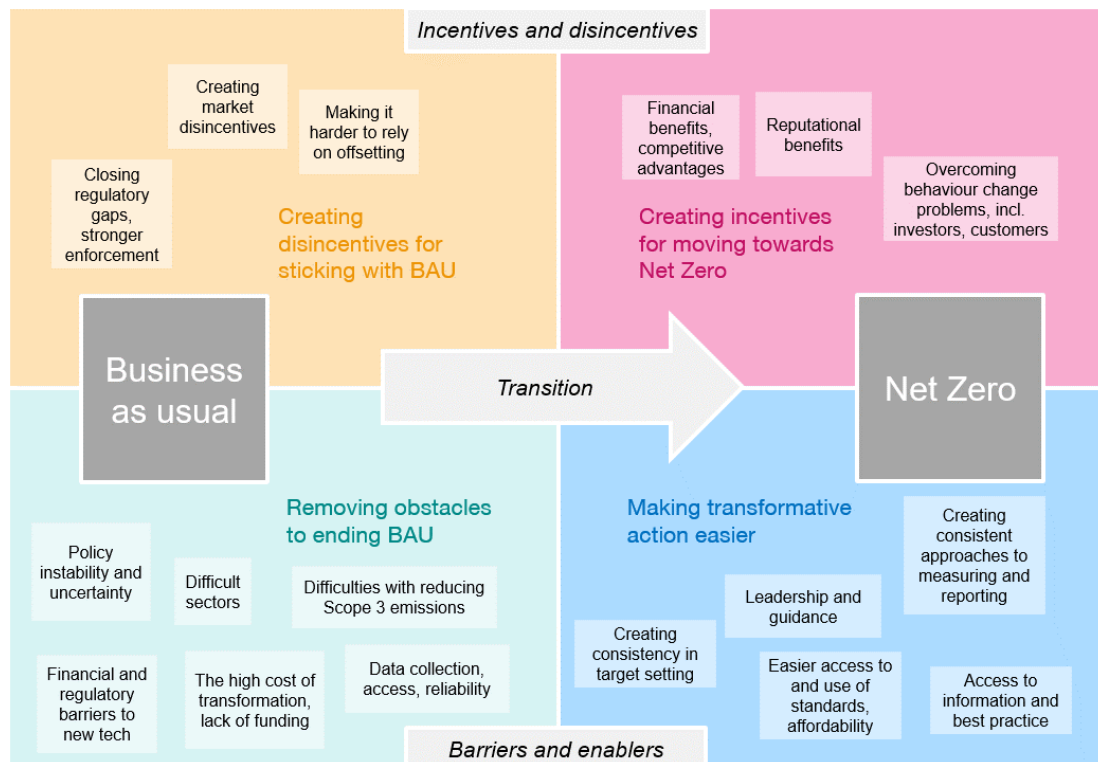
### 3.1 From business-as-usual to Net Zero

We start by outlining our conceptual framework. For actors to move from high-carbon business-as-usual activities towards Net Zero, they need to be both *motivated* and *able* to make that transition. The extent to which actors are motivated is determined by two sets of factors: the *disincentives* they have for sticking with their high-carbon activities, and the *incentives* they have to move towards low-carbon activities. The extent to which actors are able to make this transition is also determined by two sets of factors: the *barriers* they face to abandoning their high-carbon activities, and the *enablers* to adopting low-carbon activities. We therefore have four key groups of factors at play:

- **Creating disincentives for sticking with business-as-usual.** These are actions that would place pressure on non-state actors, motivating them to end existing high-carbon practices.
- **Creating incentives for moving towards Net Zero.** These are actions that would make clear to actors the range of benefits they would stand to gain by making the transition to Net Zero. This also includes actions that would alter the information and options available to investors and customers in order to make low-carbon choices more appealing.
- **Removing obstacles to ending business-as-usual.** There are a broad range of financial, regulatory, technological and organisational barriers that make it difficult for non-state actors to give up their existing behaviours.
- **Making transformative action easier.** These are actions that would smooth the pathway towards Net Zero, including standards for target setting, measuring, and reporting.

This conceptual framework is summarised in Figure 2. On the left, we have **business-as-usual (BAU)**, and on the right, we have **Net Zero**. The top half shows the incentives and disincentives that motivate actors to move from left to right along the diagram, and the bottom half shows the barriers and enablers that make it easy or difficult for them to do so. The remainder of this chapter explores each of the components of this framework in more detail.

**Figure 2:** A conceptual framework to enable the transition to Net Zero



## 3.2 Creating disincentives for sticking with business-as-usual

Three key approaches emerged from the literature and stakeholder interviews for motivating actors to end their existing high-carbon practices: 1) creating market disincentives; 2) making offsetting (and its overreliance) more difficult; 3) closing regulatory gaps and better enforcing existing regulation. We address these in turn.

### 3.2.1 Creating market disincentives

There was broad consensus across documents and interviews that carbon emissions need to have a market price in order to disincentivise emitting. This can include direct taxation of emissions, or ‘cap and trade’ systems, which set a firm limit on emissions and allow companies to buy and sell allowances to emit. The most notable example of a cap and trade system is the EU Emissions Trading System ([EU ETS](#)).

Non-state actors can create their own market disincentives for emitting by introducing Internal Carbon Pricing. This can be in the form of a shadow price or an internal carbon fee. A shadow price is a *purely theoretical* price that organisations can use in their strategic planning. Shell, BHP (a mining company) and BP use a shadow price to help plan a shift from high- to low-carbon investments and activities.<sup>9</sup> By contrast, an organisation with an internal carbon fee charges itself an *actual monetary fee* for each ton of carbon emissions, which then creates a fund within the organisation that can be used for other sustainability projects. Microsoft, for example, uses revenue from its internal carbon fee to fund other environmental activities.

<sup>9</sup> *Internal Carbon Pricing*. Centre for Climate and Energy Solutions. Retrieved from <https://www.c2es.org/content/internal-carbon-pricing>

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Some sectors – such as utilities, materials production, and energy – have been much more active in setting internal carbon prices than other sectors, such as consumer staples, healthcare, and IT. There is however a lack of consistency in how carbon prices are set, and levels are typically too low: as of 2015, 85% of the world’s emissions were priced at less than \$10 tCO<sub>2</sub>e (tonne of CO<sub>2</sub> equivalent<sup>10</sup>), but analysis estimated that prices should be in the region of \$80-100 to meet a two-degree global limit.

### 3.2.2 Making it harder to rely on offsetting

There were a range of concerns with offsetting expressed in the literature and interviews. First, there were concerns that an ability to rely on offsets was leading to less ambitious targets and plans for emissions reductions, and had the potential to further entrench high-carbon activities. For example, investing in offsets whilst building a highly efficient coal power plant may reduce emissions in the short term, but ‘locks in’ emissions in the long term. In addition, offsets can be used to market high-carbon products as if they were low-carbon; customers may purchase ‘carbon neutral’ flights rather than travel by train.

Second, there was a concern that current levels of offsetting are not sustainable since there is not enough offsetting to go around. Competition for supply of offsetting solutions will grow as more companies act, and the most effective measures may become oversubscribed, making Net Zero commitments impossible to fulfil. Often, offsets are bought in place of reductions by large emitters (such as the aviation sector), driving up costs for those actors that have made genuine efforts to reduce their emissions.

*“The problem with [offsetting] is that not everybody can have 100 per cent offsets. It just doesn’t work”*

Third, stakeholders cited significant uncertainties about the effectiveness of offsetting in the long run, and concerns about negative side effects. Nature-based offsetting solutions face risks of reversal by fires, pests or storms, and are constrained by the availability of land. The large-scale use of terrestrial carbon capture and storage could trigger adverse effects including desertification, land degradation, food insecurity, displacement of communities, worsened livelihoods, loss of natural ecosystems, loss of biodiversity, and pollution. Engineering solutions can scale up, but are currently scarce, expensive and resource intensive. Net Zero strategies should not rely on the future invention of “magical” removal technologies; Canadian oil sands producers have formed a Net Zero alliance that has proposed continuing business-as-usual in the near term, on the assumption that carbon-capture technology will become available at scale in the near future.

Fourth, a range of failures in the offsetting market were identified. Offsetting is often associated with ‘greenwashing’ due to a lack of transparency in how reductions and removals are achieved, and a lack of comparability and standardisation. The way offsets are currently priced encourages actors to buy the lowest-quality offsets, and do not take sufficient account of the duration of carbon storage, the risks of premature release, or the social equity or wider environmental benefits of removal. Further, there were concerns expressed about ‘double counting’, where offsetting activities are counted on both the demand side (i.e. the actors purchasing the offsets) and the supply side (i.e. counted against the Nationally Determined Contributions (NDCs) of the countries in which the activities take place). This has especially damaging

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<sup>10</sup> A tonne of CO<sub>2</sub> equivalent is the standard measure of accounting for greenhouse gas emissions. Emissions from greenhouse gases other than carbon dioxide are converted according to their global warming potential.

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consequences when it leads to host countries relaxing their own domestic climate ambition due to the achievements of the offset project. Following the Paris Agreement in 2015, an assessment by Gold Standard (a private certification body) found that “there are only very rare cases where it can be demonstrated that double counting is ruled out with certainty”.

### 3.2.3 Closing regulatory gaps and stronger enforcement

There is a need to close regulatory gaps that allow high-carbon practices to continue. Several distinct regulatory gaps were highlighted in the literature. For example, obtaining permits for excavating fossil fuels remains easy in many parts of the world. Although there are several European regulations and certification systems for so-called ‘Circular Economy’ buildings, there are no equivalents in many other parts of the world, including the US. And despite a UK commitment to remove gas by 2050, gas boilers are still being fitted into new builds, and homes that will require retrofitting to meet the 2050 Net Zero target are still being built.

Additionally, the importance of enforcing existing regulation fully was emphasised in the literature. If rules are not policed, some actors will lose out because they are competing with less scrupulous competitors.

## 3.3 Creating incentives for moving towards Net Zero

The research highlights a wide range of benefits that non-state actors can achieve from making the transition to Net Zero. These include both financial and reputational benefits. There is a need to make these benefits clearer to actors. There is also scope to increase the extent to which companies can benefit from Net Zero actions by changing the information and options available to investors and customers, such that they are more willing and able to seek out environmentally friendly products and services.

### 3.3.1 Financial benefits and competitive advantages

Interviewees felt that organisational behaviour is, in large part, market driven:

*“If market behaviour changes, I think organisational behaviour will change”*

There was a view expressed in interviews that by reducing emissions, actors have the capacity to become more efficient, save money, and retain and attract customers and investors:

*“Most companies who are becoming more efficient with resources are saving emissions, but they're also saving money. They've got a lot of reasons why they want to do this, including making sure that their clients and... consumers still want to buy from them and are convinced that they're putting their shoulder to the wheel in the climate change challenge.”*

Despite the fact that energy is a large variable cost for most companies, few see energy efficiency as a route to competitive advantage or profitability. Efficiencies can be gained by introducing energy management practices, installing smart meters, energy-efficient lighting and heating systems, re-designing products to require fewer inputs, reducing packaging, switching to local suppliers to decrease shipping costs, switching to recycled materials, reusing waste products or selling waste to other companies. Becoming more efficient can also lead to competitive advantage: as larger



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companies look to decarbonise their supply chains, those suppliers that move faster towards Net Zero will gain new contracts.

However, the financial benefits of low-carbon investments are not always fully accounted for, or understood. For example, a study of the building sector in Finland found that when companies are deciding whether to invest in energy efficiency improvements, the real costs and benefits of these investments are not fully factored into decisions. There were several reasons for this. Firstly, information about the costs of energy efficiency improvements may be outdated, as technology and processes have developed. Secondly, the potential increases in the value of the property following energy efficiency improvements are not always accounted for. Thirdly, investment decisions are often based on number of years it will take for the investment to be paid back (which are often longer for energy efficiency improvements than other investments), rather than the longer term return on capital investment (which may be higher for energy efficiency improvements).

Relatedly, there is a need to better communicate the financial benefits of following standards such as ISO 14001 (Environmental Management Systems). A study of Polish firms found that decisions to adopt energy management standards were rarely, if ever, motivated by perceived financial benefits, and mostly centred on perceived reputational benefits.

Interviewees described approaches that governments can take to create financial incentives for decarbonisation. In Ecuador, companies can reduce their tax liability by making progress towards, or committing to, carbon neutrality. The Costa Rican government provides direct financial incentives to aid reforestation under the Payments for Environmental Services programme.<sup>11</sup> Landowners receive direct payments when they adopt land uses and forest management techniques that avoid negative impacts on the environment. However, there was an argument made that incentivisation initiatives need to be accompanied by robust standards that enable parties to determine whether an organisation or action qualifies for the incentive.

### **3.3.2 Reputational and other benefits**

Across the literature and the interviews, there was widespread concern about the prevalence of 'greenwashing', with some actors making dubious claims of environmental progress in order to gain reputational advantages. This was often discussed in the context of offsetting. In order to prevent greenwashing, there is a need for greater standardisation, monitoring and regulation of offsetting and other actions.

There are potentially other benefits to employers from taking action towards Net Zero. Employees increasingly want to work for companies that benefit society in addition to producing a profit, and this is particularly true of younger employees. This may become a key factor if labour shortages stemming from COVID-19 and other factors persist<sup>12</sup>.

Several other benefits of decarbonisation were identified in the literature, but these are often not 'captured' within markets; that is, the wider social benefits of decarbonisation are not translated into financial benefits for those doing the decarbonising. For example, markets do not fully capture the benefits of cleaner air, improved natural capital, and the mental and physical benefits that stem from these.

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<sup>11</sup> <https://www.centreforpublicimpact.org/case-study/payments-for-environmental-services>

<sup>12</sup> In the UK, for example: according to the [ONS Labour Market Overview, UK: October 2021](#), the number of job vacancies in July-September 2021 was a record high of 1,102,000, an increase of 318,000 from its pre-pandemic level.

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### 3.3.3 Overcoming behaviour change problems for investors and customers

One approach to motivating businesses to decarbonise is to change the behaviour of investors and customers. However, there are distinct challenges in making investors favour low-carbon investments and customers favour low-carbon products and services.

The timescales used in investment decisions tend to be shorter than the timescales involved in combating the climate crisis. There are existing efforts to motivate investors to think in longer time-scales, such as 'Focussing Capital on the Long Term' ([FCLT](#)), a non-profit organisation with a membership of companies and investors that promotes longer-term investing. FCLT reports that 90% of executives agreed that longer term horizons for business decisions would improve business performance, but half the executives would delay value-creating projects if it would mean missing quarterly earnings targets. The difficulty of motivating investors to focus on low-carbon options is compounded by the fact that climate risks are generally not disclosed to investors. In New Zealand, the [Productivity Commission](#) concluded that this information deficit was driving "an ongoing and systematic overvaluation of emissions-intensive activities", and as a result the government has recently introduced legislation to make climate-related disclosures mandatory for some organisations. There was evidence presented in the literature indicating that requiring companies to disclose climate risks in this way could significantly shift shareholder behaviour.

For customers to choose low-carbon products and services, they need to be available in the first place, and often there is a requirement for complementary infrastructure; for example, sales of electric vehicles would likely increase following an improvement in the charging infrastructure. However, [research](#) was highlighted in interviews which shows that customers are not particularly motivated by the climate when making purchasing decisions, that product labelling is not hugely effective, and that other factors such as cost and convenience are typically more important:

*"Consumers are not primarily motivated by environment when they buy anything. Even green consumers will also be influenced by price and other factors like design and health."*

## 3.4 Removing obstacles to ending business-as-usual

Many non-state actors face significant barriers to ending their business-as-usual state. For some, there is very little scope to reduce emissions without a radical transformation of the very core of their activities, whilst for others transformation is possible but comes at a high cost. For some, there are challenges to even understanding the extent of their emissions, and to finding levers that can be used to reduce supply chain emissions. The shifting policy and regulatory landscape in which actors operate can make it difficult to understand the future consequences of transformational moves and can hold back innovation.

### 3.4.1 Policy instability and uncertainty

Frequent changes in policy and inconsistencies between different areas of regulation, or different parts of the world, can make the kind of long-term decision making required to transition to Net Zero difficult for non-state actors. Policy decisions can have sizeable impacts on the costs of energy and carbon emissions; uncertainty around the future policy leads to uncertainty about future prices, which increases the level of risk involved in energy efficiency improvements. Hafner et al. (2019) describe how several renewable energy projects in Australia stalled as a result of uncertainty in the renewable energy target. A lack of trust can arise from policy U-turns, such as tax

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breaks implemented in the UK to encourage the purchase of diesel cars, which were later withdrawn, and new taxes introduced instead.

However, Bryant et al. (2019) argue that uncertainty around future regulation can in fact incentivise beyond-compliance actions. The authors claim that the firms which make the biggest contribution to climate change are those which would be most affected by stringent future climate change regulation, and therefore those which gain from pre-emptively taking beyond-compliance actions. For this effect to occur, firms need to genuinely believe that stringent regulation is likely. A report from Deloitte discussed how the patchwork of different national and local policies means that companies in one particular sector (mining) are designing their decarbonisation strategies based on the most stringent common denominator and applying these strategies globally.

There are also areas in which multiple policies overlap and conflict. For example, in the UK domestic retrofitting sector, multiple regulations can pull in opposite directions: regulation to ensure conservation of historic buildings; energy efficiency regulations that require insulation; and fire safety regulation that requires elements to be replaced with fireproof alternatives. For those operating in the sector, balancing these can be difficult or even impossible. In Massachusetts, accessibility regulations come into force when the cost of construction exceeds a threshold, leading to the deliberate construction of lower quality - and therefore less efficient and durable - buildings (to come in under the threshold).

In some cases, it is not policy *instability* that causes problems, but rather the *legacy* of historic regulatory decisions that prevent future policy change. For example, in the US, existing systems of local governance were developed in part to support the electrification of rural areas: cooperatives allowed local communities to pool assets and regulate energy distribution. However, these local organisations now pose a barrier to change; existing cooperatives prioritise local benefits over system-wide value, meaning that new transmission lines for wind and solar power are not being built.

### 3.4.2 Challenging sectors

There was broad consensus across the literature and in interviews that some sectors will find it much harder to decarbonise than others without having to radically change the fundamental nature of their business model. Frequently cited industries were aviation, manufacturing and shipping, amongst others. In these particular sectors, only minimal reductions are possible, and any further reductions would require technologies that do not currently exist, and that may not exist for a very long time. Kaya et al (2019) argue that existing technologies may only produce an emissions reduction of around 30% in the iron and steel manufacturing sectors, and that more efficient processes are at an embryonic stage of development. Similarly, in the aviation sector:

*“Everyone continues to talk about the possibility of sustainable aviation fuels and all of these things, and hydrogen planes and electric planes, but you talk to anybody who's in that space, nobody believes this is happening inside 15 years. Maybe 20. Maybe not even 30.”*

Hepburn et al. (2020) suggested serious consideration of compensating those industries that are most likely to lose out in the transition to Net Zero. In other words, ‘bailing out the polluters’. The authors accept that this is undoubtedly a controversial approach but argue that it may be necessary in order to appeal to the powerful vested interests that run these industries.

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Interviewees explained that low- and middle-income countries are more likely to be dependent on challenging sectors and are often reliant on these sectors to drive their development goals. It was argued that the key objective in these countries is to find ways in which development and decarbonisation actions can be mutually enhancing:

*“How can [low- and middle-income countries] achieve development in tandem with decarbonisation? I think that’s where the sweet spot is and that’s where probably the biggest challenge is going to be in terms of getting that space where one doesn’t leave the other behind.”*

### 3.4.3 Financial and regulatory barriers to new technology and innovation

Although there was a widespread view across the literature and interviews that Net Zero strategies should not rely on future technological solutions, there was nonetheless broad consensus on the importance of new technologies, the need for a regulatory environment conducive to innovation, and the availability of funding throughout the whole development cycle.

**Regulatory barriers.** The 2017 UK Industrial Strategy Green Paper set out plans for providing financial, organisational and structural support to innovative sectors. In the same year, the Proportionate and Adaptive Governance of Innovative Technologies (PAGIT) report argued that the strategy would fail to deliver the expected benefits unless the regulatory system was made more proportionate and adaptive to the needs of innovative technologies. There was a view expressed in interviews that regulation can be too slow and too static, and can hold innovation back:

*“Regulatory systems [are] dysfunctional because they don’t very often guess accurately about what the properties in the technology will be, when and where it could be dangerous, and so on.”*

For example, new approaches to developing feed for farmed fish have been developed that have a much lower carbon impact than current methods. However, these new approaches involve genetic modification, and are not being implemented quickly enough, in part as a result of existing regulatory frameworks. The PAGIT report argues for an alternative framework based around using standards in the earlier stages of the development of new technologies instead of regulation and using regulation only when it is clearly needed.

**Financial barriers.** The basic argument for government funding of research and development is that markets typically undersupply innovative activities because firms are unable to capture all the benefits. New knowledge and technologies have ‘spillover’ effects, bringing benefits to others besides those responsible for generating them, and these effects appear to be particularly strong for environmental technologies. Those who first bring a new technology to market often face ‘first-of-a-kind’ costs that later adopters do not.

Government funding can be targeted at specific technologies, but a standard recommendation of economists is that funding should be ‘technology neutral’, meaning that funding is given to the lowest cost option that meets policy goals. However, the environmental impacts of technologies may not always be factored into assessments of cost. If long-term environmental impacts were fully factored into cost assessments, the cheapest technology that meets policy goals is more likely to be an environmentally beneficial one. Even where consideration is given to environmental impacts, the timescales considered are often too short. Technologically neutral approaches to funding can therefore lead to investment in technologies that are the cheapest and

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most effective option in the short term but are more expensive and less effective in the long term.

In addition to direct state funding, there are ways to stimulate private funding. When firms make decisions about investing in emerging technologies, they look at the balance of costs and benefits. However, environmental costs are often not included or are undervalued. The Induced Innovation Hypothesis is the idea that by placing a higher price on renewable natural capital (biodiversity, the ozone layer, ecosystems), it is possible to incentivise greater private investment in innovation as firms look for cost savings. There is also evidence that governments can spend money more efficiently by investing in a large number of small, early-stage technologies, rather than a small number of larger, late-stage technologies. This is because investing in early-stage technologies can promote private funding, since private investors are more likely to invest in small firms that receive grants.

There is a need to ensure that innovative environmental technologies are funded across the development cycle. The so-called 'Valley of Death' is the funding gap between the initial research phase and large-scale field testing. This gap hinders the growth of climate change solutions to the kind of scale required.

#### **3.4.4 The high cost of transition and the lack of funding**

Net Zero transitions often require substantial up-front investments in new technology or infrastructure. There were many examples of this discussed in the literature, often in the context of the energy and building sectors. Renewable energy infrastructure has higher upfront capital requirements than traditional energy assets, which often leads to an expectation of higher returns over the lifetime of the investment, to compensate for the additional risk. More durable building materials are typically more expensive, and for property developers who plan on immediately selling properties there is little incentive. Reusing and recycling building materials is often more expensive than disposing of them and using new materials; it is less expensive to throw used tiles from a roof into a skip than it is to carry them down, package them, transport them, and store them. For existing homes, the costs of full retrofitting are typically estimated at £80-90K and return on investment takes a very long time. For small and medium enterprises (SMEs) and individual consumers alike, ground source heat pumps involve a high-upfront cost, as do electric vehicles.

There are strategies available to spread the burden of up-front costs. In the literature, a university described a shift to an on-site solar farm. This was funded through a Power Purchase agreement, whereby a delivery partner funded the installation of the solar farm and the university agreed to pay for the energy generated at less than the grid price. A large upfront cost was avoided, at the expense of small, long-term financial savings.

Given the often high costs of transition, a recurrent theme in both the literature and the interviews was the need for better access to finance or grant funding. A survey of SMEs found that access to funding and grants was amongst the most frequent requests from businesses looking for support in making energy efficiency transitions.

*“I think one of the second most important barriers is access to finance... There are certain actions that businesses might want to take but feel unable to take because they simply can't afford it, because they need to access finance.”*

In addition to support with the up-front costs, in some sectors such as the cement and concrete industries the operational costs involved in low-carbon solutions make

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products uncompetitive, and there is a need for ongoing financial support or taxes placed on high-carbon competitors.

A lack of finance and funding is particularly problematic in low- and middle-income countries; there is a lack of private finance for renewable energy infrastructure, despite increased energy demands.

### 3.4.5 Difficulties reducing Scope 3 emissions

Reducing Scope 3 emissions can be exceptionally difficult. It can be unclear which actors have responsibility for which emissions (discussed in Section 3.5.3), and there are challenges to understanding and measuring the extent of emissions (discussed in Section 3.4.6). Even once the emissions are identified and a company takes responsibility for reducing them, companies may have insufficient leverage over their supply chain to effect change, or large elements of their supply chain may belong to the 'challenging sectors' – aviation, shipping, manufacturing, and others – discussed in Section 3.4.2.

There is evidence that larger firms are more able to reduce their Scope 3 emissions than smaller firms, for a range of reasons. One study identified several factors by looking at firms in the United Arab Emirates: large firms have more leverage or power over their suppliers; they have more opportunity to seek alternative suppliers, since they are more likely to operate over large geographical scales, or internationally. Similarly, they are more able to source expertise on environmental policy and practices; the potentially high costs of implementation are less of a barrier; they have greater awareness of climate related issues; and they are more likely to see the financial benefit to their business. SMEs tend to lack the resources and expertise to engage fully with their supply chain emissions.

In interviews, examples were given of industries that are struggling to reduce Scope 3 emissions. In the mineral products industries – which produce concrete, cement and lime – a very large proportion of emissions are due to the transportation of construction materials and carbon storage materials, over which companies have little control. Similarly, in the timber industry, transportation makes up a higher proportion of emissions compared to other building materials, but electrification of this transportation is particularly difficult: vehicles often need to reach remote locations without charging points, and batteries would not last long enough.

### 3.4.6 Data collection, access and reliability

Gathering and understanding high-quality data covering the whole of a company's emissions is challenging. In the literature and in interviews, this issue was primarily discussed in the context of Scope 3 emissions. Companies are often unaware of the full extent and make-up of their Scope 3 emissions, which can make it tempting to ignore them. Many companies simply do not have the resources and capacity to monitor their emissions activity in sufficient detail, and this can be a particular problem for SMEs. Once companies do start trying to understand these emissions, they can rapidly find they are far higher than anticipated:

*“If I start today and I've got 100 tonnes of emissions, and of those tonnes, 30 tonnes are Scope 3, that may be scratching the surface. I could find that I've got, actually, 100 tonnes of Scope 3 once I've already started to measure this and look at it properly, so my results have gone up to 170 within 12 months of starting to measure.”*

One example was discussed in the literature that highlights the resource demands and the difficulties of fully understanding Scope 3 emissions. In January 2007, the CEO of

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Tesco (a large UK supermarket chain) announced the company's plan to achieve 'carbon neutrality' by 2050 and to be the first company to measure the carbon impact of all products using the Carbon Trust's carbon footprint label. After three years, Tesco cancelled the labelling initiative, citing the high cost of determining the Scope 3 emissions associated with products (in addition to other factors, including little consumer interest and the lack of a standardised carbon measurement system for products).

## 3.5 Making transformative change easier

In addition to motivating non-state actors to make the transition to Net Zero, and removing the obstacles to them doing so, there is a need to actively facilitate these transitions. This will require clear leadership, guidance and coordination, and increasing access to information and best practice. It will also require creating consistency in target setting, measuring and reporting; this will not only make change easier for these actors, but will make it easier for international governance bodies to assess progress. Standards will play a role here, and there is a need to make these easier to access, use and afford.

### 3.5.1 Leadership, guidance and coordination

Multilateral climate regimes, such as the United Nations Framework Convention on Climate Change (UNFCCC), have advantages of legitimacy and global scope, but can be slow and rigid in their actions. However, non-state actors have their own advantages – flexibility, innovation, and diversity – but can lack central direction. Across the literature and interviews, there was a view that greater coordination is needed, between non-state actors, states, and multilateral climate regimes, and between groups of non-state actors. There were concerns that without coordination of efforts there could be gaps in non-state action, or that the actions of non-state actors could overlap with each other or with the actions of state actors. However, there were also concerns about the impact of previous and existing coordination efforts, and evidence that some coordination efforts are not leading to any significant action. The literature on initiatives to coordinate non-state actors consistently suggests that in order for these to be effective, there needs to be a set of minimum standards in place.

Past attempts at coordinating non-state actors have shown only limited success. At the 2002 World Summit on Sustainable Development (WSSD), over 200 non-state and public-private partnerships were launched, with more formed after the summit. Academic studies found little, or no, measurable activity following the summit amongst these initiatives and attributed this to the UN's limited mandate and capacity for screening, monitoring, supporting and supervising partnerships.

There is a danger that initiatives that aim to coordinate the actions of non-state actors lead to double counting of emissions reductions. International Cooperative Initiatives (ICIs) are multi-country and multi-actor and aim to reduce emissions. Different ICIs bring together different types of actors: the Cement Sustainability Initiative brings together actors in the cement industry, while the Covenant of Mayors brings together cities, and other initiatives bring together other industries, regions, or types of polluters. A review of the literature on ICIs found that although overlap between the actions of ICIs themselves appears to be small, the overlap with emission reduction efforts under the UNFCCC is believed to be quite large. In other words, there is a risk that emissions reductions are being double counted. This was found to be especially true of those ICIs that bring together cities or private companies.

It is key that attempts to coordinate non-state action are inclusive. Participation in non-state schemes is skewed towards large companies, and schemes for both non-state actors are skewed towards the Global North. SMEs make up 90% of businesses and

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more than 50% of employment worldwide, and feature heavily in the supply chains of larger companies but are typically not involved in major coordination efforts.

*“I think the consensus that's coming through on Race to Zero doesn't yet feel like a global consensus. It feels like that is a consensus in a bubble of elite organisations that worry about this, in the West.”*

### 3.5.2 Access to information and best practice

Across interviews, there was a view that many non-state actors want to take action towards Net Zero, and see the benefits, but are unsure what actions they should be taking. SMEs, in particular, are less likely to have in-house expertise.

*“I think one of the most crucial barriers is access to information. Access to clear, simple information and guidance on Net Zero that is tailored to domestic businesses, that enables them to understand exactly what Net Zero means for them as a business, not as an abstract scientific concept, and what they're expected to do about it, and then what benefits they as a business can expect to accrue from starting their Net Zero journey.”*

Many organisations do not have the capacity and expertise to create their own climate solutions, and would prefer to use existing technology and approaches:

*“Not all of these organisations are going to be innovating... Many of them will be takers of technology and approaches and processes.”*

The challenge for many businesses is translating high-level targets into specific actions within individual parts of the business. Targets should be broken down into “mini targets” so that ambition is “devolved down into the business”.

### 3.5.3 Creating consistency in target setting

As discussed in Chapter 2, the IPCC definition of Net Zero – when “anthropogenic<sup>13</sup> emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals” – is clear and well understood. But it provides little help to individual actors trying to understand what a Net Zero target would mean for them. Consequently, a range of approaches have arisen to help non-state actors to gauge whether their carbon commitments are consistent with global Net Zero. These include the [Standards Based Targets initiative](#) (SBTi), the [Oxford Principles for Net Zero Aligned Carbon Offsetting](#), and [Transform to Net Zero](#). Generally, these approaches emphasise the importance of reducing greenhouse gases as much as possible in the value chain, using interim targets, and purchasing carbon removal for residual emissions that cannot be reduced.

Despite these efforts, there is a notable lack of consistency in how targets are set and the form that they take. Looking at SBTi's Corporate Manual, for example, companies have a wide range of discretion over key elements of the design of their targets:

- For Scope 1 and 2 emissions, companies can choose between two target setting approaches: the Absolute Contraction Approach and the Sectorial Decarbonisation Approach (SDA). Under the Absolute Contraction Approach, all companies reduce their absolute emissions at the same rate, irrespective of initial performance. Targets can take the form of overall reduction in emissions (i.e. reduce annual GHG emissions by 35% by 2025, from 2018 levels), or they can be translated into intensity terms (i.e. a reduction of GHG gases per unit of production). The SDA is a

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<sup>13</sup> Anthropogenic def: Caused by humans or their activities. Cambridge Dictionary



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more complicated approach and involves sector-specific pathways for decarbonisation. Individual companies align their targets with the pathway for their sector.

- Companies are only required to develop Scope 3 targets if Scope 3 emissions exceed 40% of total emissions. Scope 3 targets only need to apply to two-thirds of a company's Scope 3 emissions. Companies can choose which elements of their supply chain should be included in the two-thirds. When setting a Scope 3 target, companies can again choose between Absolute Contraction and SDA.
- Companies can choose the base year used for their targets, although the SBTi recommends that companies choose the most recent year for which adequate data is available.

It should be noted that SBTi has very recently introduced a new, separate [standard for Net Zero](#).

There was concern across the literature and the interviews about the extent to which Scope 3 emissions are included in targets. One analysis of companies' policy and strategy documents found that very few explicitly address supply chain emissions, and Scope 3 emissions tend only to be mentioned in the context of business or employee travel. A study of major multinational companies found that climate efforts predominantly focus on owned emission sources, and that only 12% of funds to address climate impacts were invested in value chain emissions sources. In part, this is likely a result of the difficulties in measuring and understanding Scope 3 emissions, and the challenges in determining the extent of a company's responsibility:

*“There's a real problem around Scope 3 of how to draw the boundaries around ‘what's my emission versus your emission?’ Obviously, one company's Scope 3 emissions is another company's Scope 1 or 2... [Different] companies make different choices around that, and it's not clear they all add up to a full picture of global emissions.”*

Perhaps unsurprisingly given the variation in target setting initiatives, and the challenges associated with Scope 3, data from the Carbon Disclosure Project (CDP) – which contains details of corporate emissions and reduction targets – shows significant variation across non-state actors. Some companies have carbon intensity reduction targets, while others have absolute reduction targets; very few incorporate Scope 3 emissions and those that do vary considerably in what activities they include. Similarly, the SBTi provides access to all targets on its [website](#), and shows wide variation in the form and ambition of targets.

### **3.5.4 Creating consistency in measuring and reporting**

In addition to this lack of consistency in the form and ambition of Net Zero targets, there is a clear lack of consistency in approaches to measuring and reporting emissions, and for reporting progress towards targets. There was a widespread view across the documents and interviews that this lack of consistency makes it difficult or even impossible for authorities, customers, and investors to identify the least and most efficient companies, products and services. In particular, non-state actors do not consistently separate reduction and removal in their reporting.

*“We need to get to a situation where every company in the world basically knows its own footprint and the footprint of its services and products, so we all have access to the data all the time. We can then compare providers”*

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Attempts to create consistency, such as the CDP, have not been entirely successful. Despite being the world's largest repository of self-reported corporate carbon data, there are problems with comparability, comprehension and reliability. Companies vary in what they report, how they report it, and how often they do so.

There is a need for emissions reporting to disentangle the various factors and actors involved. For example, in 2015 the EU adopted the Monitoring, Reporting and Verification (MRV) regulation for large shipping vessels. Poulsen et al. (2020) found that many different factors affect the efficiency of a ship, such as the route the ship takes, the weather, the cargo it carries, and the speed at which it travels. Different actors in the shipping industry have differing levels of control over each factor; typically, for example, it is those who charter ships who typically dictate the speed at which it travels. MRV reporting does not disentangle these factors, so it is impossible to know which ships are most energy efficient. Future reporting regulation needs to be sensitive to the complex global power relations between the actors involved.

### **3.5.5 Making standards easier to access, use and afford**

Standards can play a role in disseminating information and best practice, and in creating consistent approaches to setting targets, measuring emissions, and reporting. Standards can therefore act as a facilitator to non-state actors looking to achieve Net Zero.

There was a view that if standards are to play a greater role in the transition to Net Zero, they need to be easier to use, access, and afford. We will discuss this in detail in Section 4.3, which looks at the key barriers to centring Net Zero standards.

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## 4 The role of standards

*“Standards have a really critical role to play, because then in essence we're all singing from the same hymn sheet.”*

A broad range of environmental standards exist, including standards set by national and international standards bodies, in addition to those set by other organisations, such as the Science Based Targets initiative (SBTi), which recently announced a [Net Zero standard](#). In interviews, there was relatively broad consensus on the value of standards generally, and on the specific roles that standards can play in Net Zero. That said, the path towards centring standards in the transition to Net Zero faces several challenges. This chapter is primarily based on the qualitative interviews. We first discuss interviewees' perceptions of the role of standards generally as tools in the creation of norms and network effects. We then look at the specific roles that standards can play in facilitating the journey to Net Zero. Finally, we discuss the barriers that those looking to promote standards are likely to face.

### 4.1 Overall role

There was a view that standards can create norms, which lead to good practice being embedded in business operations from the start, and to higher consumer expectations. Interviewees drew parallels with standards around health and safety:

*“Health and safety now is just a norm. You would never consider starting a business without looking at health and safety... That's something that is standardised... We need a similar sort of approach for Net Zero so there's no confusion, businesses understand that it should be a fundamental part of their business plan in the same way that health and safety is.”*

A related idea was that standards create network effects; as a standard is more widely used, it becomes increasingly difficult for organisations to act outside of that standard:

*“If you're the one company that's trying to articulate it in a different way, I think you'll find it very difficult to convince lawyers or accreditors, or anyone you're doing business with, that... your way's better. So you have this network effect that gives increasing returns to the path-dependent process over time.”*

One of the perceived outcomes of these effects was changes to national and international legislation. This view was expressed in both the literature and the interviews. The existence of widely used standards can help to convince lawmakers that robust legislation is politically possible, and can give them a basis from which to start when drafting that legislation:

*“The real value of... a standard is sometimes even greater in its indirect impact... A lot of governments' trade agreements lawyers are looking to what the international standard is when they're thinking about how to design their own regulations or how to rule on a certain case. That can give standards an indirect impact that can be really powerful.”*

### 4.2 Standards for Net Zero

In this section we discuss the specific roles that standards can play in the transition to Net Zero, according to interviewees.

## 4.2.1 Target setting

As discussed in 3.5.3, there is inconsistency in the approaches taken by non-state actors to setting targets, and scope for many actors to set unambitious targets. There was a broad consensus in interviews that a standard that defines Net Zero and specifies the features that a Net Zero target should have, would be useful. The key considerations when defining such a standard would be those identified in Section 2.3: which ‘scopes’ are included; the extent to which targets should be based on a notion of a ‘fair share’ or ‘just transition’; whether targets should be absolute or relative; the timeframes involved; the role of removals and offsets; whether historical emissions should be considered; and which greenhouse gases are in scope. For interviewees, the key concern was around the role of offsetting, and there was a widely held view that any standard for Net Zero target setting would need to set strict limits here.

Views were divided on whether new standards for targeted setting were needed. One view was that ISO and other standards bodies should focus on developing a new standard for Net Zero target setting, but an opposing view was that existing standards were sufficient. In particular, there was a view amongst interviewees that SBTi has become the “*de facto*” organisation for setting Net Zero standards, with good resourcing and access to advisory experts. Given this, it was argued that national standards bodies should focus on leveraging their wider set of standards:

*“[Standards for Net Zero target setting have already] been done by Science Based Targets. It’s not perfect, but it has been done. The way in which ISO and BSI can contribute is to stop chasing that, and start to integrate climate change action into all of the family of standards that it has already.”*

It should also be noted that SBTi has very recently (November 2021) published a [standard](#) that specifically focusses on setting Net Zero targets. The standard has four key requirements:

1. Companies should focus on rapid and deep emission cuts across the whole of the value chain. Most will require decarbonisation of 90-95% under the standard. Beyond this, residual emissions must be removed.
2. Companies must set near- and long-term targets.
3. Companies must not make Net Zero claims until their long-term targets are met.
4. Companies are encouraged to make further investments beyond their targets to help mitigate climate change elsewhere, but these investments should be in addition to emissions cuts, not instead of them.

## 4.2.2 Measuring and reporting

As discussed in Section 3.5.4, there is wide variation in how actors measure and report their emissions and their progress towards targets, which makes it difficult for observers (including investors and customers) to understand which actors are performing well. A widely shared view amongst interviewees was that standards must play a role in defining how organisations should measure and report on their emissions.

*“International standards could provide a lot of clarity. If there is [an] international benchmark or framework, everybody will be reporting on the same basis, using the same technical criteria, providing the same type of reports. It will help... better comparison and tracking of progress so that we all know that we are speaking the same language and measuring in a consistent way.”*

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One view was that standards bodies should not seek to build consensus on standards for measuring and reporting emissions. The topic is complicated, and most actors want to be told the best approach. Attempting to reach consensus runs the risk of a lowest-common denominator approach.

There was also the view, however, that standards around measuring and reporting are already in place, such as ISO standards and the GHG Protocols. Rather than creating new standards, there is a need to promote the wider use of these existing standards (see Section 4.3.2).

### **4.2.3 Providing guidance and support for organisations to reach their targets**

Whilst standards for target setting, measuring and reporting may help an organisation begin their journey to Net Zero and to track progress, they do not necessarily help organisations establish detailed plans for reducing emissions. There was a widespread view that organisations need help with this:

*“Most companies want to do something, but they have no idea how to do it. It's too technical a subject. They don't understand it, they don't know where to start.”*

Standards can help organisations reach their targets by providing access to information and best practice, as discussed in Section 3.5.2. Many actors are looking to be told what technology and processes they should be using, and standards can play that role:

*“Standards can help you set targets [and] can help you understand if you're meeting the targets. [But they don't] do anything to tell you how to do that as an organisation. I think organisations are looking for both. They want to set targets, but they want a concrete plan to get them there. I think that's part of what standards can do...”*

*“Not all of these organisations are going to be innovating the... least carbon-intensive approach to doing something. Many of them will be takers of technology and approaches and processes that they're going to need to be able to compete with the rest of the world or to meet their minimum obligations.”*

There was a view that standards could be particularly helpful in this way for organisations in low- and middle-income countries, and for SMEs, who may have less awareness and expertise.

### **Standards for offsets**

There is a role for standards to help overcome the problems with offsetting discussed in Section 3.2.2. One suggestion was for separate standards for reduction and removal; that is, a standard on how organisations should reduce their emissions, and a standard for the role that offsets should play, and the quality of those offsets. An additional suggestion was for a standard for ‘insetting’, the process of paying for offsets that are within a company’s own value chain. For example, a company that purchases coffee might pay for agroforestry techniques to be implemented on the coffee farms they purchase from, rather than paying for tree-planting elsewhere.

### **4.2.4 Leveraging the wider set of standards**

There was consensus around the idea that standards bodies should integrate decarbonisation throughout the wider set of standards.

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*“I think the approach to look back through all of the standards and make sure that they are all aligned to decarbonisation... is really critically important.”*

This point was tied back to comparisons to health and safety standards whereby sustainability should be integrated into standards for products in the same way as health and safety. Standards for new and emerging technologies could build Net Zero in from the start. In addition to standards for products and services, sustainability could be built into standards for public procurement – a large part of the economy – as is currently the case in Sweden.

There were conflicting views about whether or not the task of integrating Net Zero across the wider set of standards should be the immediate priority for standards bodies. One view was that standards bodies should keep a narrow focus on setting standards to define Net Zero and shape target setting, measuring, and reporting. Once this is complete, standards bodies should tackle the wider set of standards: *“Once you've cracked the problem at the top of the pyramid, then it makes it easier to trickle down”*. However, an opposing view was that standards for target setting, measuring and reporting already exist from SBTi, ISO and the GHG Protocols, amongst others. Where national standards bodies can contribute, it was argued, was precisely by integrating climate action into the wider set of standards it already has: *“stop chasing the big thing, get on with the hard work”*.

#### **4.2.5 Facilitating innovation and ensuring new technology is Net Zero-aligned**

A large part of the transition to Net Zero will require the development of new technologies and processes, and the wider use of existing ones. There was a view that the existing approach to regulating the development and roll-out of innovative technologies is overly restrictive – in the UK, at least – and that standards can play a more central role, especially in the early stages of development. New technology is commonly given a ‘Technology Readiness Level’ (TRL), which ranges from 1 to 9, where 1-3 involves basic research in universities and laboratories, 4-6 involves proof-of-concept, and 7-9 involves real-world trials. There was an argument that standards can sufficiently protect against the potential harms of new technology at the early stages, and that regulation should not be introduced until TRL 5 at the very earliest.

The PAGIT report (discussed in Section 3.4.3) makes this argument in detail. The report proposes a new framework for the governance of innovative technologies that includes a distinct role for standards. In particular, the framework involves a ‘Responsibility Standard’, with component standards covering ‘Responsible Innovation’ and ‘Responsible Engagement’. The Responsibility Standard would essentially require developers of innovative and ‘disruptive’ technologies to anticipate and then assess the social, health and environmental concerns and risks stemming from the technology, to engage with other stakeholders, and to take mitigating actions where appropriate.

One concern, however, was that regulators can be averse to relying on standards for new technologies:

*“Regulators themselves are slightly resistant to standards having anything other than a subservient role in relation to regulation. They're very happy with standards that would enable companies to meet the requirements of the regulatory systems, and that's a very common role for standards across a whole range of systems/technologies.”*

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## 4.3 Key barriers to centring standards

Interviewees outlined a range of key barriers to centring standards. Cutting across all of these was a need to develop standards quickly: the development of new standards has, historically, been a relatively slow process, but the transition to Net Zero, by definition, demands timely decision making:

*“I think one of the challenges with the international standardisation system, and some of the national standardisation systems, is responding to the need for rapid change. [...] we need to look at [...] how we also modernise and upgrade the standardisation community to produce faster deliverables and be more agile, so that we can respond to the urgent needs of climate change.”*

### 4.3.1 Complexity and cost

The landscape of standards is complex, and interviewees felt that there are too many, that they overlap, and that it is often unclear which standards an organisation should be using. There was a suggestion to develop a framework to introduce consistency in standards across sectors, countries, and between high and low/middle-income countries.

Once actors have identified the appropriate standard, they can be difficult to understand and implement. ISO standards in particular were argued to be overly complicated:

*“I see people's faces when I mention sometimes ISO standards, and their face is not a smiley face. ‘We've been there, no, it's too complicated. We don't understand this. We're just going to go and either make up something new, or just do our own thing.’”*

Instead, standards should be providing clarity and simplicity in an already complex space:

*“[Businesses are] asked to do lots of different things by different stakeholders, by local government, by central government, by other stakeholders in their local area. I think what standards do is provide that simplicity and clarity”*

It is not only companies implementing standards who find them complex. There was a perception that customers are unaware of standards or do not understand what they are for. This is not helped by cryptic numerical naming systems. Consumers need to understand standards in order to be able to act on them, and public concerns over greenwashing demonstrate that the desire is there.

There was a related concern about the cost of standards. There is an expectation that services are free. In particular, SMEs may be reluctant to pay for standards, and making them free could act as an incentive to start their transition to Net Zero.

### 4.3.2 Raising awareness and uptake

There was a widespread view that national standards bodies can do more to promote and market their existing standards. Potential users need central guidance on what standards exist, how they can be used, and the benefits they bring.

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## Making the benefits of adopting standards clearer

Interviewees felt that more work could be done to make the benefits of adopting standards clearer to businesses:

*“How can I use this to attract new customers? How can I use this to make my business more competitive? How can I use this to make myself a better business?”*

In many cases, when companies become more efficient with their resources in order to save emissions, they save money as a result. For SMEs, the argument should be made that adhering to certain standards allows companies to access new and bigger markets. The need to stress the benefits of adopting standards is particularly acute in low- and middle-income countries, who are not primarily responsible for climate change:

*“It's got to have an economic plus for [low- and middle-income countries]. It can't just be, “We've made everything bad and now we're going to make it bad for you as well”. There's got to be an economic benefit for them [to adopting standards].”*

However, there was interest in more data and evaluation research on the difference that standards can make to organisations:

*“We need to understand their impact better and be able to communicate that more, so that we can do better packaging, so that we can do better continuous improvement.”*

## The relationship between standards and legislation

There was a sense that companies are more likely to adopt standards if they feel that future regulation is likely to build on those standards. Interviewees explained that there is a history of governments writing standards into legislation: standards are seen as *“apolitical”*, which helps gain buy-in from politicians. The existence of standards can build an environment in which regulation is less contested and easier to implement.

There were complex and contrasting views on the extent to which standards should be made mandatory. There was an argument that the voluntary nature of standards is an obstacle to widespread adoption and change. A history of insufficient climate action made some interviewees sceptical that standards can drive transition, unless companies are forced to adopt them. There was a perception that standards are a stepping-stone to regulation, and the claim was made that standards bodies need to advise their national government on which standards should be written into legislation.

Conversely, there was a view that the voluntary nature of standards is a strength. As discussed in the introduction, standards can create norms and network effects. In particular, there were arguments that voluntary standards may work better for SMEs, and for companies in low- and middle-income countries although these companies may lack the necessary expertise or finances to access and implement standards.

### 4.3.3 Ensuring standards work for all

There was a concern that any new Net Zero standards need to work for as many actors as possible, whilst remaining specific and useful. Rather than setting out the exact path that all organisations should follow, standards should set limits on the range of approaches that can be taken:



*“It's not like everyone needs to have a single, common road map... Rather... there have to be common benchmarks and guard rails around the range of road maps that will be used, so that they're serious ones that are credible and reasonable... [Standards should say] things like, 'If you're intending using offsets, here's the quality criteria they have to meet'.”*

One approach to ensuring that standards work for a wide range of actors is to ensure that these actors are involved in their development. This was widely felt to be particularly important for actors in low- and middle-income countries. Interviewees explained that actors in different parts of the world face different challenges and have different needs, and that low- and middle-income countries need to actively participate in the development of international standards. There was an argument that the local political, social, environmental, and geographic context are *particularly* important for companies operating in low- and middle-income countries. Standards are typically written in English and meanings can be lost when translated into other languages.

*“I think there's a huge amount to be said for listening to indigenous voices on what sustainability looks like, marginalised voices, the idea of a just transition”*

However, there was real concern that a focus on consensus could lead to low-quality standards. There was a view that certain businesses in certain sectors will lobby for the lowest possible standards. Lowest common denominator standards risk giving businesses an excuse for not taking more ambitious action, and could facilitate greenwashing:

*“How do you avoid locking in a bad standard? For me, that's the biggest issue. I'd rather have no standard than a bad standard”*

## 4.4 Key priorities for standards bodies in the immediate future

As discussed throughout this chapter, interviewees identified a range of areas of focus for national standards bodies in the immediate future. There were areas of agreement and disagreement here. In this section, we bring these recommendations together. In many cases, the immediate concern for standards bodies is whether new standards are needed, or whether there is a need to consolidate, endorse and promote existing standards.

- **Standards for Net Zero target setting.** There was broad consensus on the importance of standards for Net Zero target setting. However, whilst some interviewees felt that national standards bodies should develop these standards, others felt that existing standards – in particular, the SBTi standards – were sufficient. Standards bodies will need to decide whether to create new standards here, or to endorse existing standards.
- **Standards for measuring and reporting emissions.** Similarly, interviewees felt that standards are needed for measuring and reporting emissions, and for monitoring progress towards Net Zero targets. However, some felt that existing standards from ISO, or the GHG Protocols, were sufficient here. National Standards Bodies will need to decide whether to create new standards for measuring and reporting emissions, or to endorse existing standards.
- **Standards for offsetting.** As discussed in Section 3.2.2, there are significant problems with overreliance on offsets and with the validity of offsetting products.

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Again, National Standards Bodies will need to decide whether to create new standards for offsetting, or to endorse existing standards.

- **Promoting existing standards.** There is a clear need for better promotion of the existing set of standards. It needs to be easier for non-state actors to understand what standards are available and which are most appropriate. Standards need to be easier to understand and use. For some, standards also need to be more affordable.
- **Embedding Net Zero throughout the wider set of standards.** Standards bodies are in a position to embed transformative climate action in business activities by integrating Net Zero into the wider set of standards already in existence. In order to do this, National Standards Bodies needs to settle on a definition of Net Zero that works from an operational perspective. For some interviewees, leveraging the wider set of standards in this way should be the main priority for National Standards Bodies.
- **Engaging with diverse actors.** There is a clear need for standards bodies to engage with a diverse set of actors when developing new standards or deciding on standards to endorse and promote. In particular, there is a need to engage with actors from low- and middle-income countries, who are less responsible for the climate crisis and more likely to be negatively affected by global heating now and in the future.
- **Moving at pace.** Cutting across all these priorities is the need to move quickly and efficiently. Interviewees felt that standards bodies have historically moved too slowly, and risk being left behind.

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## 5 Recommendations for future research

The findings from this research suggest several directions for future exploration. Although the literature review was extensive and interviews were conducted with a broad range of stakeholders, it should be noted that the research recommended below may already exist. Any future research should first seek to identify whether there is already published literature on the topic.

- **Research with actors from low- and middle-income countries.** A clear learning from this research is the need for more work to understand the needs of non-state actors in low- and middle-income countries. Research should aim to understand how the circumstances and challenges faced by these actors differ, and how this translates into different needs. Actors in the low- and middle-income countries need to balance decarbonisation and development, and ideally these two goals would complement each other. Research is needed to understand how actors in the low- and middle-income countries understand Net Zero in this context, and how standards can help whilst allowing for the diversity of needs and circumstances they face.
- **Research with small and medium enterprises (SMEs).** Related to the concerns regarding actors in low- and middle-income countries, this research has identified that the circumstances and challenges faced by SMEs are often distinct. Their understanding of climate issues is often lower, as is their capacity and capability to engage fully with Net Zero initiatives. SMEs have greater financial constraints, which can make it more challenging for them to access and implement standards. Research is needed to understand in detail the different circumstances and needs of SMEs, how they understand Net Zero, and the role that standards can play.
- **Identifying the range of measures, metrics and calculators.** Any future standards for Net Zero target setting, measuring and reporting will likely need to promote a unified approach to measuring and calculating emissions. It is clear that there are currently a wide range of approaches being used and promoted. Research could be conducted to identify the range of approaches to measuring and calculating emissions, and to identify the key dimensions of variation. Further research could aim to understand why certain actors prefer certain approaches.
- **Understanding how to assess Scope 3 emissions.** Many actors clearly struggle to assess the extent and nature of their Scope 3 emissions. Future research could look at what approaches businesses are using to do this, where there are gaps in capability and capacity, and what support is needed.
- **Evaluating the difference that standards can make.** The research identified an issue with potential users of standards not understanding or appreciating the positive difference that the adoption of a standard can have, whether reputationally, financially, or in other ways. Future research could aim to evaluate and even quantify this difference, which would in turn enable standards bodies to better promote their standards.
- **Finding ways to promote standards.** The research identified issues with levels of awareness and understanding of standards. Future research could aim to understand: the levels of awareness and understanding generally and amongst particular groups; what different groups see as the potential benefits and costs of adopting standards; how best to explain to different groups what standards there are, how they work, and the benefits of adopting them.

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# Appendix A. Detailed methodology

This research comprised a literature review and in-depth online interviews with key stakeholders working in sustainability, standards and related fields. An iterative approach was taken, meaning that insights which emerged at earlier stages of the research were used to inform decisions for later stages. This was particularly important for this research, which involved mapping a very large, complex and often technical topic area. Here, the iterative approach involved prioritising both key stakeholders and key papers identified by BSI at the first stage of the research. This approach was informed by support from BSI's Strategic Advisory Board. Emerging concepts, terms and categories from these initial findings gave shape to our analytical framework and informed our selection of remaining evidence.

## Literature review

In this section we describe the methodology used for the literature review, including the search strategy, screening process and approach to data extraction and synthesis.

### Search strategy

The literature review sought to assess existing evidence on the two key research areas:

1. How do non-state actors define Net Zero and what are the consequences of definitional variation?
2. What are the key barriers to achieving Net Zero for non-state actors?

Both academic literature (published in academic journals) and non-academic literature (known as 'grey literature', typically freely accessible on websites) were included. We reviewed a wide range of evidence types, from corporate Net Zero commitments, to policy papers and contemporary academic research across disciplines. Key pieces of both academic and grey literature were provided by BSI and identified by priority stakeholders in early interviews. These informed our search strategy by exemplifying the kinds of evidence to search for and providing a starting point for citation tracking, a process through which further pieces of evidence were identified in references. Grey literature was also sourced by searching key websites, some of which were provided by BSI and others which were identified as relevant during the iterative process.

Academic literature was sourced by running a series of complex search strings across academic databases (Web of Science, CAB Abstracts, Greenfile, and Int Political Science Abstracts). The search string design was informed by an initial manual web search to build knowledge of the evidence base. To address the two research questions, two separate searches were conducted, one relating to definitions and one relating to barriers. These were tightly defined to ensure that a manageable volume of evidence was returned.

Inclusion and exclusion criteria set out in the search strings are explained in turn below.

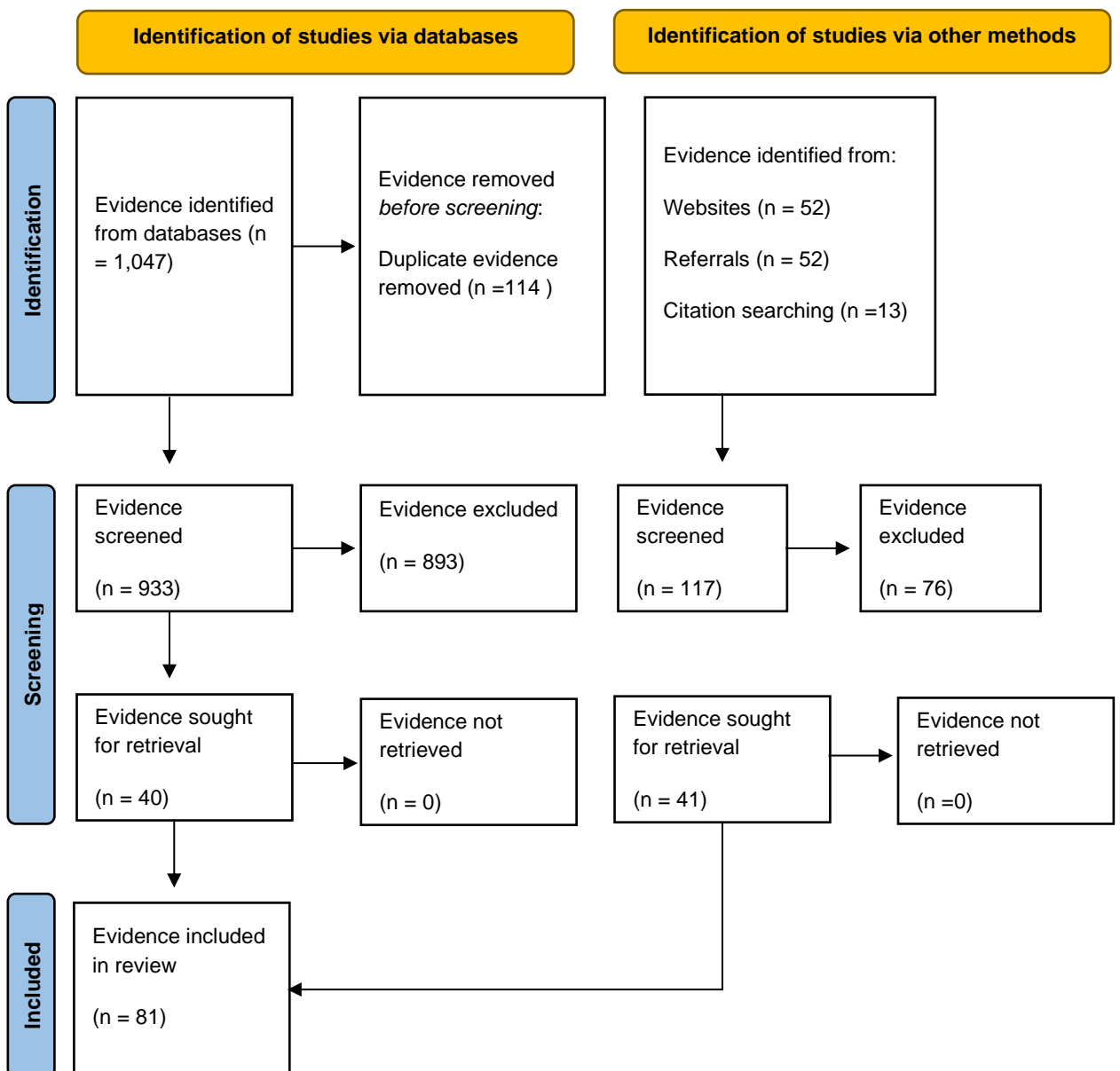
- Only literature from 2018 onwards was included based on the assumption that the literature of most relevance to the review will be that which directly engages with issues arising from the Paris Climate Agreement.
- Only literature discussing non-state actors (businesses as well as non-profit organisations, local governments and regions) was included. Any literature discussing Net Zero at the national or international level was excluded, unless there was specific reference to how this interacted with barriers at the non-state level.

- Given that the focus is on high-level themes, we excluded highly technical literature that provides detailed evaluations and assessments of particular metrics or calculators, unless that literature also contained a high-level non-technical summary.
- The search sought primarily to focus on evidence about Net Zero commitments, however we also included relevant literature which discussed adjacent concepts and precursors, such as carbon or climate neutral.

### Additional evidence

In addition to this automated searching, wherever key literature was identified, we conducted forward and backward citation tracking. This process was supplemented by evidence recommended by stakeholders during the qualitative interviews.

**Figure 3: Evidence review process**



### Screening

As well as being used to define the search strings, the above criteria were also used to determine inclusion and exclusion decisions at the screening stage. 495 academic

papers were found for RQ1 and 438 for RQ2. A process of title and abstract screening resulted in a final total of 63 academic papers that met the inclusion criteria. A final set of 81 papers – both academic and grey literature – were prioritised for data extraction and synthesis.

### Data extraction and synthesis

Data relevant to the research questions were systematically extracted from the selected studies and compiled along with basic descriptions of each piece of evidence. Synthesis was completed using NatCen’s ‘Framework Approach,’ where columns represent key themes and sub-themes and rows represent pieces of evidence within a matrix. These themes were developed with BSI on the basis of the research questions and emerging findings from early interviews and reviewed literature. The Framework Approach has the advantage of linking summarised evidence to the relevant research questions as well as to the source document, which allows the content for each question to be easily viewed and interpreted.

### Stakeholder interviews

#### Sampling and recruitment

Key stakeholders working in sustainability, standards and related fields were identified by BSI and a sample was given to NatCen. This sample included people working internationally across industry, academia, standards bodies, government and NGOs who were already engaged with BSI or other ‘Our 2050 World’ partners. Stakeholders were contacted by email and invited to take part in interviews. Twenty-one agreed to take part. Once stakeholders gave their consent to be contacted by NatCen, our researchers pre-briefed potential respondents with an outline of the questions so that they could prepare in advance and enable more focused interviewing.

#### Interviews

In-depth interviews were then conducted with consenting stakeholders from a range of countries and organisations.

**Table 1: Sample breakdown**

Continent and organisation type	Number of interviews
<b>Africa</b>	<b>2</b>
Academic	1
Climate organisation	1
<b>Europe</b>	<b>10</b>
Academic	2
Climate organisation	1
Consultant	2
Corporate	1
Government	1
Industry association	2
Standards	1
<b>Global</b>	<b>5</b>
Consumer representative	1
Government	1
Standards	3
<b>North America</b>	<b>2</b>
Government	1
Standards	1

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<b>South America</b>	<b>2</b>
Standards	2
<b>Total</b>	<b>21</b>

These qualitative interviews covered:

- current debates around defining Net Zero;
- high-level barriers in different industries and contexts; and,
- practical examples of the challenges and barriers for specific non-state actors.

Topic guides were deliberately open-ended and designed to allow stakeholders to discuss their particular area of expertise in detail. Interviewers were able to explore in depth the complex topics and sought examples to illustrate these. Fieldwork took place between late September and November 2021. Interviews generally lasted 45 minutes, were conducted over video call or over the phone where necessary and were recorded with permission.

### **Data management and analysis**

Once interviews were transcribed, data was managed using NatCen's Framework Approach, as described above. Each row represents one interview/stakeholder and each column represents a key theme or sub-theme. Researchers summarised key themes discussed in the interview and picked out quotations where they illustrate a point well. Data is then analysed to build a picture of the range of views, identify points of similarity and difference, and establish high-level themes.

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# Appendix B. Topic guide

## Introduction

- Introduction to researcher. Thank you for agreeing to take part
- Introduction to NatCen – independent research organisation, commissioned by BSI to carry out this study
- Explanation of research:
  - Carrying out 25 in-depth interviews with a range of stakeholders, including government, national standard bodies, charities, businesses, media and consumer representatives around the world.
  - Interviews will explore issues around Net Zero and carbon emissions, the current definitions and measurements as well as the barriers and challenges to achieving alignment on these.
  - The findings will be used to help BSI build the Standards Pace to Net Zero<sup>14</sup> initiative and place standards at the heart of the transition to Net Zero.
- About the discussion
  - Participation is voluntary - there are no right or wrong answers, you can choose not to discuss any issue
  - What you say is confidential and your participation is anonymous.
  - We will write a report of our findings but no names or personal details will be included
  - You will not be identifiable to anyone else in the report
- We will be recording the interview so we have an accurate record of what is said
  - Recorder is encrypted and files stored securely on NatCen's computer system in line with General Data Protection Regulation (GDPR) 2018
  - Only the research team will have access to the recordings
  - Data will be deleted at the end of the project
- The interview will last 45 minutes/Questions/Ask for permission to start recording

**NB.** For some interviewees, it will be appropriate to ask about how their organisation is progressing towards net zero (i.e. businesses, charities, regions/cities) but for others it is more about how they are helping to drive others towards net zero (i.e. standards bodies, international organisations, etc.). Will need to scope this out at the start and adjust question wording accordingly.

## START RECORDING

## Background

- Role title and length of time in role
- Personal remit and responsibilities
  - Generally
  - In relation to sustainability, carbon and Net Zero, if applicable

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<sup>14</sup> This initiative was later renamed 'Our World 2050'.



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- The nature of the organisation
    - Primary activities / business
    - Size and geographical scope
    - It's role in relation to sustainability and Net Zero (if applicable)

## Understanding of Net Zero

- **Personal understanding** of the term. Probe on:
  - Balance between reduction and removal
  - The role of offsetting in achieving Net Zero
  - The speed with which Net Zero should aim to be achieved
  - Dates for benchmarks and targets
- Official definition in use within **organisation**
  - Are **other definitions** used within the organisation?
  - How these compare with personal understanding
- Other definitions used by **other organisations** or individuals they engage with
  - What are these?
  - Reasons for multiple definitions
  - If variation in definitions, views on this.
    - If not problematic, why not?
    - If problematic? Why? What problems does it cause? How do they work around it?
- The **challenges** for them reaching a **consensus** understanding
  - Within the organisation
  - With partners
  - What would help them to achieve a consensus?

## Current actions towards Net Zero

- The **benefits** for their organisation of achieving Net Zero
- The **specific actions** are they taking
  - Explore each action:
    - Nature of action
    - Reasons for taking action
    - Effectiveness of action
    - Any plans to continue/develop/progress this further
- Do they feel like there is **coordinated action and collaboration**
  - Across their organisation
  - With their partners, on Net Zero?
  - If not, what are the barriers to better coordination?

- 
- **What else** do they think their organisation (or organisations within their sphere of influence) should be doing to achieve Net Zero?

## Measuring and reporting

- Whether they have **targets** in place
  - What form do these take?
  - If not, why not? What is preventing them? What would help them to implement targets?
- How **change and progress** is measured
  - The **metrics** used
    - Just one set of metrics, or multiple? Is this problematic? Why?
    - Why did they choose these metrics? Are there others they don't use? Why?
  - Do they **collect** all the **data** they need?
    - If not, why not? What is preventing them collecting the data they need? What would help to collect all the data they need?
  - How do they **calculate** their emissions?
    - Reasons for using this particular calculator/approach? Is it commonly used? Is it easy or difficult to use?
    - What are the strengths and weaknesses of this approach? What would help overcome the weaknesses?

## Current barriers in drive to Net Zero

- Anything that needs to be in place **within their organisation** to make faster progress towards Net Zero
  - Describe what factors need to be in place and why
  - Why are these factors not in place?
  - What are the barriers to implementing them?
- **Factors outside of your organisation** that are preventing faster progress towards Net Zero
  - What would have to happen for these barriers to be removed?
- Probe on the '**knots**' if they don't come up naturally. For each: what would enable them to overcome it? What would be the role of government/regulation, business, consumers/public in this?
  - Inconsistent understanding of Net Zero
  - Global/national/sectoral/organisation leadership
  - Reliance on offsetting
  - Difficulties with measuring and reporting consistently
  - Insufficient incentives to achieve Net Zero
  - The role of technology and innovation
  - Difficulties driving consumer, investor, employee behaviour change
  - Scope 3 emissions

### What is Scope 3? [INTERVIEWER – READ OUT IF ASKED]

Greenhouse gas emissions are categorised into three groups or ‘Scopes’ by the Greenhouse Gas (GHG) Protocol. Scope 1 covers direct emissions from owned or controlled sources. i.e. fuel use, company vehicles. Scope 2 covers indirect emissions from the generation of electricity, heating or cooling. Scope 3 includes all the other indirect emissions that occur in a company’s value chain. This can include the goods and services the company purchases, business travel, employee commuting, waste disposal, investments, etc.

## The role of international standards

### What are standards? [INTERVIEWER – READ OUT IF ASKED]

A standard is an agreed way of doing something, such as making a product, managing a process, delivering a service, supplying materials, or simply using a term. Standards are designed by subject matter experts and aim to define the best way of doing something. Standards are voluntary – organisations are not forced to follow standards, they choose to do so. Some standards set out absolute requirements that must be met if a user wants to make a claim about their compliance with the standard.

The British Standards Institution (BSI) is the national standards body for the UK – they maintain the catalogue of standards and develop new ones. BSI have several standards related to sustainability, including standards for energy and environmental management systems, amongst many others.

- **Awareness of international standards** in relation to sustainability, energy use, and emissions
- Perceptions of **the role of standards currently** in achieving Net Zero
- Views on **gaps in standards** delivering Net Zero
  - Standards for measuring, monitoring and reporting progress to Net Zero
  - Standards more generally
- **Perceived challenges** in centring standards
  - Perceived challenges in defining a set of standards around **measuring, monitoring and reporting** progress towards Net Zero
    - Do these challenges differ or align across organisations, sectors, or countries?
    - If there were standards for measuring organisational progress towards Net Zero, would you adopt them? Why / why not? What would make you more / less likely?
  - Perceived challenges in leveraging **standards more generally** in the drive to Net Zero
- Views on **voluntary** initiatives, such as standards or guidance, **as opposed to mandatory** initiatives, such as government legislation
  - Are there some areas or issues where voluntary measures are **more likely to be effective** in delivering Net Zero?
  - Areas or issues where they are **less likely to be effective**?
- **What role could BSI play** in supporting the drive to Net Zero?

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## Conclusion

- **Overall views** on Net Zero:
  - Is Net Zero **achievable** by 2050? Why/why not? What other targets are needed?
  - What about in terms of **halving carbon emissions** by 2030? Do you think that is achievable? Why/why not? Are other targets needed?
- Anything else they would like to add?
- Explain that we are **looking for literature** that will help us to:
  - Understand the range of definitions of Net Zero in use, and the barriers to achieving a consensus understanding
  - Identify the key barriers to achieving Net Zero

Can they provide any literature recommendations?

- Thank and end.

**END RECORDING**

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