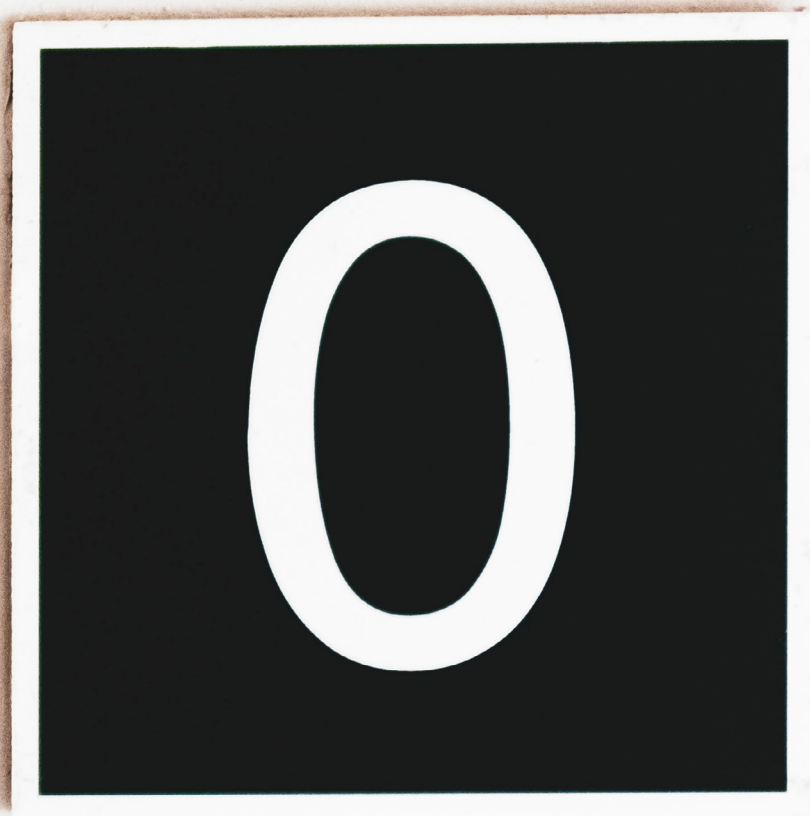


Net Zero explained

October 2021



Introduction

Although the target of net zero is becoming a legal requirement in many countries, understanding and public awareness remains low or at best mixed. An IEMA-commissioned YouGov survey in October 2021 (one month ahead of COP26) explained the concept and asked about public awareness. Only 30% of those polled stated they were both aware of the requirement and understood its meaning in practice. Around half were not aware of the requirement. Some 64% did not understand the meaning in practice. In a separate 2021 survey of professionals, IEMA members were asked 'Are you confident that the leadership in your business has recognised the urgency of the challenge to achieve net zero?' Notably, just under half indicated they were confident.

Despite gaps in practical awareness, the concept of an organisation seeking to become net zero has become synonymous with climate leadership. At the same time, net zero has received criticism as a concept that (if wrongly approached) can allow organisations to avoid transition and continue "business as usual".

This short briefing will help professionals to understand this evolving landscape. Tracing from science and international policy origins through to the term's growing use by differing actors, explanations and links are provided regarding

1) Origins in science and global policy

A key reference in understanding net zero, is the 2015 Paris Agreement, deliberately framing a goal for planetary climate action. This negotiated text, along with reports from the IPCC (Intergovernmental Panel on Climate Change), has informed developing concepts such as science-based approach, climate neutrality and net zero. Article 4 of the Paris Agreement states:

In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.¹

Noting some key terms (underlined) this wording specifically relates to the planetary scale and includes important acknowledgement of urgency (rapid rebalancing) and also the basis of equity and sustainable development (informing the concept of certain actors pursuing a larger or 'fair share' of emissions cuts required). IPCC reports have continued to develop the language with Special Report 15 (2019), including this explanation:

To stabilize global temperature at any level, 'net' CO₂ emissions would need to be reduced to zero. This means the amount of CO₂ entering the atmosphere must equal the amount that is removed. Achieving a balance between CO₂ 'sources' and 'sinks' is often referred to as 'net zero' emissions or 'carbon neutrality'.²

The Paris Agreement and subsequent scientific reports, including IPCC reports, all point to clear conclusions:

- We have already around 1.1°C of global warming above pre-industrial levels.
- Global warming is likely to reach 1.5°C between 2030 and 2035 at current trends.
- Global 'rebalancing' must be pursued at pace and requires interim emission cuts of around 50% by 2030, for any prospect of staying close to 1.5°C of warming.
- Solutions and actions cannot be separated from concepts of equity and sustainable development (and should be intrinsic realities in pursuing transitions).

Concepts such as science-based approaches and net zero have been developed, from the scientific understanding at the planetary scale and applied by 'actors' to the transition approaches of specific entities. The rationale is to enable contributions to emissions cuts to proceed in line with the pace required globally.

¹ Adoption of the Paris Agreement, Paris Agreement text (unfccc.int)

² Special Report 15: Global Warming of 1.5°C, Chapter 2 ([ipcc.ch](https://www.ipcc.ch))

The key risk occurs when approaches focus on 'balancing' emissions without sufficient regard to transition (e.g. via an economic trade in carbon credits without accompanying reductions in line with science).

2) A focus for commitment by states

Each signatory (Party) to the Paris Agreement has a duty to produce a Nationally Determined Contribution (NDC), indicating how state-level transformations will contribute to climate action. Examples can be seen in the UNFCCC (United Nations Framework Convention on Climate Change) NDC Synthesis Report³. Although over 130 signatories have submitted a new or updated NDC, their planned combined contributions by 2030 still fall far short of the ambition needed to achieve the 1.5°C goal.

In making commitments, over 100 countries⁴ have also set or are considering a target of reducing emissions to net zero by mid-century and at least 13 have set this in legislation, including the UK. In October 2021, the UK government published its Net Zero Strategy⁵ ahead of COP26 (this also forms the UK's Long-Term Low Greenhouse Gas Emission Development Strategy or LT-LEDS Paris Agreement submission). Longer-term net zero commitments, however, cannot be relied upon as being sufficiently science based (a critical consideration is the pace of transition).

3) A focus for action by 'non-state actors'

Although net zero initially relates to rapid rebalancing at the planetary scale, many businesses, local governments and communities (non-state actors) have also set targets to achieve net zero themselves. Within IEMA's own membership, surveys have indicated a growth in the use of corporate declarations and targets, and, as indicated below, growth since 2019 is significant.

Growth in climate action declarations and targets

Responses from survey (381 in 2019/509 in 2021)	2019%	2021%	Change in 2 years (percentage points)
Declared a climate emergency	18.0	30.5	+12.5
Used carbon or carbon neutrality as a target	43.8	67.9	+24.1
Set a target date to be net zero	28.7	59.6	+30.9
Signed up to a science-based target	23.4	42.3	+18.9

Mobilising so-called 'non-state actors' is the key focus behind the UN-backed Race to Zero.⁶ At the time of writing, the campaign includes a coalition of 21 net-zero initiatives (IEMA contributed to one of the approved campaigns, Pledge to Net Zero⁷). The Race to Zero has received huge take-up, providing an opportunity for driving consistency and raising ambition. Participants commit to reducing emissions across all scopes swiftly and fairly, in line with the Paris Agreement, with transparent action plans and near-term targets.

Some examples of notable specific science-based examples include:

- SBTi (the Science Based Targets Initiative) has worked to translate climate science into a scheme framework (net-zero standard) for companies to set ambitious targets, and to allow for independent assessment of these based on a set of criteria and validation protocols. The initiative is gaining wide interest.⁸
- An approach from Carbone 4 is their Net Zero Initiative reference framework. Stating that the only scientifically valid definition of net zero so far applies only to the planet, and possibly to state actors, their initiative has sought since its creation to think of the company not as an object that can be 'neutral' in itself, but as one that should contribute at the right level to the objective of global and national carbon neutrality.⁹

³ UNFCCC, NDC Synthesis Report, 17 September 2021 (unfccc.int)

⁴ See eciu.net

⁵ BEIS, Net Zero Strategy, 19 October 2021 (gov.uk)

⁶ UNFCCC, Join the Race – Race to Zero (unfccc.int)

⁷ Pledge to Net Zero (pledgetonetzero.org)

⁸ Science Based Targets, Net-Zero (sciencebasedtargets.org)

⁹ Carbone 4, [Net Zero Initiative – 2020–2021 Report](#)

- Another science-informed approach is available from the Tyndall Centre. Carbon Budget Reports can be developed that present recommended climate change commitments for UK local authority areas, aligned with the commitments in the Paris Agreement and defined by science-based carbon budget setting. The carbon budgets translate the 'well below 2°C and pursuing 1.5°C' global temperature target and equity principles in the Paris Agreement to subnational areas within the UK.¹⁰

4) Some definitions and terms

The developing language and terminology around net zero requires research, care and, importantly, a transparent approach. This is especially important when consideration is given to the wide confusion that continues. IEMA's YouGov poll of October 2021 asked the public about their understanding of the terms 'carbon neutral' and 'net zero' – with the following outcomes:

- 30% indicated they do not understand either of the two concepts
- 14% indicated they only understand one of the concepts
- 29% indicated they understand both and believe that these two concepts are the same thing
- 27% indicated that they understand both concepts and believe that the two concepts are different.

4.1) Net zero

Referring to a planetary scale, net zero and climate neutrality can be defined as follows: 'When anthropogenic emissions of greenhouse gases (GHGs) to the atmosphere are balanced by anthropogenic removals over a specified period'. A growing view suggests that individual actors may reach their own state of net zero when they have reduced emissions by following science-based pathways,¹¹ with any remaining GHG emissions attributable to that actor being fully neutralised by like-for-like removals (e.g. permanent removals for fossil carbon emissions) exclusively claimed by that actor, either within the value chain or through purchase of valid offset credits.¹²

4.2) Carbon neutral

Carbon neutrality for actors/entities has been used as both a future target and as a point-in-time status that can be 'achieved'. Emissions here are addressed by a combination of direct reductions, along with compensatory measures on residual emissions, such as purchasing carbon offset credits that meet specified criteria. Many declarations of neutrality will make a more extensive use of compensation measures, notably carbon offset credits. Standards have been developed for claims of carbon neutrality, including BSI PAS2060 (2014) which does require reductions (although PAS2060 does not oblige these to be at a science-based equivalent pace).

There are differing approaches in defining carbon neutrality, with some limiting to a strict use of just CO₂ emissions and others (e.g. PAS2060) seeking to include all significant GHG emissions and convert these to CO₂ equivalent.

4.3) Evolving use considerations

The urgency of the Climate Emergency, along with some poor practice examples, has informed stakeholder understanding and heightened concerns of 'greenwashing'. Some approaches and actors are now viewing carbon neutrality as a point-in-time status that could be achieved while the entity (e.g. City, organisation, business, etc) is transitioning to become net zero. In this context, the end target of net zero may be viewed as 'science-based', whereas the use of carbon neutrality is not necessarily equivalent (with some seeing it as an 'economy-based' concept). This could be a point of transparent distinction between terms, with carbon neutrality potentially contributing to economic transitions, as long as this does include the entity itself as being demonstrably in transition (e.g. doing so in line with scientific scenarios).

Both approaches could be used within a transition journey, with carbon neutrality, for example, contributing funding towards transition projects (e.g. in developing nations). If widely scoped and credibly used, carbon neutrality could create an internal carbon price within organisations, in turn supporting their financial business case for transition. A critical consideration here is the level of commitment and approach on transitioning the entity itself (essential if 'greenwashing' allegations are to be minimised).

¹⁰ Tyndall Centre for Climate Change Research, The University of Manchester, The Tyndall Carbon Budget Tool (manchester.ac.uk)

¹¹ For science-based pathways, see sources such as SBTi and the Tyndall Centre for Climate Change Research.

¹² Description from Race to Zero Lexicon, 2021 (unfccc.int)

4.4) Other accepted and developing terms

A range of terms are already well established. These include Scope 1 – direct greenhouse gas (GHG) emissions from sources that are controlled or owned by an organisation (e.g. fuel combustion in boilers/vehicles) – and Scope 2 – indirect GHG emissions associated with the purchase of electricity, steam, heat or cooling. Scope 3 GHG emissions are also indirect and result from activities/assets not owned or controlled by the organisation, but that the organisation indirectly impacts across its value chain.

Many terms, however, are far more developmental, for example ‘carbon insetting’. Initiatives like the Race to Zero’s lexicon¹³ are helpful in describing their use within the developing net zero context.

While differing methods and standards emerge, it is clearly important that organisations do ‘make a start’ and do not wait for standards. In this evolving phase, safeguards include the concept of a ‘radical transparency’, where actors clearly communicate to stakeholders the approaches they are following and (for example) disclose key assumptions.

5) Reputational risks and ‘greenwash’

Given confusions that can exist, it is easy to see how actors can develop approaches to net zero that can be criticised. Some examples and areas of concern include:

- the risk that longer-term targets are set that are too distant (i.e. lack of sufficient interim targets)
- setting a narrow scope for the organisation’s GHG accounting (not extending sufficiently in scope)
- approaches that use carbon offsetting instead of seeking rapid emission cuts within the organisation.

The Race to Zero campaign has developed criteria that will help address these concerns. Specific schemes within the Race to Zero campaign help organisations to establish credible approaches. IEMA has also drafted supporting guidance and principles through engagement with professionals in practice.¹⁴

Similar risks and communication challenges exist with the related concept of carbon neutrality (sometimes framed as climate neutrality). As a term, carbon neutrality has been in use far longer than net zero and is often more closely associated with carbon offsetting. Standards have developed to give greater confidence in the more transparent use of ‘neutrality’, including BSI PAS2060 (2014). In addition, ISO is now developing an international standard on carbon neutrality, ISO 14068.

Advertising guidelines and standards are also very relevant when considering claims such as carbon neutral. In the UK, the ASA¹⁵ has considered complaints and published rulings. Internationally, the ICC (International Chamber of Commerce) has published a framework as guidance.¹⁶

6) Indirect emissions

Within net zero and carbon neutrality approaches there are important scope considerations regarding GHG accounting of indirect emissions (Scope 2 and Scope 3). There is also a need for understanding how the contexts can differ between target-based approaches and point-in-time declarations.



¹³ Race to Zero Lexicon, 2021 (unfccc.int)

¹⁴ IEMA, [Pathways to Net-Zero, November 2020](#).

¹⁵ Advertising Standards Authority (ASA). In 2021 the ASA and CAP are undertaking a Climate Change and the Environment project, taking stock of the rules regulating environmental claims.

¹⁶ ICC, ICC Framework for Responsible Environmental Marketing Communications, 2019 ([iccwbo.org](https://www.iccwbo.org))



6.1) Scope 2 emissions

There are two methods recognised internationally for GHG accounting of Scope 2 indirect emissions including purchased and consumed electricity. A transparency-based approach has been advocated, for example within GHG Protocol, where dual accounting is adopted and calculations are disclosed using both approaches:

- I. The 'location-based' method is to quantify GHG emissions based on average energy generation emission factors for defined geographic locations, including local, subnational or national boundaries (sometimes reference is made to use of a grid-average emissions factor).
- II. The 'market-based' method is attributes based. It will quantify the Scope 2 GHG emissions of a reporter based on GHG emissions emitted by the generators from which the reporter contractually purchases electricity, bundled with contractual instruments, or contractual instruments on their own. Under the market-based method of Scope 2, accounting the allocation represents contractual information and claims flow, which may be different from underlying energy flows in the grid.

Setting targets for science-based reductions over time is an area of practice where dual accounting is not always being required and the market-based method has been used on its own.

Key considerations include the nature of the related claim or target in question. For point-in-time claims such as an 'achieved' status of becoming carbon neutral (i.e. current status), a conservativeness principle could be used to suggest that the Scope 2 emissions are calculated to reflect the reality of the grid distribution (i.e. to be location-based). If a market-based factor is to be solely used, this could open up some extra reputational risk considerations, especially if the purchased emission certificates are perceived as lower quality (e.g. certain unbundled certificates). Context is everything in these situations and transparency in approach is essential. Scope 2 practice regarding the related use and purchase of so called 'green electricity' tariffs continues to be variable, as illustrated in the survey responses below from IEMA members. The variability in approach may be a response to the use across differing contexts (e.g. to support a differing corporate claim). However, it also reflects both a level of ongoing confusion and some variability between guidance and standards.

Variation in carbon (GHG) accounting - Scope 2

Response options	2010%	2019%	2021%	Change since 2010 (percentage points)
We do not purchase green-tariff electricity	44.9	31.8	28.5	-16.4
Our green-tariff electricity use is always stated as zero carbon within our GHG footprint reports	4.1	10.0	8.4	+4.3
Our green-tariff electricity use is reported as 'grid average' emissions within our gross (total) footprint but as zero carbon within our net footprint	4.2	5.8	7.6	+3.4
Our green-tariff electricity use is reported as 'grid average' but we do also disclose a market-based factor (i.e. we dual report)	1.7	4.5	8.9	+7.2
We purchase green-tariff electricity but do not report on it any differently	15.3	15.0	11.6	-3.7
Unknown	28.3	30.8	35.9	+7.6
Do not understand the question	1.7	2.1	1.9	+0.2

6.2) Scope 3 emissions

It is important to ensure a credible approach and wide scope within an organisation's carbon accounting. Complexities exist within Scope 3 GHG emissions and a 'comply or explain' approach has been justified in certain cases, where Scope 3 considerations are especially complex, standards and approaches are undeveloped, or where there are ownership complexities (e.g. Joint Ventures). Organisations can rarely quantify a full Scope 3 inventory at the outset and may, for example, take two to three years to develop their systems and accounting.

Approaches to Scope 3 are developing, as are standards. The Developing Science Based Targets Corporate Standard will influence many Scope 3 approaches within net zero.

IEMA member surveys are reflecting a picture of increased ambition and coverage. Interestingly, the increase over a 10-year period for those addressing all significant (or material) Scope 3 emissions is only +7%. This is evidence of the complexity and challenge that can exist within approaches to address Scope 3. New standards and guidance have a key role, especially if developed to align with transitions to achieve net zero.

Developments in carbon (GHG) accounting – Scope 3

How extensive is your organisation's reporting with regard to scope 3?	2010 %	2019 %	2021 %	Change since 2010
We do not measure Scope 3 emissions	32.3	29.1	23.9	- 8.4
Our reporting and footprinting only covers some very limited Scope 3 emissions (e.g. 1 or 2 sources like business travel/employee travel to work)	29.7	27.7	21.3	- 8.4
Our reporting and footprinting addresses a number of Scope 3 emissions (e.g. all travel and some key supply-chain emissions) but we are aware there are other significant Scope 3 emissions that are not included	16.4	16.0	17.2	+ 0.8
Our reporting and footprinting addresses all significant (or material) Scope 3 emissions that we have identified for our organisation	6.0	7.1	13.0	+ 7
Our reporting and footprinting addresses all of our organisation's Scope 3 emissions	2.4	4.2	4.9	+ 2.5
Unknown	10.0	9.4	18.8	+ 8.8
Do not understand the question	3.1	6.5	3.0	- 0.1



7) Offsets and addressing 'residual' emissions to reach net zero

As part of their climate strategies, companies, organisations, cities, regions and other actors have used voluntary carbon offsetting, paying to receive credit for a certified unit of emission reduction or removal carried out by another actor (and attributing the credit to compensate their own residual emissions). Voluntary standards for offsets have been developed and guidance is available from the sector¹⁷ and also from independent bodies such as Stockholm Environment Institute (SEI).¹⁸

The Oxford Principles for Net Zero Aligned Carbon Offsetting¹⁹ present an approach where offsetting will itself, over time, transition to help actors contribute to and achieve net zero. In this approach, 'traditional' offsets continue to offer contributions, such as helping other actors to transition, but at the same time market signals are made that will, over time, help transform the practice of carbon offsetting.

A notable development in communication around carbon offsetting exists in how language and terms are changing in certain settings. One example is that the achievement of net zero in the future (for example, after driving down emissions via a science-based reduction) may now require future 'offsets' or similar actions (e.g. insets) that 'neutralise' rather than 'compensate' the residual emissions. This would be the case for a future status when net zero is 'achieved' by the entity. Another language development exists around the use of 'offsets' and other measures as making a 'contribution', as is seen within developments on UNFCCC web pages.²⁰

In the context of contributing, a wider consideration is the situation with historic emissions, which are out of scope for many standards and reporting schemes, but are relevant and do have a 'science-based' implication on the climate. Certain organisations are starting to address these historic or legacy emissions.²¹ In the UK, an important evidence review has been completed by the Environment Agency to help evaluate the options for carbon offsetting within the Agency's strategic net-zero approach.²² A further important development internationally is the work of the Taskforce on Scaling the Voluntary Carbon Market (TSVCM).

8) Net zero actions – some examples from practice

IEMA's GHG Management Hierarchy states broad approaches for eliminating, reducing and substituting emissions, along with options for compensating residual and historic emissions. IEMA has surveyed its members to understand how practice is evolving (headlines and data below):

- (i) Improvements to buildings and premises and active energy management approaches both continue to be dominant (the leading) actions and approaches. This is encouraging and reflects that serious net-zero transitions require both step changes in business structures/facilities as well as ongoing management of energy.
- (ii) Engagement and team approaches have declined, possibly reflecting a combination of technical solutions such as choice editing (starting to replace behaviour-based emissions), along with impacts from changes to working practices in the pandemic that have reduced office-based working.
- (iii) The importance of organisational approaches such as management systems and sustainable procurement has increased. This reflects the growing strategic approach that organisations adopting net zero require systems that will address longer-term targets and also which can work to engage suppliers in addressing complexity and Scope 3 emissions.
- (iv) Substitution measures such as fuel-switching and on-site renewables have increased over time. Similarly, there is a significant increase in actions directed at product and service carbon emissions.
- (v) Finally, there is a notable increase in 'compensatory' measures such as green-energy tariffs and use of carbon offsets and reflecting the ambition of organisations to make additional contributions while they are transitioning.

¹⁷ ICROA (International Carbon Reduction and Offset Alliance) (icroa.org).

¹⁸ SEI (Stockholm Environment Institute), Securing Climate Benefit: A Guide to Using Carbon Offsets, November 2019 (sei.org).

¹⁹ University of Oxford, The Oxford Principles for Net Zero Aligned Carbon Offsetting, September 2020 (smithschool.ox.ac.uk).

²⁰ UNFCCC, Contribute (unfccc.int).

²¹ The Official Microsoft Blog, Microsoft will be Carbon Negative by 2030, January 2020 (blogs.microsoft.com).

²² Environment Agency, Carbon Offsetting: Reviewing the Evidence, May 2021 (blog.gov.uk).

Developments and change in carbon (GHG) management approaches –

Approaches used	2010 %	2019 %	2021 %	Change since 2010 (percentage points)
Active energy management and reduction on site	71.2	66.8	72.2	+ 1.0
Improvements to your buildings and premises	69.4	65.0	68.0	- 1.4
Wide staff engagement and awareness campaigns	63.2	61.2	51.5	- 11.7
Travel plans	60.0	50.8	51.0	- 9.0
Investing in new plant, equipment and processes	56.3	57.0	51.5	- 4.8
Team approaches (e.g. with champions)	50.4	41.2	44.7	- 5.7
An overall organisation-scale management system – either specific (e.g. on energy/GHG) or existing (e.g. an EMS)	47.5	43.3	54.0	+ 6.5
Sustainable procurement (efficiencies/low carbon through supply chains)	46.2	48.7	54.5	+ 8.3
A strategic approach to reducing the GHG footprint of products/services provided by the organisation	32.5	28.9	46.4	+ 13.9
Substitution (e.g. fuel switching to lower carbon sources)	30.6	35.6	47.0	+ 16.4
Developing on-site renewable energy generation	30.4	34.2	37.6	+ 7.2
Purchasing green-tariff energy	27.4	42.0	50.4	+ 23.0
Land management on our sites (e.g. woodland creation)	13.1	19.3	23.5	+ 10.4
Purchasing carbon offsets	11.3	16.3	22.4	+ 11.1
Other	4.0	4.0	7.9	+ 3.9

IEMA has also provided a practice-informed collation of tools – [see the resource 'toolbox'](#) (updated 2021).



Conclusions

While standards and schemes develop, and indeed after they become available, it is important for professionals to maintain a broad understanding across these ongoing developments.

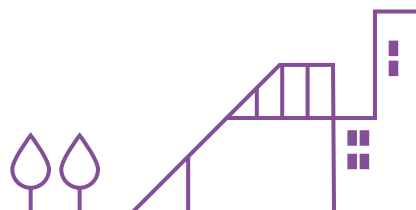
Key considerations and safeguards include being aligned to credible science-based scenarios and using interim (near-term targets); following a hierarchy approach, with a focus on eliminating, reducing and substituting emissions; and ensuring credibility in scope and being especially transparent with stakeholders and in communications. Collaboration and innovation are important, with systemic thinking and an ethical lens (e.g. considering influence and responsibilities across value chains and potentially past emissions).

As Carbone 4 suggests, the concept of an entity becoming net zero can be questioned on a pure science basis. At the same time, the framing on net zero is hugely significant in mobilising commitments, especially during the lead-in towards COP26. With initiatives underway from SBTi, ISO, UNFCCC and Race to Zero, there is the start of an emerging consensus.

Professionals and IEMA should continue to engage in this fast-developing field and seek to understand and contribute to the international effort and developments. IEMA has pioneered frameworks and approaches in support of net zero and contributed to key consultations within the UK and internationally. IEMA will continue to engage with key partners, supporting critical developments in international standards and guidance, working with IEMA members to bring forward their unique and practice-focused experience and insights.

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IEMA is the professional body for everyone working in environment and sustainability. We're committed to supporting, encouraging and improving the confidence and performance, profile and recognition of all these professionals. We do this by providing resources and tools, research and knowledge sharing along with high quality formal training and qualifications to meet the real world needs of members from their first steps on the career ladder, right to the very top.

We believe that together we can change perceptions and attitudes about the relevance and vital importance of sustainability as a progressive force for good. Together we're transforming the world to sustainability.

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