

Your first steps to net zero

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Discussions of net zero often start with an unstated assumption that there is a common understanding of the term. However, 'net zero' is sometimes conflated with other concepts, such as offsetting, in a manner which causes confusion, and which can undermine support for net zero ambitions. For this reason, we start the discussion of the topic with a quick recap of the science which underpins net zero ambitions.

The term 'net zero', as originally coined by Professor Myles Allen, condenses climate science and its implications into one simple idea which can be understood by a wide range of audiences.¹ 'Net zero' is reached when atmospheric concentrations of emissions have stabilised and global Greenhouse Gas (GHG) emissions are balanced by global GHG removals. This transition is described in Fig. 1, illustrating an idealised pathway to 'net zero' emissions, and highlighting the point where 'net zero' emissions is achieved.

Further details are given in Table 1, where the level of climate change mitigation sought is tied to: a fixed 'carbon budget' of remaining emissions, an associated future emission reduction pathway, and a target date for reaching net zero emissions. The objective of limiting climate change to 1.5°C of warming in order to avoid the most dangerous impacts of climate change is also introduced. The urgency of this challenge is emphasised by NASA's climate tracker, which confirms that, as of 2022: warming to date is 1.2°C and nineteen of the warmest years on record have occurred since 2000.²

Response to climate change

The considerations in Table 1 suggest that, however we get there, an ambition to achieve net zero emissions is at the heart of our response to climate change. Although some level of climate change is locked in already, we won't stop adding to the problem until we reach net zero emissions.

Following on from scientific developments, the United Nations has

Fig 1: An idealised pathway to net zero emissions

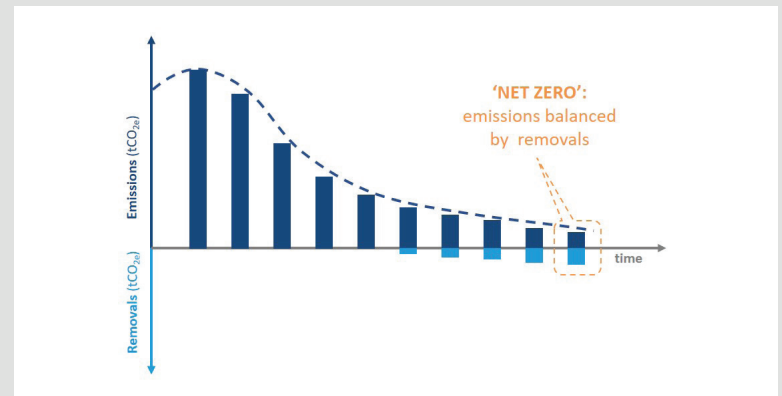


Table 1: Climate science underpinning 'Net Zero' ambitions^{3 4}

1. Underpinning CLIMATE SCIENCE...

- Climate change is primarily driven by manmade greenhouse gas emissions.
- Unless actively removed, these remain in the atmosphere long enough to effectively represent permanent additions to atmospheric concentration levels.
- Therefore, cumulative greenhouse gas emissions up to the date of interest correlate to the level of Climate Change anticipated.
- Limiting Climate Change to 1.5°C of warming has become the globally accepted target for avoiding the most dangerous impacts of climate change.

2...means there is fixed global CARBON BUDGET for future emissions...

- We have already increased global atmospheric CO₂ concentrations to around 420 parts per million, an increase of approximately a 50 per cent beyond pre-industrial levels.
- These emissions have already resulted in approximately 1.2°C of warming.
- Assuming we are to limit Climate Change to 1.5°C of warming, this defines a finite remaining 'carbon budget' for total future greenhouse gas emissions.

3...and that ANNUAL EMISSIONS must be CUT RAPIDLY to reach a 'NET ZERO' position before we have used up this carbon budget.

- Current trajectories suggest we will breach this carbon budget and the associated 1.5°C warming threshold within 10-30 years.
- Rapid reductions in greenhouse gas emissions are required if we are to keep within this budget.
- Annual global emissions must then reach a 'net zero' position, limiting further warming by avoiding any subsequent increases in atmospheric greenhouse gas concentrations.

4. If we exceed our carbon budget, MORE SEVERE LEVELS OF CLIMATE CHANGE CAN BE ANTICIPATED beyond 1.5°C of warming.

- At higher levels of climate change, the anticipated impacts become more severe⁴: "With further global warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers. Changes in several climatic impact-drivers would be more widespread at 2°C compared to 1.5°C global warming and even more widespread and/or pronounced for higher warming levels.
- Low-likelihood outcomes, such as ice sheet collapse, abrupt ocean circulation changes, some compound extreme events and warming substantially larger than the assessed very likely range of future warming cannot be ruled out and are part of risk assessment."



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led global efforts to mitigate climate change through the creation of the United Nations Framework Convention on Climate Change (UNFCCC), which was formed in 1992.

The convention has a membership of about 200 parties, made up of countries and regions such as the European Union. The ultimate objective of the UNFCCC is to "stabilise greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a timeframe which allows ecosystems to adapt naturally and enables sustainable development."⁵ To this end, the 2015 Paris Agreement aims to keep the global average temperature rise this century as close as possible to 1.5°C above pre-industrial levels.

Global climate negotiations are held annually by the United Nations, in the form of the 'Conference of the Parties (COP)' discussions. COP 26, held in Glasgow during 2021, delivered a comprehensive range of pledges towards net zero, highlighting that "Over 90 per cent of world GDP and around 90 per cent of global emissions are now covered by net zero commitments."⁶

These pledges and their future developments can be reviewed and tracked in detail via the Climate Action Tracker, accessible at:

<https://climateactiontracker.org/global/cat-net-zero-target-evaluations>.

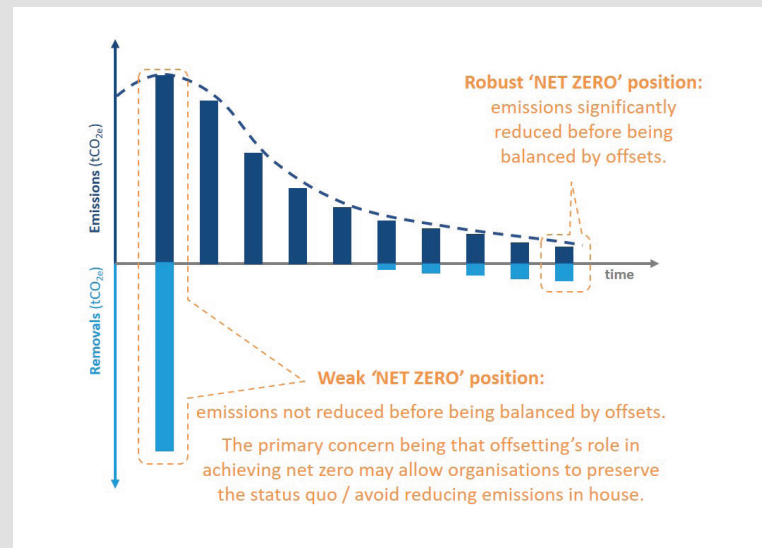
Some critiques of net zero relate to issues with historic offsetting practices and have led to counter claims that net zero is better understood as 'Not Zero'⁷ or that organisations should aim for a 'Real Zero'⁸ position.

These claims aim to challenge the 'net' aspect of 'net zero' and aim to emphasise the need to focus upon delivering rapid emission reductions, as opposed to simply offsetting 'business as usual' emissions, as shown in Fig. 2.

A number of organisations and accreditation schemes have been set up to support the development of robust net zero strategies and to call out some of the more dubious practices within the sector.

One prominent reference point in this context is the 'Science Based Targets initiative' (SBTi) which aims to "drive ambitious climate action in the private sector by enabling companies to set science-based emissions reduction targets."⁹ An SBT is an emission pathway aligned with scientific consensus over the cuts

Fig 2: A rapid reduction in emissions is required before being balanced by offsetting



required for a particular outcome e.g., aiming to limit global warming to a 1.5°C increase.

One of the early aims of the SBTi was to support organisations which wanted to demonstrate leadership by taking action ahead of government policy and who therefore needed a scientific reference point against which to set their emission reduction targets. This work gave rise to the concept of a 'science-based target.'

As the concept of net zero has progressed, the SBTi has subsequently extended the concept of Science Based Targets to a standard/framework of requirements for setting and tracking robust net zero targets. The requirements of the SBTi's Net Zero Standard and similar alternative schemes are summarised in the net zero scorecard presented later in this article.

Given the need for a robust and consistent methodology, plus the desire to set a net zero target in a manner which is acknowledged to

be valid by external stakeholders, it is best practice to adopt an externally recognised framework for setting a net zero target. These frameworks often provide standard tools, best practice information and benchmarking data, and offer opportunities for members to support each other by sharing experience and knowledge.

There are many such frameworks, with a useful reference point being the list of frameworks which have been accepted as official partners to the United Nations' 'Race to Zero' initiative¹⁰.

Alternatively, specific industry bodies, institutes, trade associations, work groups and regulators also provide frameworks and peer networks to facilitate net zero ambitions. The full list of official partner frameworks to the UN Race Zero campaign also includes the names of current member organisations of each initiative, giving a sense of likely peers and the amount of momentum behind each initiative. There is also a brief description of

each framework to help review which may be most applicable to a particular organisation or context. Reviewing this list would be a good starting point for exploring which net zero framework is most appropriate to your organisation. The list of official partner initiatives and networks: <https://unfccc.int/climate-action/race-to-zero/who-s-in-race-to-zero>.

Guiding frameworks

Although 'net zero' is a contested term, there are a number of guiding frameworks which can help. For example, the climate mitigation hierarchy provides a high-level means of reviewing net zero targets. This is an extension of the well-established 'energy hierarchy' to include non-energy sources of GHG emissions, as illustrated in Fig. 3.

Much like the waste hierarchy of: 'reduce, reuse, recycle', the climate mitigation hierarchy encourages: the 'avoidance' of emissions, followed by 'reduction' through efficiencies, then 'replacement' through switching to low carbon inputs, and finally 'offsetting' as the least preferred option to manage emissions.

The net zero scorecard (Table 2) expands upon these themes, drawing upon guidance from two prominent reference points: the United Nation's 'Race to Zero' initiative,¹¹ and the Science Based Targets Initiative's list of 'Key requirements of the Net Zero Standard.'¹²

The scorecard above can be used to assess net zero claims of other organisations, as well as to review internal net zero targets and plans.

The following site also provides useful insights as to action that peers and other sectors are already taking: <https://zerotracker.net/>. This site tracks the net zero target status of the 2,000 largest publicly traded companies in the world.¹³ The database is searchable by company name, country, and sector. The database gives details on the net zero target type, timeframes, level of planning behind the targets, the reporting mechanism, coverage of scope 3 and the use of carbon credits.

This article has aimed to introduce the science and policy underpinning net zero ambitions and to provide a review of early action and best practice in response to the net zero future.

When developing the business case for net zero and planning for implementation, it is important to consider the level of ambition and organisational change implied by the

Fig 3: The climate mitigation hierarchy provides a means of reviewing targets

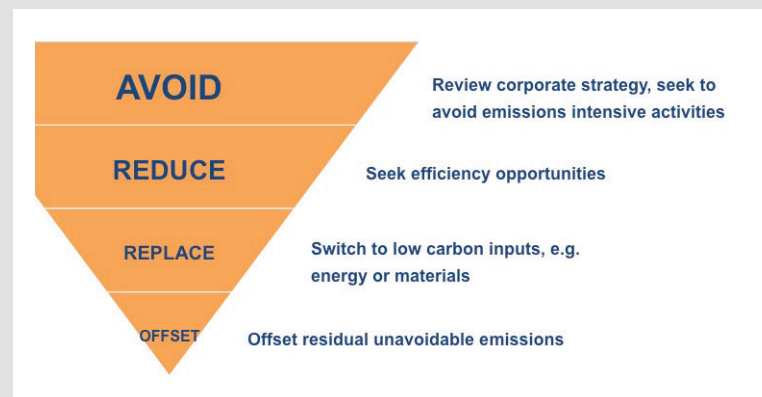


Table 2: A scorecard for net zero targets

	UNITED NATION'S 'RACE TO ZERO': 'Six questions to ask about net zero commitments (11)'	SCIENCE BASED TARGETS INITIATIVE: 'Key requirements of the [SBTi] Net Zero Standard' (12).
1. Target respects the climate mitigation hierarchy?	IS IT JUST OFFSETTING? (Prioritise reduction) What is the role of offsetting in the net zero strategy? Are they reducing emissions, or relying mainly on offsets? Credible = Offsets do not substitute for, or delay, decarbonisation and by the net zero target date, credits and sinks are only used to balance the hardest-to-abate emissions.	FOCUS ON RAPID, DEEP EMISSION CUTS: Rapid, deep cuts to value-chain emissions are the most effective and scientifically-sound way of limiting global temperature rise to 1.5°C. This is the central focus of the Net Zero Standard and must be the overarching priority for companies. Most companies will require deep decarbonisation of 90-95% to reach net zero under the Standard
2. Target acknowledges the urgency of climate change mitigation efforts?	IS IT ABOUT NOW? (50% reduction by 2030) Does the commitment focus on acting right now, toward an interim 2030 target, as part of the global effort to halve emissions by 2030? Credible = I see an interim target, which supports the global goal to halve emissions by 2030 IS IT FAST ENOUGH? (i.e. before 2050) Are they planning to reach net zero emissions in time – before 2050? Does the target maximise their ability to act, given that some can get there faster than others? Credible = The end goal is before 2050, by continuing to prioritise reduction.	SET NEAR- AND LONG-TERM TARGETS: Companies adopting the Net Zero Standard are required to set both near-term and long-term science-based targets. This means making rapid emissions cuts now, halving emissions by 2030. By 2050, organisations must produce close to zero emissions and neutralise any residual emissions that are not possible to eliminate
3. Clear plan for delivering the target?	IS THERE A PLAN? (From ambition to action) Is there a clear plan of what actions will be taken immediately, and in the next five years, toward achieving both interim and longer-term targets? Credible = I see a plan, with interim and end goals, that are focused on the next five years.	NO NET ZERO CLAIMS UNTIL LONG-TERM TARGETS ARE MET: A company is only considered to have reached net zero when it has achieved its long-term science-based target.
4. Progress reported transparently?	CAN YOU SEE PROGRESS? (Transparency + governance) Do they report publicly on their progress, at least annually, and against all of their emissions? Credible = I can see their progress clearly, against all scopes, without having to dig for it and there are strong governance arrangements in place.	Most companies are required to have long-term targets with emission reductions of at least 90-95% by 2050. At that point, a company must use carbon removals to neutralise any limited emissions that cannot yet be eliminated.
5. Scope of the target is adequate?	WHAT DOES IT COVER? (Scope Of commitment) Does the commitment cover all greenhouse gas emissions, including Scope 3 for businesses and investors? Credible = all emissions sources are discussed, even if the plan is to manage them together with other partners.	GO BEYOND THE VALUE CHAIN: The SBTi recommends Companies to go further by making investments outside their science-based targets to help mitigate climate change elsewhere. There is an urgent need to scale up near-term climate finance; however, these investments should be in addition to deep emission cuts, not instead of them. Companies should follow the mitigation hierarchy , committing to reduce their value chain emissions before investing to mitigate emissions outside their value chains

prioritise activities and to act as a baseline for target setting;

- setting the net zero targets and emission reduction trajectories; and
- planning for the launch, management and communication of the net zero plans to the organisation's direct and wider stakeholders.

The Energy Institute has launched a two-day, in person course on developing net zero targets and strategy which is also available via an online pathway. The course aims to support those looking to prepare their organisation for the net zero emissions future.

• Further details can be found at <https://www.energyinst.org/whats-on/training>.

REFERENCES

1. The British Broadcasting Corporation (BBC). Life Scientific interview: 'The physicist behind net zero. Prof Myles Allen talks to Jim Al-Khalili.' [Online] <https://www.bbc.co.uk/sounds/play/m000fgcn>.
2. National Aeronautics and Space Administration (NASA). Global climate change: Vital signs of the planet. [Online] <https://climate.nasa.gov/>.
3. Intergovernmental Panel on Climate Change. SPECIAL REPORT: GLOBAL WARMING OF 1.5 °C - Summary for policy makers. [Online] www.ipcc.ch/sr15/chapter/spm.
4. —. Assessment report six: Working Group I The Physical Science Basis. Headline Statements from the Summary for Policymakers. [Online] www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Headline_Statements.pdf.
5. United Nations Framework Convention on Climate Change (UNFCCC). About the [UNFCCC] Secretariat. [Online] <https://unfccc.int/about-us/about-the-secretariat>.
6. United Nations Conference of the Parties 26. COP26 The Glasgow Climate Pact. [Online] <https://ukcop26.org/wp-content/uploads/2021/11/COP26-Presidency-Outcomes-The-Climate-Pact.pdf>.
7. Coalition including Friends of the Earth. NOT ZERO: How 'net zero' targets disguise climate inaction. [Online] https://demandclimatejustice.org/wp-content/uploads/2020/10/NOT_ZERO_How_net_zero_targets_disguise_climate_inaction_FINAL.pdf.
8. BBC reporting Greta Thunberg. Davos: 'Forget about net zero, we need real zero' - Greta Thunberg. [Online] <https://www.bbc.co.uk/news/av/world-us-canada-51192740>.
9. Science Based Targets initiative (SBTi). [Online] <https://sciencebasedtargets.org/about-us>.
10. United Nations. Who's in Race to Zero? - List of official partner initiatives and networks. [Online] <https://unfccc.int/climate-action/race-to-zero/who-s-in-race-to-zero#eq-25>.
11. —. Race to Zero Initiative: Get net zero right, A how-to guide for spotting credible commitments and those that miss the mark. [Online] <https://racetozero.unfccc.int/wp-content/uploads/2021/07/Get-Net-Zero-right-2.pdf>.
12. Science Based Targets Initiative (SBTi). The Net-zero standard. [Online] <https://sciencebasedtargets.org/net-zero>.
13. Net Zero Tracker. Overview of the net zero targets for the 2,000 largest publicly-traded companies in the world. [Online] <https://zerotracker.net/>.

launch of a net zero campaign. The net zero business case will touch upon high-level themes, such as the organisation's future strategy and business model.

Taking the next steps for your organisation would involve the following activities:

- developing an organisation-specific register of net zero drivers from a wide range of aspects of the organisation's context, such as: policy and legal frameworks; new markets created by innovations in products, services and technologies; reputational and licence to operate considerations, physical considerations; resource efficiency and new energy sources; the emergence of green finance / capital offerings; and opportunities to recruit and retain the best talent.
- developing the organisation's current emissions inventory to help



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ENTRY FORM

Please mark your answers below by placing a cross in the box. Don't forget that some questions might have more than one correct answer. You may find it helpful to mark the answers in pencil first before filling in the final answers in ink. Once you have completed the answer sheet, return it to the address below. Photocopies are acceptable.

Questions

- 1). Net zero emissions are achieved when anthropogenic emissions of greenhouse gases to the atmosphere are**
- Completely reduced to zero.
 - Stabilised so that they are no longer increasing.
 - Balanced by anthropogenic removals over the period relating to the net zero claim.
 - Falling on a steep enough trajectory to meet energy efficiency targets.
- 2). Which of the following statements are true?**
- Climate change is primarily driven by manmade greenhouse gas emissions.
 - These emissions remain in the atmosphere long enough to effectively represent permanent additions to atmospheric concentration levels.
 - Although some level of climate change is already locked in, we won't stop adding to the problem until we reach a net zero emissions position.
 - All of the above
- 3). The role of offsetting in delivering a net zero position should be**
- Maximised to deliver as quick a net zero position as possible.
 - Minimised as far as possible and only compensate for emissions remaining after the delivery of reduction targets.
 - avoided completely
 - the first step in a net zero strategy.
- 4). The adoption of a Science Based Target as part of a strategy to deliver a net zero position is**
- ... mandatory.
 - ... not possible, the two objectives are incompatible.
 - ... not mandatory, although doing so represents best practice.
 - ... only possible for larger FTSE 100 type organisations.
- 5). As of 2022, how many of the of the warmest years on record have occurred since 2000?**
- none
 - five
 - ten
 - nineteen

- 6). The Paris Agreement aims to keep the global average temperature rise this century as close to 1.5°C. What level of warming has already been observed as of 2022?**
- 0.5°C
 - 0.9°C
 - 1.0°C
 - 1.2°C
- 7). What is the approximate timeframe within which we must reach a reach a global net zero position to avoid the most extreme impacts of climate change and stay with the carbon budget which correlates to the UN's Paris Agreement?**
- 10-30 years
 - 25-50 years
 - 50-100 years
 - 100+ years
- 8). Although of varying quality, and still to be refined; as COP 26 closed in 2021, what percentage of global emissions were covered by a national / government level net zero target?**
- Approximately 25 per cent
 - Approximately 50 per cent
 - Approximately 75 per cent
 - Approximately 90 per cent
- 9). Which list below puts the main elements of the climate hierarchy in the correct order, when ordered from highest priority first to lowest priority last?**
- Reduce, Avoid, Replace, Offset
 - Avoid, Reduce, Replace, Offset
 - Offset, Replace, Reduce, Avoid
 - Replace, Reduce, Avoid, Offset
- 10). What are the minimum levels of emission reduction that the SBTi advise organisations to aim for by 2030 and 2050?**
- Emission reductions of at least 25 per cent by 2030 and at least 50-60 per cent by 2050.
 - Emission reductions of at least 35 per cent by 2030 and at least 70-80 per cent by 2050.
 - Emission reductions of at least 45 per cent by 2030 and at least 80-90 per cent by 2050.
 - Emission reductions of at least 50 per cent by 2030 and at least 90-95 per cent by 2050.

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