



HEAT NETWORK EFFICIENCY SCHEME



Seminar: Scope 1 & 2 carbon emissions



Agenda

Introduction and purpose of the session

Will Taylor, Gemserv

Carbon Emissions – Scope 1 & 2

Chris Forster, Turner and Townsend

Measurement & Verification

Megan Crossley, Ramboll

Q&A



Introduction

To meet our social value commitments through the HNES scheme – Gemserv, Ramboll and Turner and Townsend have all committed to support decarbonisation through the delivery of the HNES contract.

- One way is to provide applicants to the scheme (you) with information, advice and guidance on measuring and potentially reducing your carbon emissions.



Aims and objectives of the session

1. To support the objective of the HNES scheme to reduce the carbon impact of heat networks. To reduce carbon, you need to measure it!
2. To support the evidencing of carbon reduction achieved over time and through the HNES scheme.
3. To improve the carbon literacy of the heat networks supply chain

To note for the session:

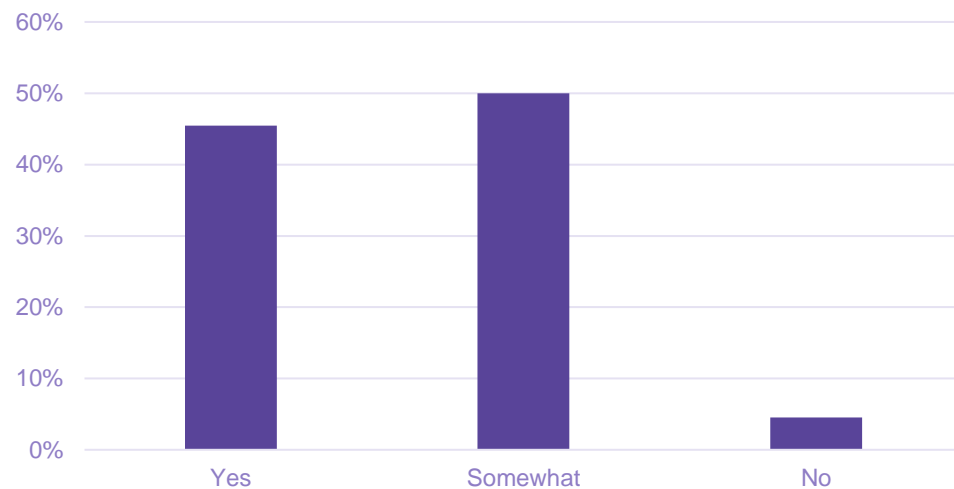
- This session will be recorded
- Please keep your camera off unless speaking
 - Please keep your microphone muted
- Questions in the chat during the presentation



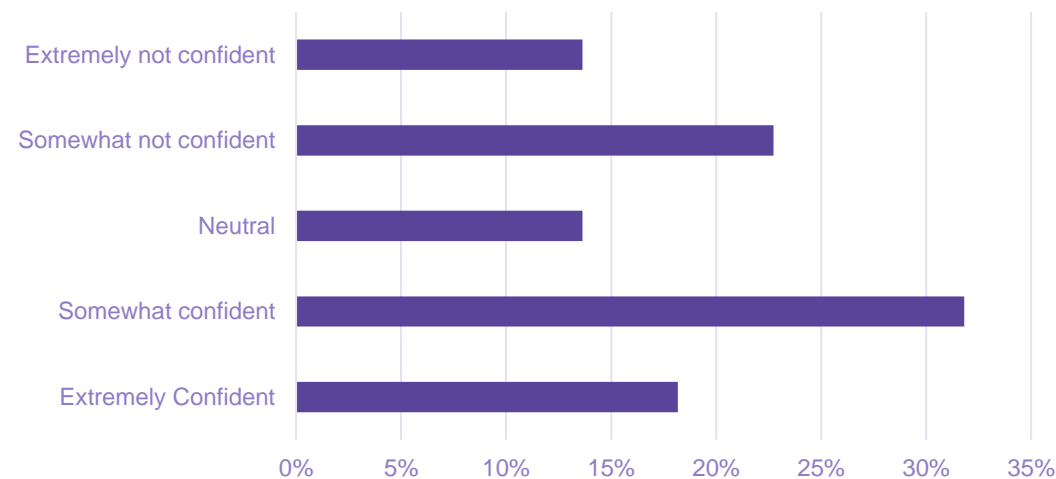
What you told us

We surveyed HNES applicants to ask you about what you wanted from a carbon measurement seminar.

Are you familiar with what Scope 1 and 2 emissions are?



Are you confident in your understanding of how to quantify Scope 1 and Scope 2 emissions?

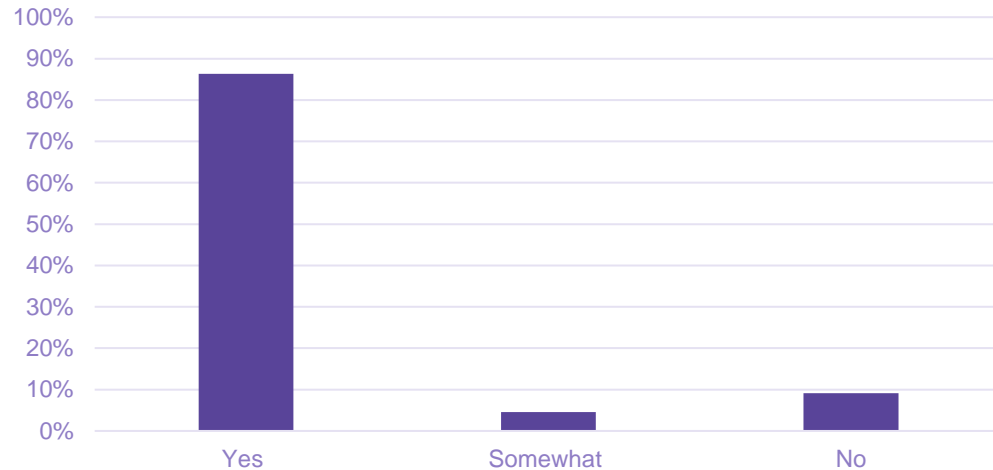


- 50% of respondents were only 'somewhat' familiar with Scope 1 and 2 emissions, indicating a lack of confidence
- 50% of respondents answered between neutral – extremely not confident in their understanding of quantifying Scope 1 & 2 emissions

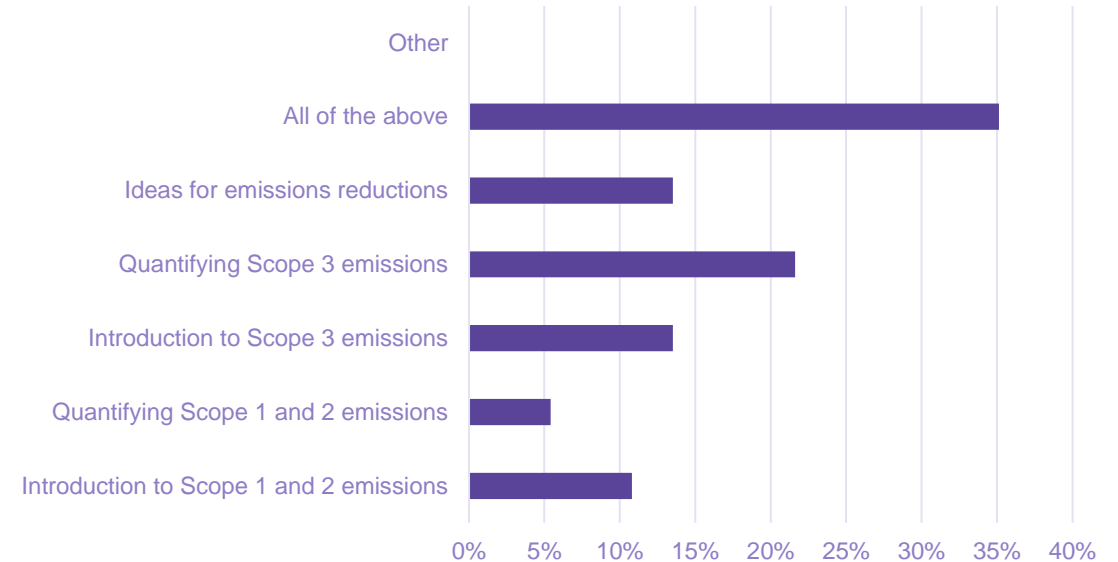


What you told us

Are you interested in learning more about target setting in line with Science Based Targets



What would you like a seminar to cover?

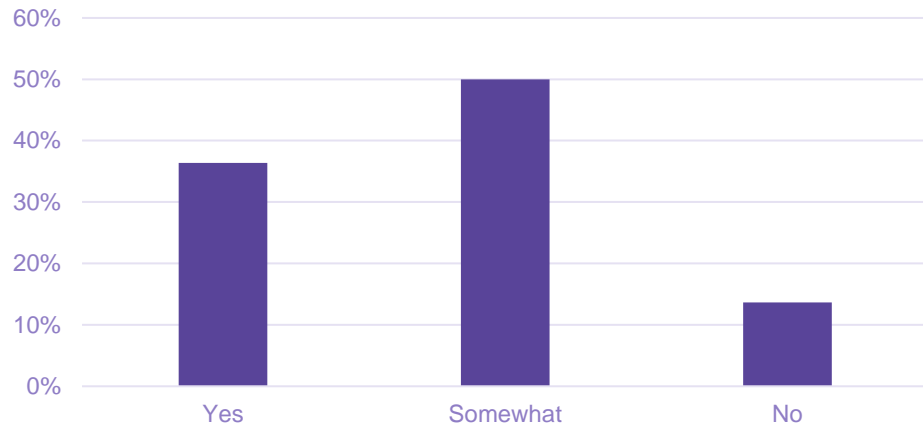


- 86% of respondents were interesting in learning about target setting in line with Science Based Targets
- 35% of respondents wanted the seminar to cover Introduction and Quantifying Scope 1, 2 and 3 emissions, as well as ideas for emissions reductions

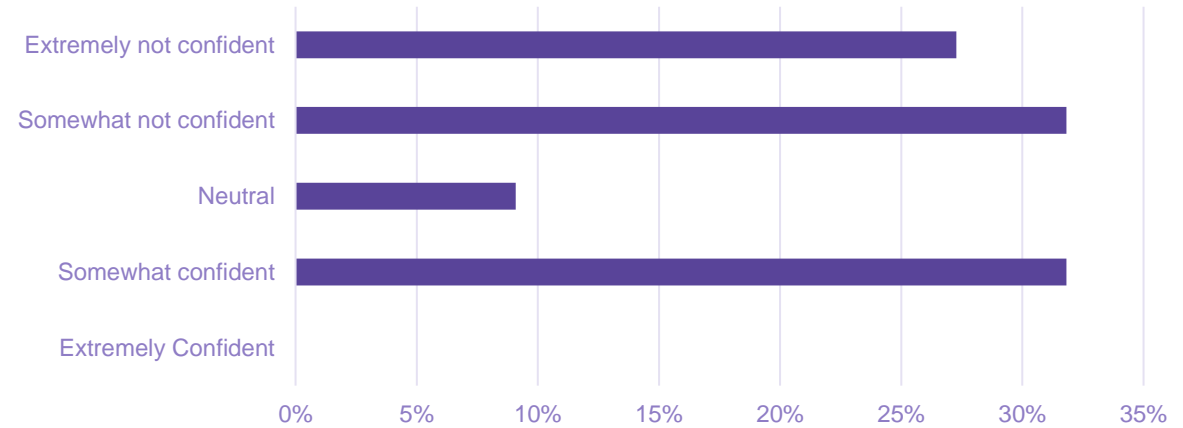


What you told us

Are you familiar with what Scope 3 emissions are?



How confident are you in your understanding of how to quantify Scope 3 emissions?



- 64% of respondents are either somewhat or not familiar with Scope 3 emissions, indicating a lack of confidence
- 68% of respondents answered between neutral – extremely not confident in their understanding of quantifying Scope 3 emissions



Key Definitions

Scope 1 emissions

GHG emissions directly from operations that are owned or controlled by the reporting company

Scope 2 emissions

Emissions from the generation of purchased and consumed electricity, steam, heat, or cooling (collectively referred to as “electricity”).

Scope 3 emissions

All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions



Carbon Dioxide

A naturally occurring gas fixed by photosynthesis into organic matter. A by-product of fossil fuel combustion and biomass burning, it is also emitted from land use changes and other industrial processes

Carbon accounting

Carbon accounting or greenhouse gas accounting refers to processes used to measure how much carbon dioxide equivalents an organization emits.

Carbon equivalent (CO₂e)

A metric measure used to compare the emissions from various greenhouse gases such as methane or nitrous oxide



Additional Definitions

Greenhouse Gases	Greenhouse gases, such as carbon dioxide and methane, trap and hold heat in the atmosphere and contribute to climate change. Much of human activity emits greenhouse gases, such as burning fossil fuels for energy and transport, farming land for food production, and deforestation.
Carbon footprint	The measurement used to quantify the carbon impact associated with an activity, business, product etc.
Embodied carbon	The carbon that is emitted in the construction of a building, through manufacturing, transport, storage and construction related activities up to Practical Completion (PC). This should be inclusive of scope 1, 2 and 3 emissions.
Operational carbon	The carbon that is emitted during the in-use operation of a building or asset. This should be inclusive of scope 1, 2 and 3 emissions. This should be subject to on-going monitoring and annual reporting as a minimum, to allow for offsetting.
Whole Life Carbon	Whole Life Carbon assessment (sometimes referred to as Life Cycle Assessment or LCA) describes the combined impacts of both operational and embodied emissions over a building's entire lifecycle and its ultimate disposal. Similar to Whole Life Cost, Whole Life Carbon should be managed and assessed to minimise overall carbon emissions over a building's entire life cycle and therefore support decision making to maximise carbon saving measures during design and construction phases.
Offsetting / Carbon offsetting	The process of investing in schemes that sequester (or absorb) CO ₂ (or CO ₂ e) from the atmosphere. In theory, this allows for the balance or offset of the emissions calculated with the natural sequestration.
Carbon Neutral / Carbon Neutrality	Balancing the carbon dioxide (equivalent - all GHGs) that is released into the atmosphere through everyday activities with the amount that is absorbed or removed from the atmosphere.
Net Zero Carbon (NZC)	This requires consideration of Scope 1, 2 and 3 emissions. These are supported with a proactive and positive set of actions to minimise emissions before then looking to offset the remaining emissions.
Carbon Negative	This means you have a quantifiable positive carbon impact - your offsetting and other positive impacts are greater than the negative impacts.
Zero Carbon	Zero carbon describes something (process, product, business) with no carbon impact and does not require reduction/offsetting. This is a rare status.



UK Climate Change Targets

- The UK government aims to achieve net zero by 2050. Currently not on track to meet its carbon budget targets in 2025 and 2030.
- As of 2022, the Government's Environment Act requires us to “Reduce carbon emissions by 78% by 2035 compared to 1990 levels”

Other environmental targets include...

- Halt the decline in species populations by 2030, and then increase populations by at least 10% to exceed current levels by 2042
- Restore precious water bodies to their natural state by cracking down on harmful pollution from sewers and abandoned mines and improving water usage in households
- Deliver our net zero ambitions and boost nature recovery by increasing tree and woodland cover to 16.5% of total land area in England by 2050
- Halve the waste per person that is sent to residual treatment by 2042
- Cut exposure to the most harmful air pollutant to human health – PM2.5
- Restore 70% of designated features in our Marine Protected Areas to a favourable condition by 2042, with the rest in a recovering condition.



Green House Gas Protocol

The Green House Gas (GHG) Protocol is the world's most widely used greenhouse gas accounting standard. It provides a framework for businesses, governments and other bodies to measure and report GHG emissions to support their environmental goals.

- The GHG Protocol ensures consistency and transparency in GHG accounting and reporting.
- The GHGs include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), which are emitted during the combustion of fuels.
- The Protocol requires that CO₂ emissions from biomass combustion (non-fossil fuels) are tracked separately from fossil CO₂ emissions.

There are two main methods for estimating GHG emissions from stationary combustion sources:

1. Direct measurement: performed through the use of a Continuous Emissions Monitoring System (CEMS). This involves the continuous measurement of pollutants emitted into the atmosphere in exhaust gases from combustion or industrial processes
2. Analysis of fuel input: a mass balance approach in which carbon content factors are applied to fuel input to determine emissions. This involves determining a carbon content of fuel combusted using either fuel-specific information or default emission factors, and applying that carbon content to the amount of fuel burned to quantify CO₂ emissions.



UK Grid emissions trajectory

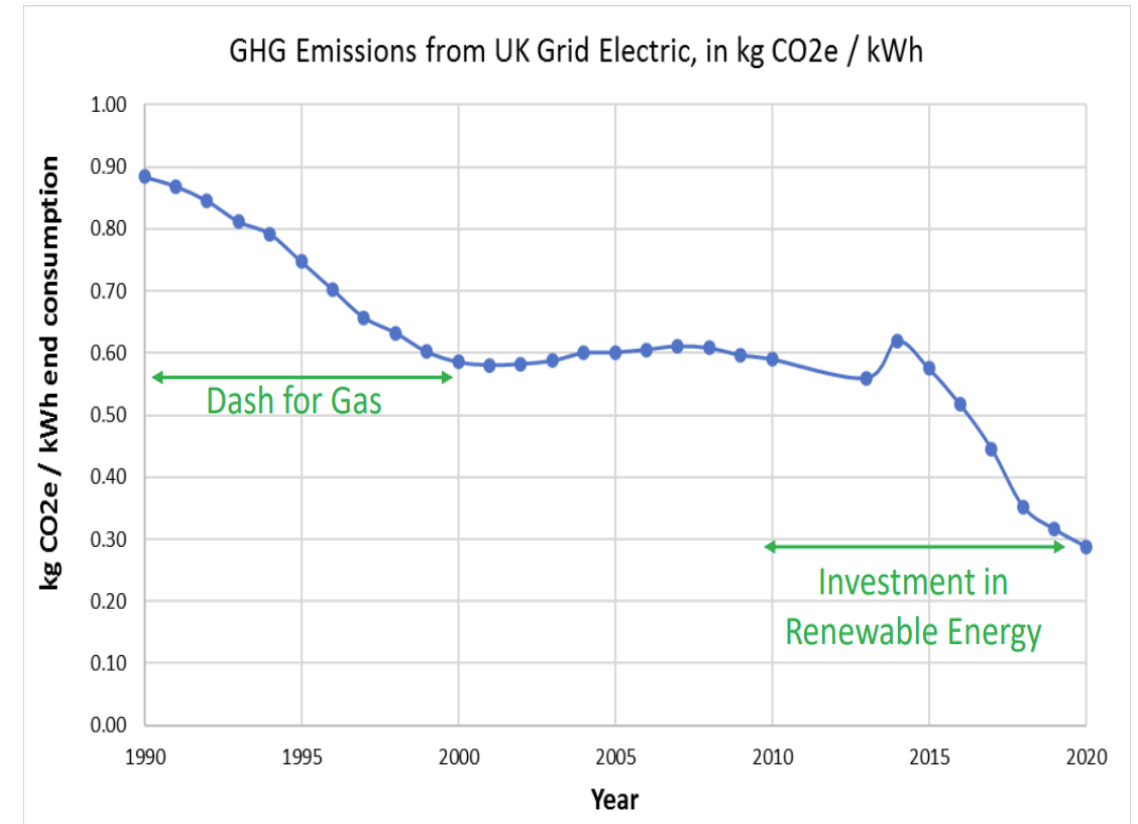
Significant progress has been made to reduce carbon intensity of the UK's grid electricity.

Reduced by 67% since 1990 due to two main reasons:

- Dash for gas' in 1990's (less coal fired power stations)
- Five-fold increase in renewable energy production since 2010: on & off shore wind, solar PV, and biomass.

In amount of renewable generation feeding the grid is set increase out to 2050 and beyond. With the expectation that electrification and further deployment of renewables will allow the grid to become Net Zero within the next few decades.

The future of the UK gas grid and its carbon intensity is less certain with no official figures published on the projected decarbonization of the gas grid. This could be achieved through increases in biofuel use or through high deployment rates of hydrogen.

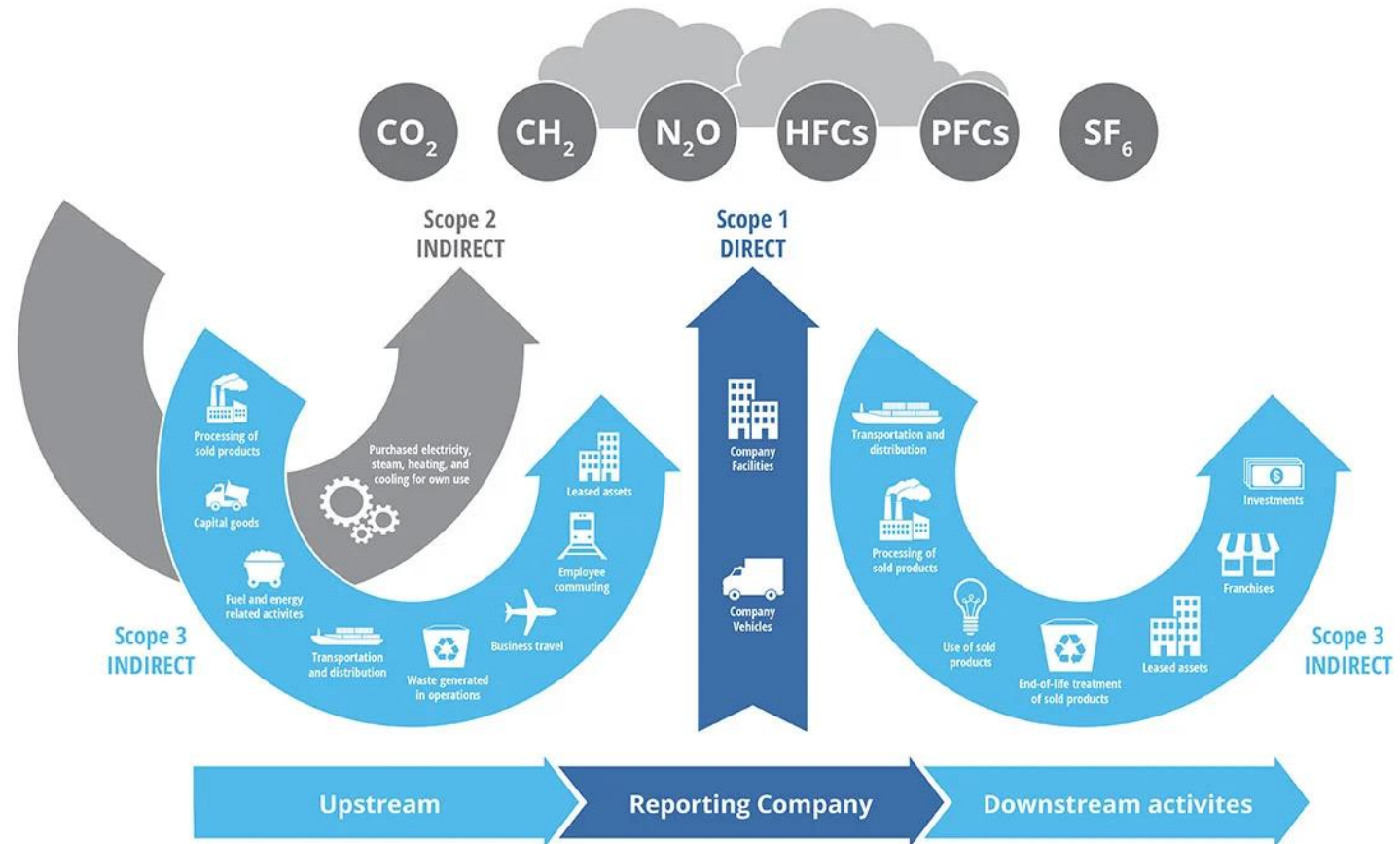


Scope 1, 2 and 3 Emissions

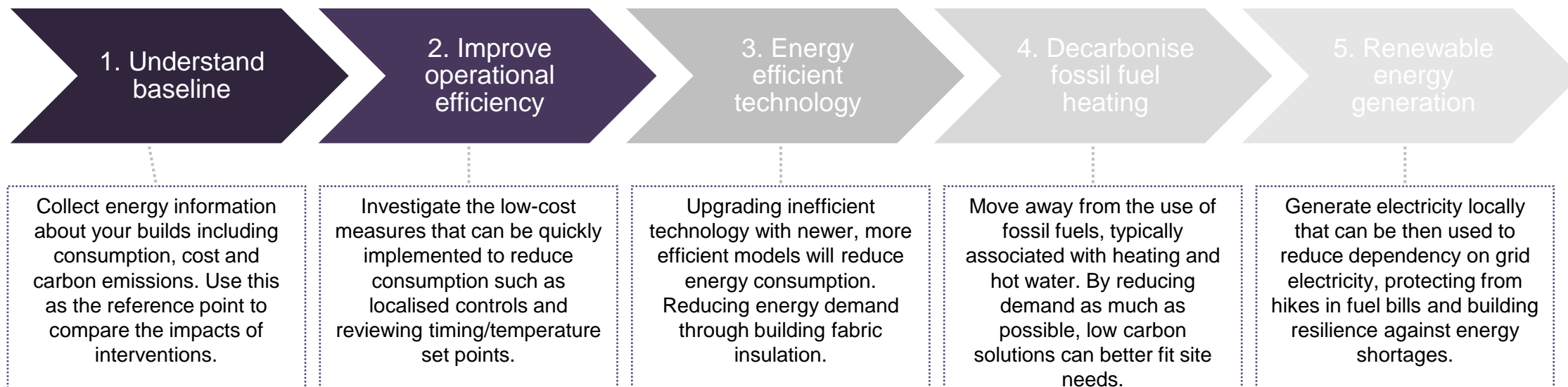
Scope 1 emissions are direct greenhouse (GHG) emissions that occur from fuel used in assets owned or controlled by an organisation i.e. for the purposes of HNES all gas boilers contribute to scope 1

Scope 2 emissions are those emissions which are indirectly associated with the organisation such as the purchase of electricity and heating/ cooling provision.

Scope 3 emissions are the upstream and downstream emissions of an organisation's value chain.



Whole building approach



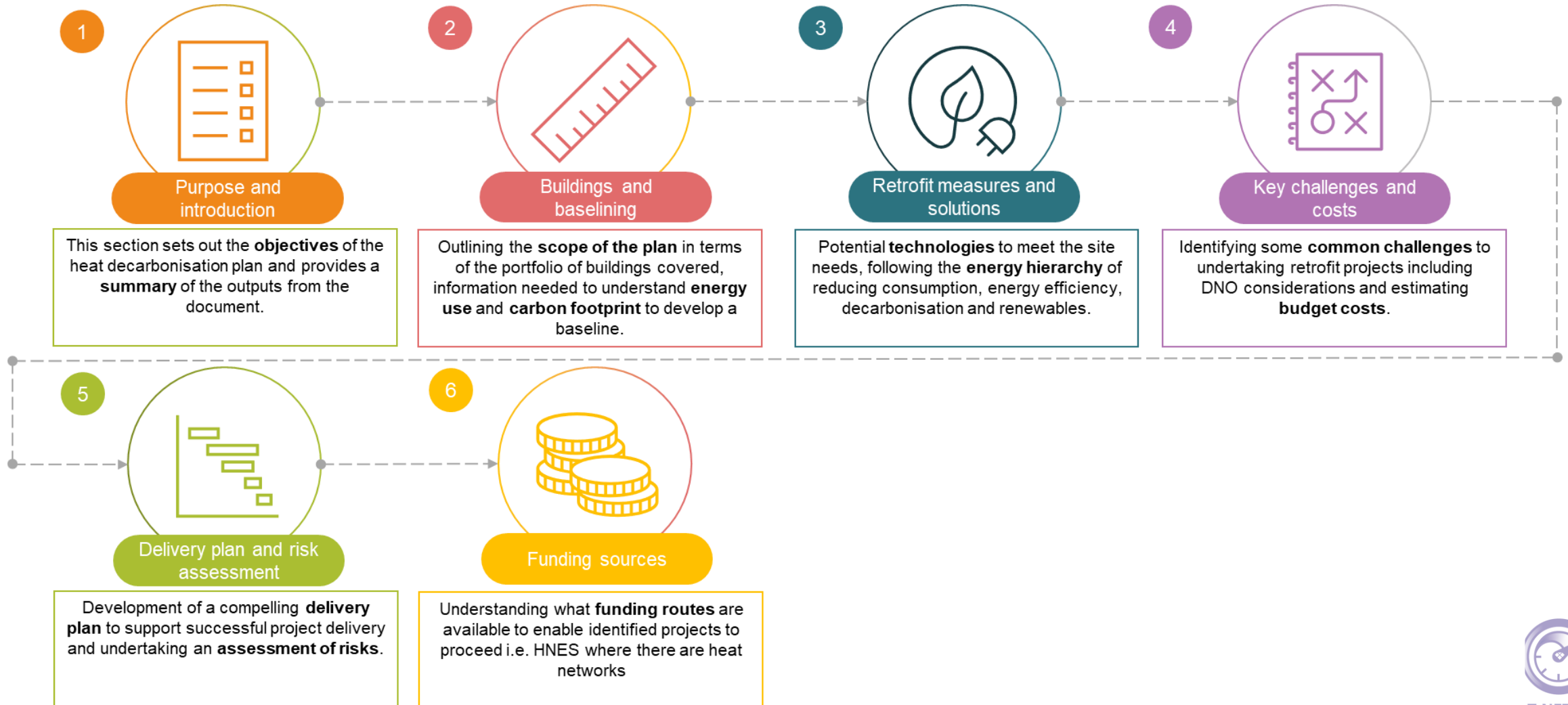
The whole building approach follows the logic of reducing energy demand as much as possible before moving to cleaner sources of fuel, before finally offsetting consumption with renewables.

It also helps a site plan a pragmatic journey towards net zero emissions.

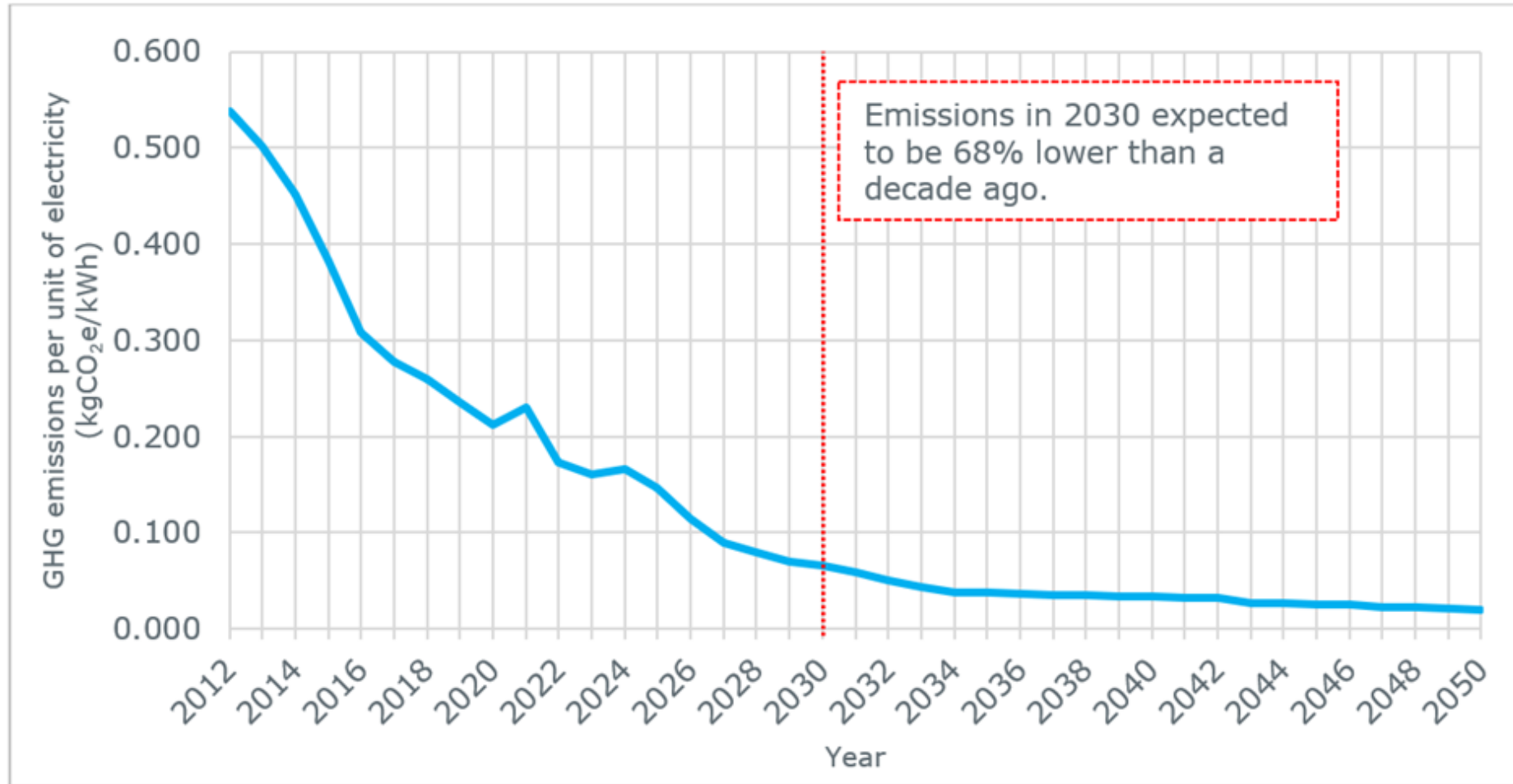
Each of the heat decarbonisation plans are structured using this approach.



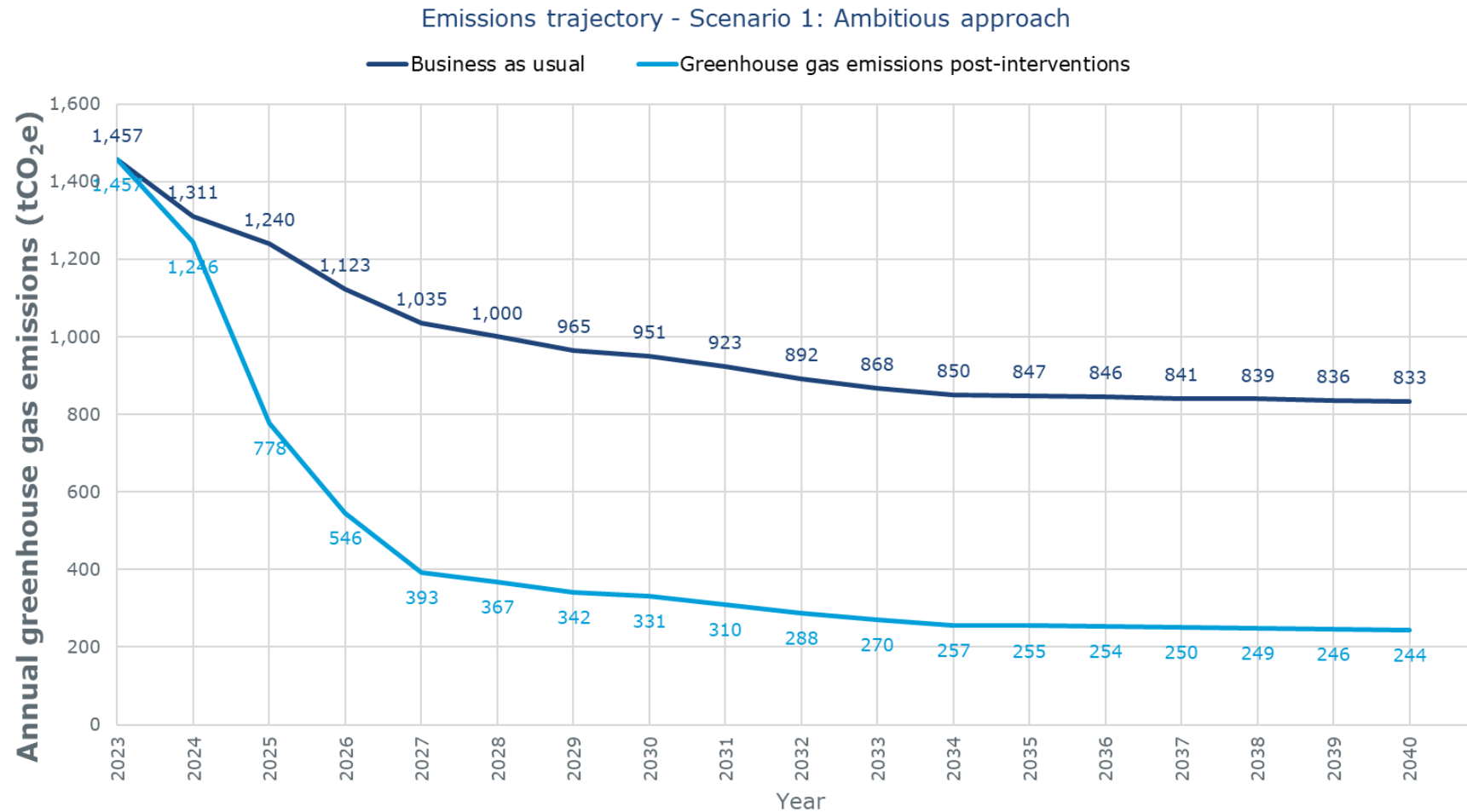
Delivering best practice decarbonisation plans



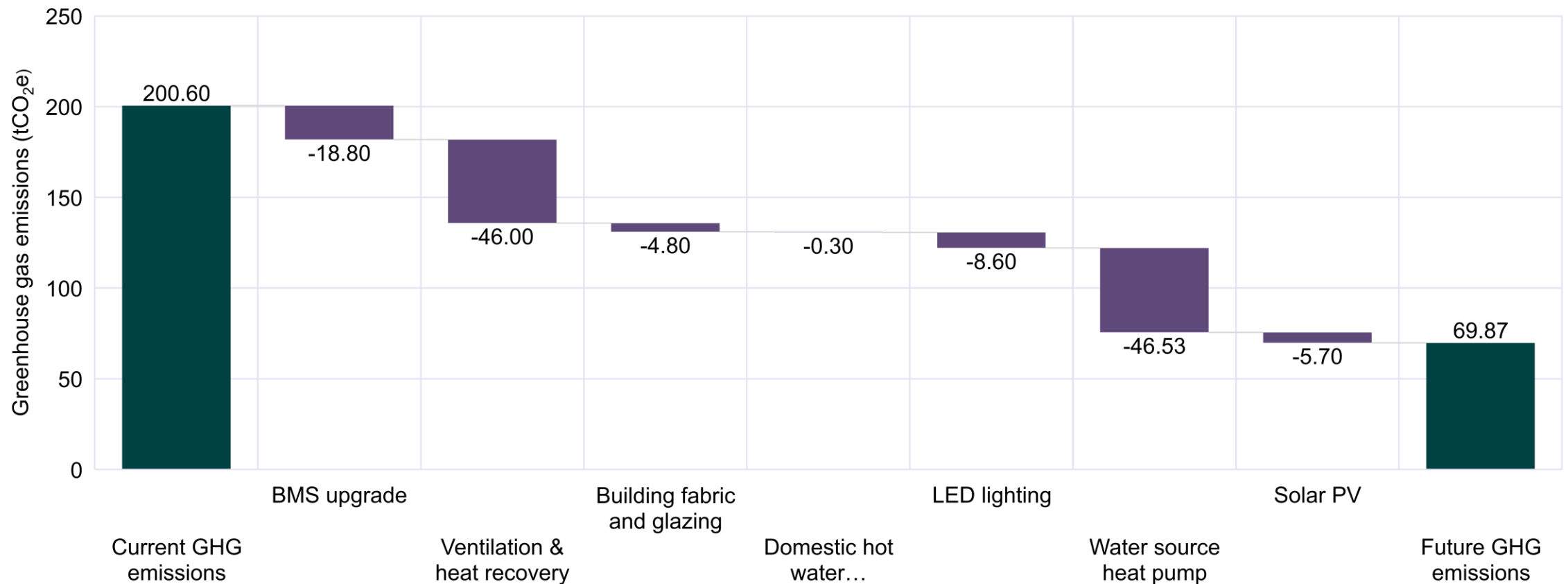
Electricity Grid Decarbonisation (Forecast)



Removal of Scope 1: Fossil Fuel Generation



Building decarbonisation pathway



Standards & Certification

UK Green Building Council (UKGBC) – UKGBC has developed a framework definition for net zero carbon buildings to provide the industry with clarity on how to achieve net zero carbon in construction and operation. The framework is intended to be used by building developers, designers, owners, occupiers and policy makers to inform the development of building tools, policies and practices.

Low Energy Transformation Initiative (LETI) – LETI have developed a Climate Emergency Design Guide which outlines the requirements of new buildings to ensure a net zero future. It is specifically aimed towards developers/landowners, designers, policy makers, and the supply chain. The guide covers five key areas: operational energy, embodied carbon, the future of heat, demand response and data disclosure.

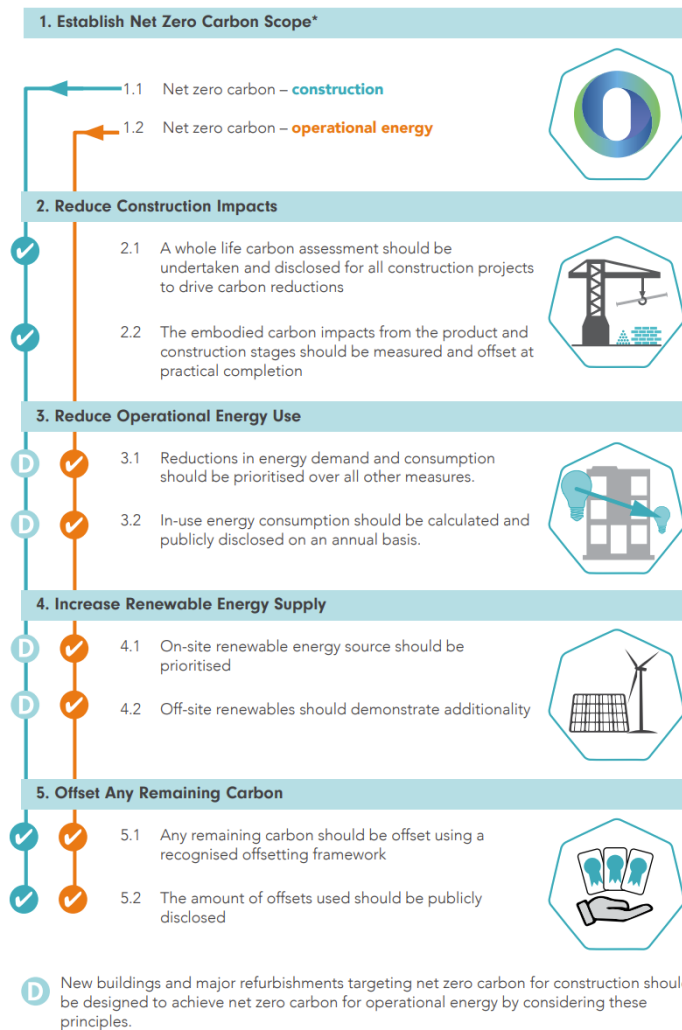
Net Zero Now – Official certification scheme provider for the Net Zero Sector Protocols - a series of industry standards that defines what Net Zero means practically for businesses in different sectors and what those businesses need to do to get there. Based on the GHG Protocol and the SBTi.

Science Based Target Initiative (STBi) – STBi have developed a net zero standard which provides companies with the guidance and tools to set science-based targets

Net Zero International – Provides certification of an organisation's net zero status. The certification confirms the organisations current carbon footprint, confirms they have a net zero reduction plan, and enables an organisation to show their commitment to net zero to costumers/other stakeholders.



Steps to Achieving a Net Zero Carbon Building

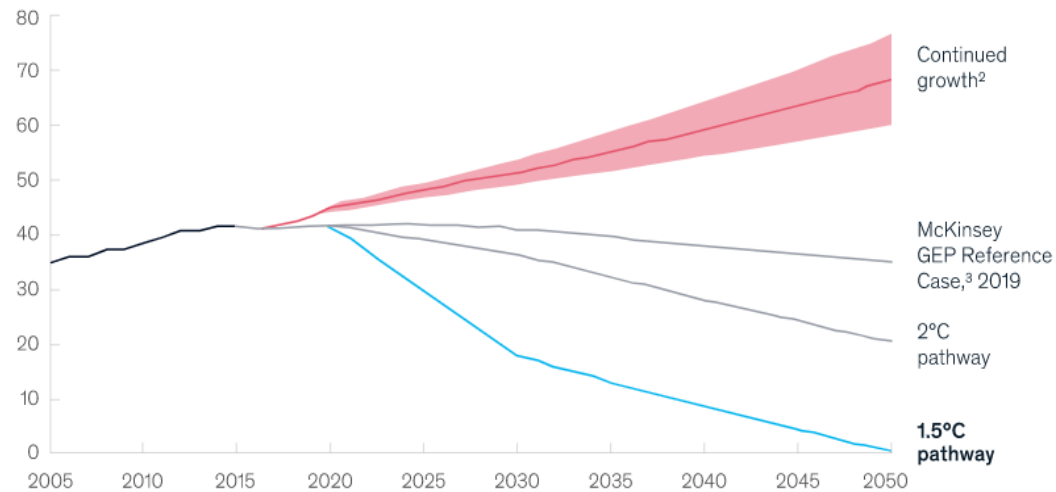


Why set reduction targets with the Science-Based Target Initiative (SBTi)?

Climate Scenarios Over Time

Projected global CO₂ emissions per scenario¹

Metric gigatons of CO₂ (GtCO₂) per year



¹In addition to energy-related CO₂ emissions, all pathways include industry-process emissions (eg, from cement production), emissions from deforestation and waste, and negative emissions (eg, from reforestation and carbon-removal technologies such as bioenergy with carbon capture and storage, or BECCS, and direct air carbon capture and storage, or DACCS). Conversely, emissions from biotic feedbacks (eg, from permafrost thawing, wildfires) are not included.

²Lower bound for "continued growth" pathway is akin to IEA's *World Energy Outlook 2019* Current Policies Scenario; higher bound based on IPCC's Representative Concentration Pathway 8.5.

³GEP = Global Energy Perspective; reference case factors in potential adoption of renewable energy and electric vehicles.

Source: Global Carbon Budget 2019; *World Energy Outlook 2019*, IEA, expanded by Woods Hole Research Center; McKinsey *Global Energy Perspective 2019: Reference Case*; McKinsey 1.5°C scenario analysis

1.5°C Scenario

- As of July 2022, all scope 1 and 2 targets must be aligned with this scenario, which aims to limit global warming to 1.5°C
- Scope 3 targets can optionally be aligned with this scenario

Well Below 2°C Scenario

- As of July 2022, scope 3 targets must be aligned with this scenario (at a minimum)

2°C Scenario

- As of July 2022, this scenario is no longer valid for SBTs
- Companies who set target prior to 2022 may have used this scenario for scopes 1,2 or 3 and will need to update when they reach their mandatory recalculation period

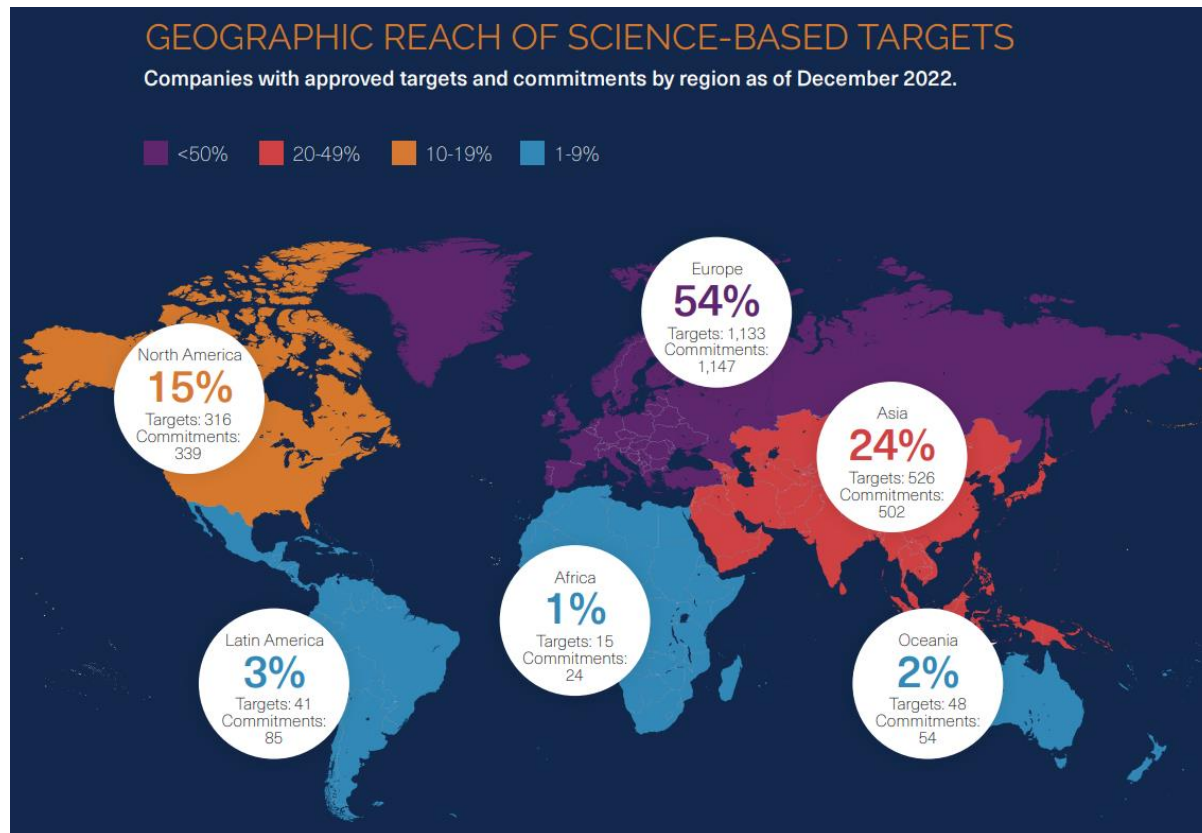
Source: "Climate Math: What a 1.5-degree Pathway Would Take." McKinsey, April 2020



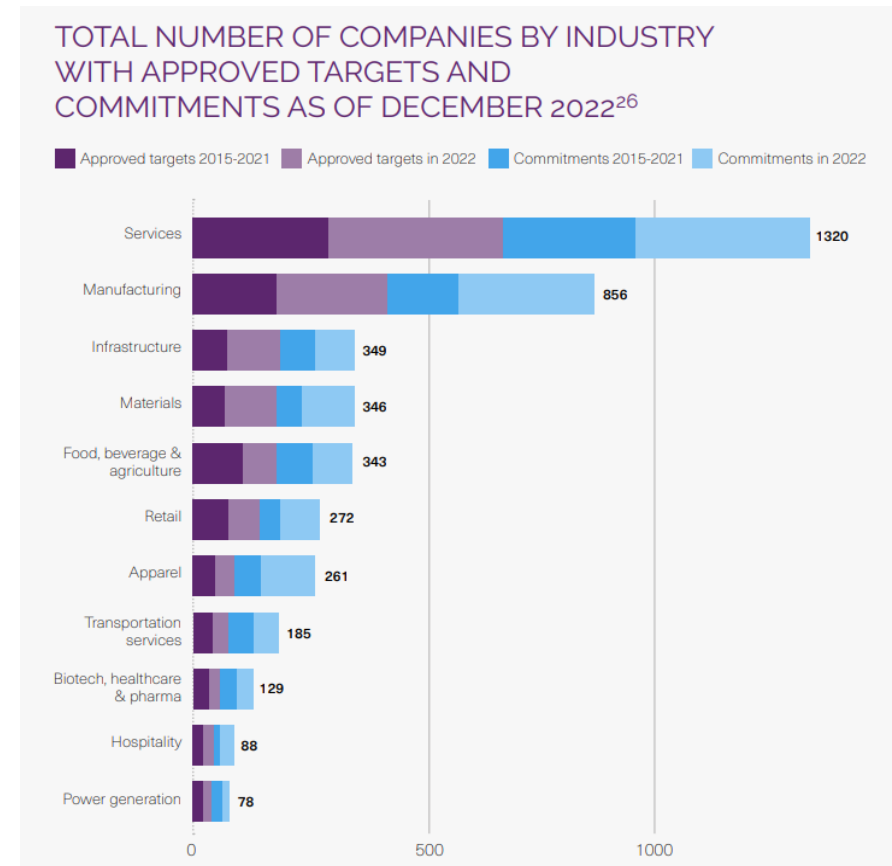
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Companies from around the world and across different sectors can all set science-based targets (SBTs)

Where are the companies setting SBTs¹?



What sectors are these companies in²?



Sources:

- 1) SBTi Monitoring Report 2022. Pg. 11
- 2) SBTi Monitoring Report 2022. Pg. 17



What is the process for setting Science-Based Targets?



COMMIT

- Register [online](#) and send a [letter](#) to SBTi stating commitment to set a target
- Once accepted, companies have 24 months to get a target developed, validated, and published



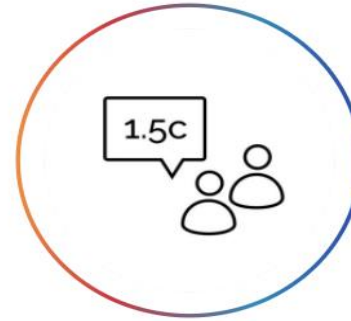
DEVELOP

- Develop scope 1+2 targets for the near term (5-10 years, must achieve 1.5° C) and long term (before 2050)
- If scope 3 emissions >40% of total emissions, set near-term (must be well-below 2°C) and long-term target for scope 3



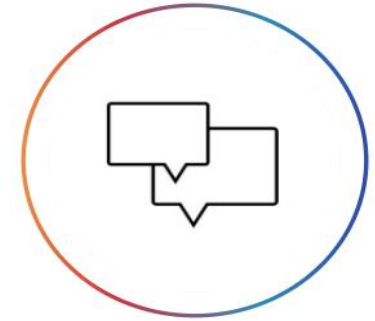
SUBMIT

- Submit [target submission form](#) for SBTi review
- SBTi will validate the target against the [Target Validation Protocol](#)
- Review typically takes 30 days or less (though experiencing backlog of up to 6-12 months in 2022)



COMMUNICATE

- Once approved, company must make target public within 6 months



DISCLOSE

- Companies must disclose emissions annually and monitor progress towards targets
- SBTi recommends disclosing through CDP and company annual / ESG reports and website



What target-setting options are available for SBTi?

Near Term Targets

Covers how organizations will reduce emissions over the next 5-10 years

Required when committing to SBTi

Long Term Targets

Indicates the degree of emission reduction needed to achieve net zero targets (achieved no later than 2050*)
Also includes any targeted reductions with a target date > 10 years away

Not required when committing to SBTi

Net Zero Targets

Commitment to reducing scope 1,2 and 3 emissions to zero / a residual level, and neutralizing any residual emissions released thereafter

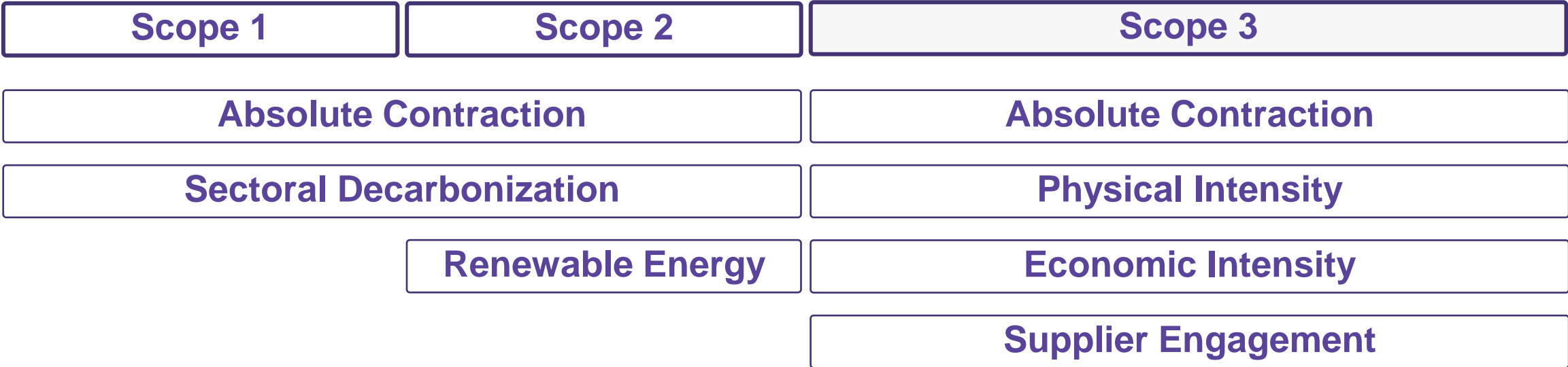
Most companies will require deep decarbonization of 90-95% to reach net-zero

Not required when committing to SBTi, but must set near-term and long-term targets to set a net zero target

Source: "About Us." SBTi, accessed June 23, 2022. "SBTi Corporate Net-Zero Standard." SBTi, October 2021.
*Long term targets must be met no later than 2040 for the power sector.



How does a company develop Science-Based Targets?



Depending on which method is chosen, companies may need to use different strategies to achieve their targets

*Not all methods may be available to all companies. Companies should consult with any sector-specific guidance to verify if certain methods are allowable for their industry..

Target methodology

An **Absolute Contraction** target covering **100%** of Scope 1 & 2 emissions.

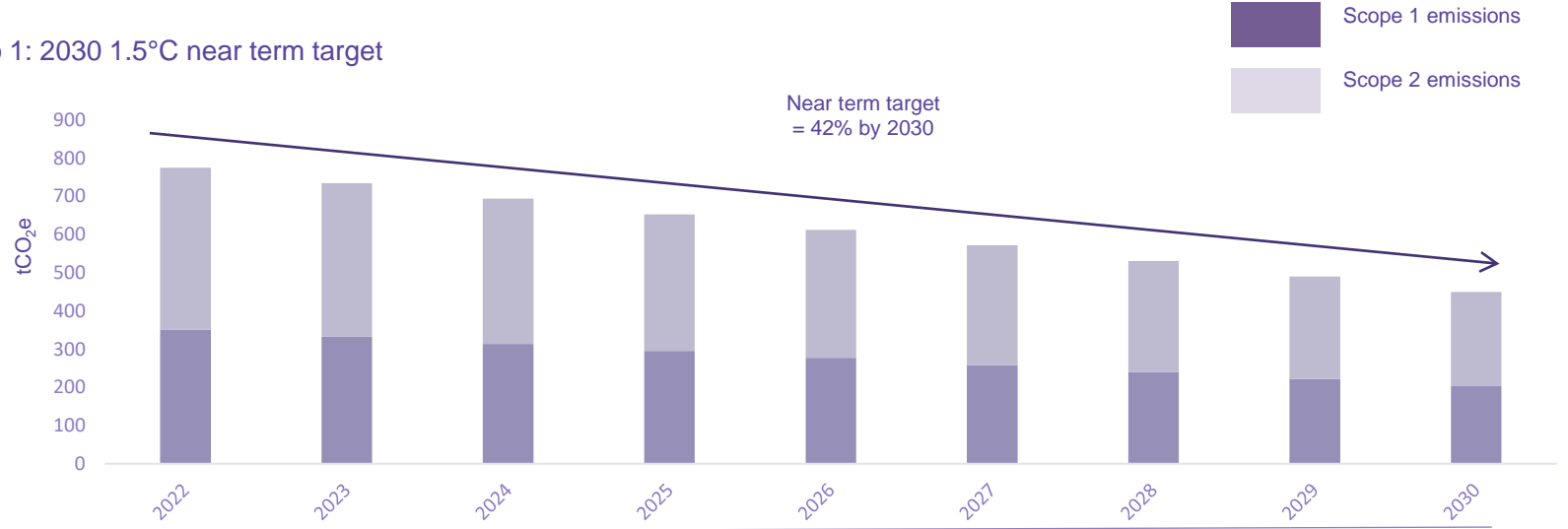
2022 Scope 1 & 2 Emissions: 750 tCO₂e

Reduction of **42%**

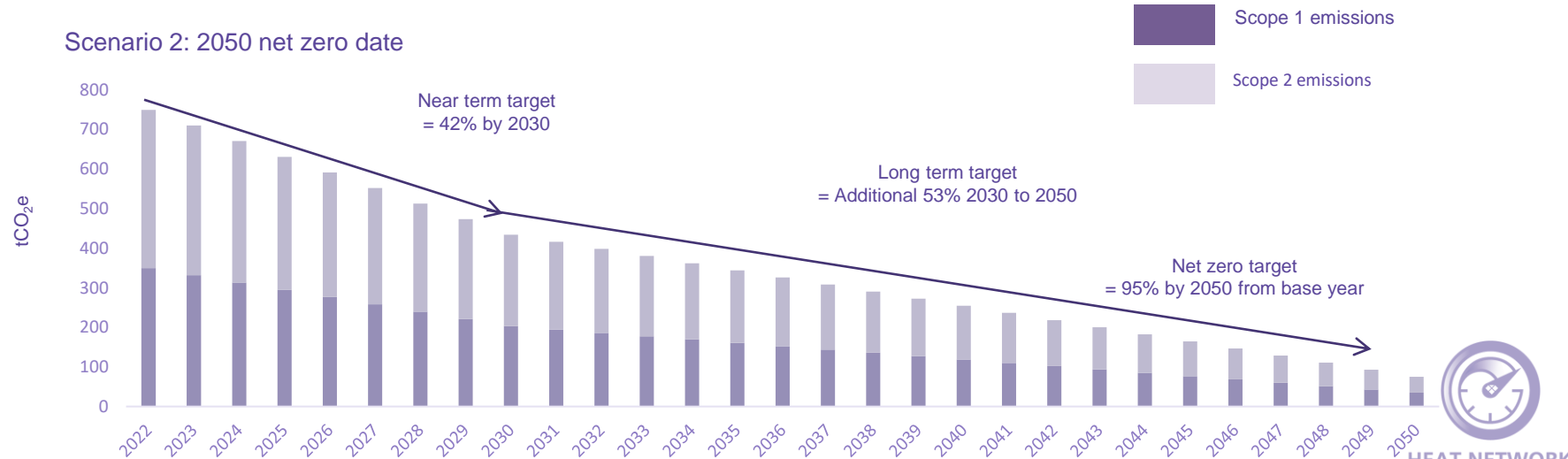
2030 Near-term target: 435 tCO₂e

Example Targets – Scope 1 & 2 Emissions

Scenario 1: 2030 1.5°C near term target



Scenario 2: 2050 net zero date

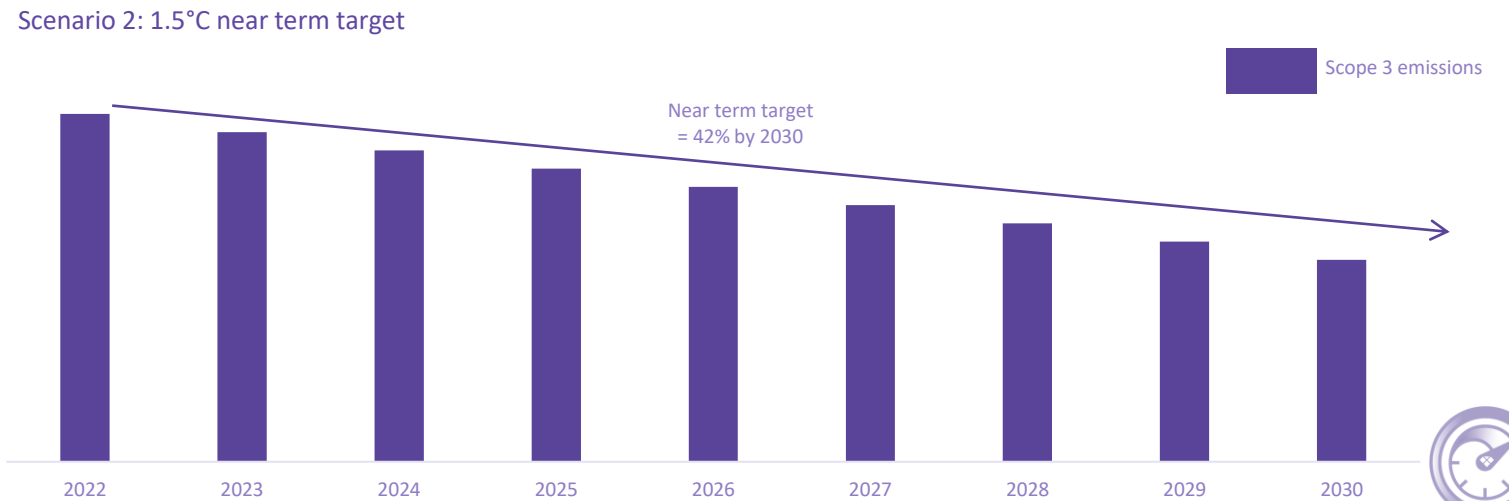
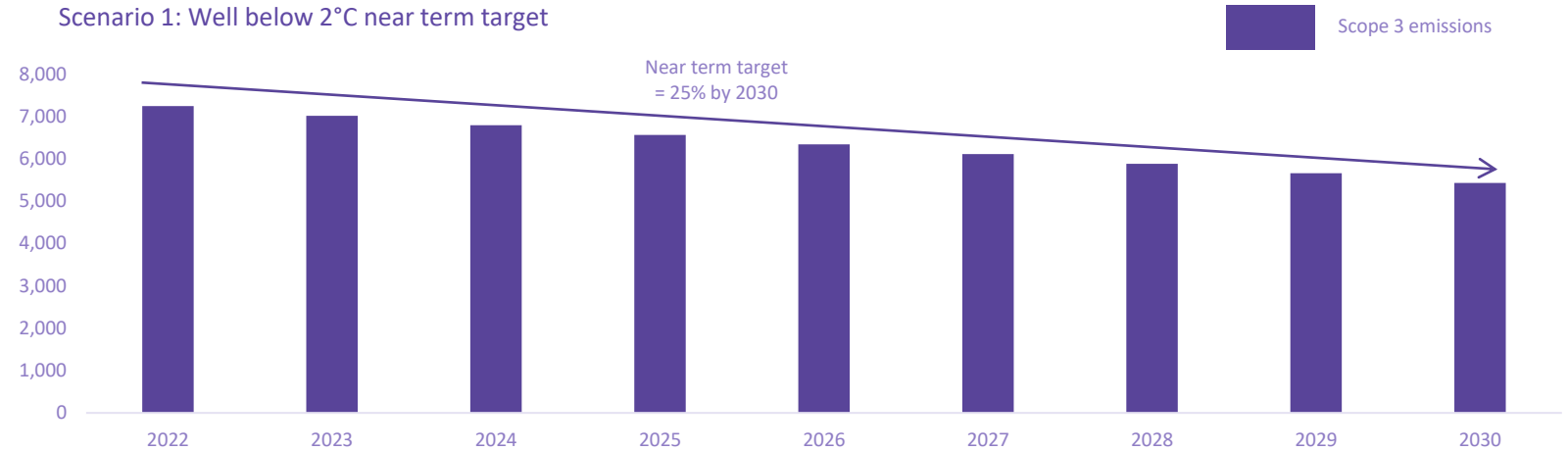


Target methodology

Absolute Contraction target covering all of Scope 3 for near-term targets.

There is the option to do 1.5 degrees aligned, or a well-below 2 degrees aligned.

Example Targets – Scope 3 Emissions



2022 Scope 3 Emissions:
7,000 tCO₂e

2030 1.5 target:
4,060 tCO₂e



Communication & Disclosure: SBT

Example targets:

Scope 1 & 2 – Company A to set an ‘Absolute Contraction’ target for Scope 1 and 2 because it covers the required >95% of Company A’s Scope 1 and 2 emissions and has the lowest reduction rate compared to other available SBTi target setting methods.

Scope 3 – 67% coverage needed

- An Absolute Reduction target could be set for reduction of Business Travel emissions. In 2019, this accounts for 44% of Scope 3 emissions.
- For the remaining 23% of Scope 3 emissions required for coverage, a Supplier Engagement target is could be considered.

Disclosure & subsequent monitoring:

- After communicating your target, you will be required to keep up on disclosing progress made against the science-based targets, as well as monitoring progress.
- You can do this through CDP, annual reports, your own company’s website etc.

Scope 1	Scope 2	Scope 3
Absolute Contraction		Absolute Contraction
<p>2019 Base Year: 50.7% reduction by 2030 2022 Base Year: 42.0% reduction by 2030</p>		<p>2019 Base Year: 27.5% reduction by 2030 for WB2°C aligned 2022 Base Year: 25% reduction by 2030 for WB2°C aligned</p>
Covers all required Scope 1 and 2 emissions		Covers all required Scope 3 emissions
Renewable		Physical or economic intensity
100% Scope 2 renewable electricity by 2030		51.6% by 2030
Electricity only. Doesn't cover all required Scope 1 and 2		Could be applied to emissions embodied in construction and would cover all required Scope 3 emissions
		Supplier Engagement (coverage)
		Not a tCO ₂ target
		Would require a certain % of suppliers to set SBT's to meet coverage needed

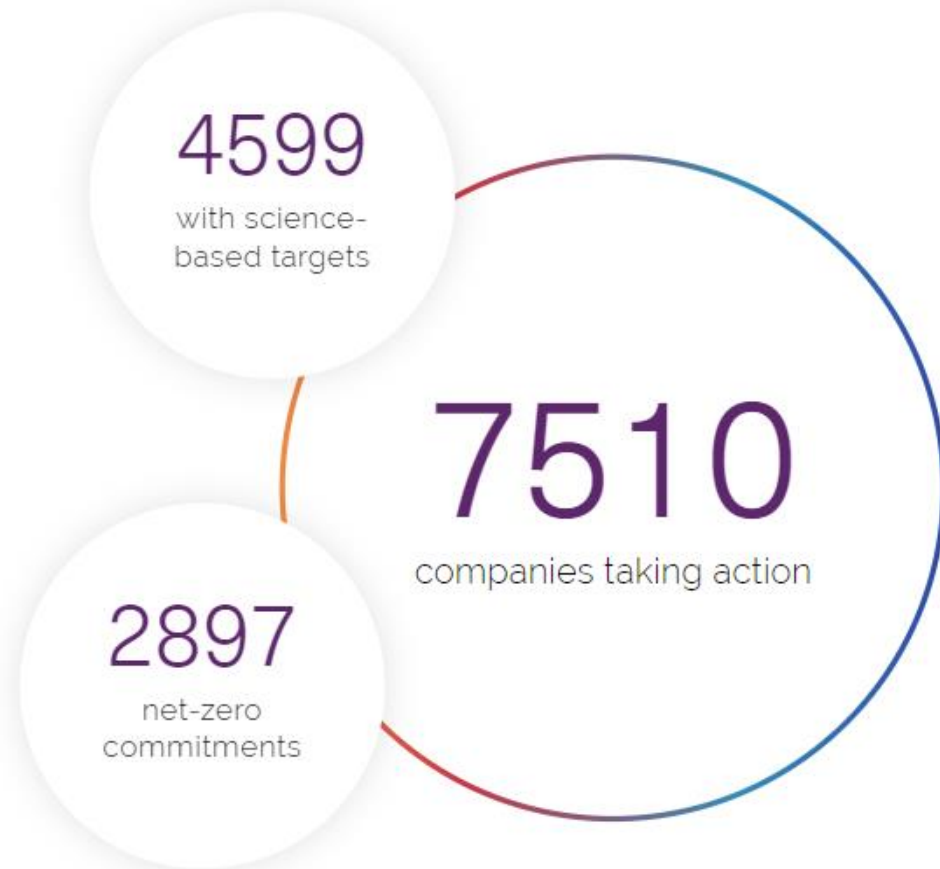
Example target statements:

“Company A commits to reduce absolute Scope 1 and 2 GHG emissions 50.7% by 2030 from a 2019 base year.

Company A also commits to reduce absolute Scope 3 GHG emissions from business travel by 27.5% by 2030 from a 2019 base year, and that 60% of suppliers by emissions impact covering purchased goods and services will have science-based targets by FY2028.”



Taking the next step on your climate journey with SBTi



Resources:

- [SBTi Corporate Manual](#)
- [SBT Commitment Letter](#)
- [SBTi Standard Commitment application](#)
- [SBTi How-To Guide](#)
- [SBTi Criteria and Recommendations](#)
- [Net-Zero: Getting Started Guide](#)
- [Net-Zero Standard Criteria](#)
- [Target Validation Protocol](#)
- [Target Setting Tool](#)
- [Target Setting Tool for Well-Below 2°C Targets](#)
- [Net-Zero Tool](#)
- [Sector-specific Guidance and Requirements](#)
- [SBTi Buildings Guidance Pilot Testing](#)
- [List of All Resources](#)

Any questions?



What happens now?

- We'll save and share the recording of this session.
- We'll develop and communicate out the timings and content of the Scope 3 seminar in due course.
- If you have any questions we've been unable to answer, or any feedback you'd like to give us on the session, please contact us at: HNES@gemserv.com
- We will circulate feedback forms over the next couple of days to gather your views.

