SUPPLY CHAIN SUSTAINABILITY SCHOOL

Net Zero, Carbon Reduction and Science Based Targets

Stefania Chica Jacome, Action Sustainability

House Rules

Mics off unless talking

‘Raise your hand’ or use the chatbox for questions

Share your feedback at the end

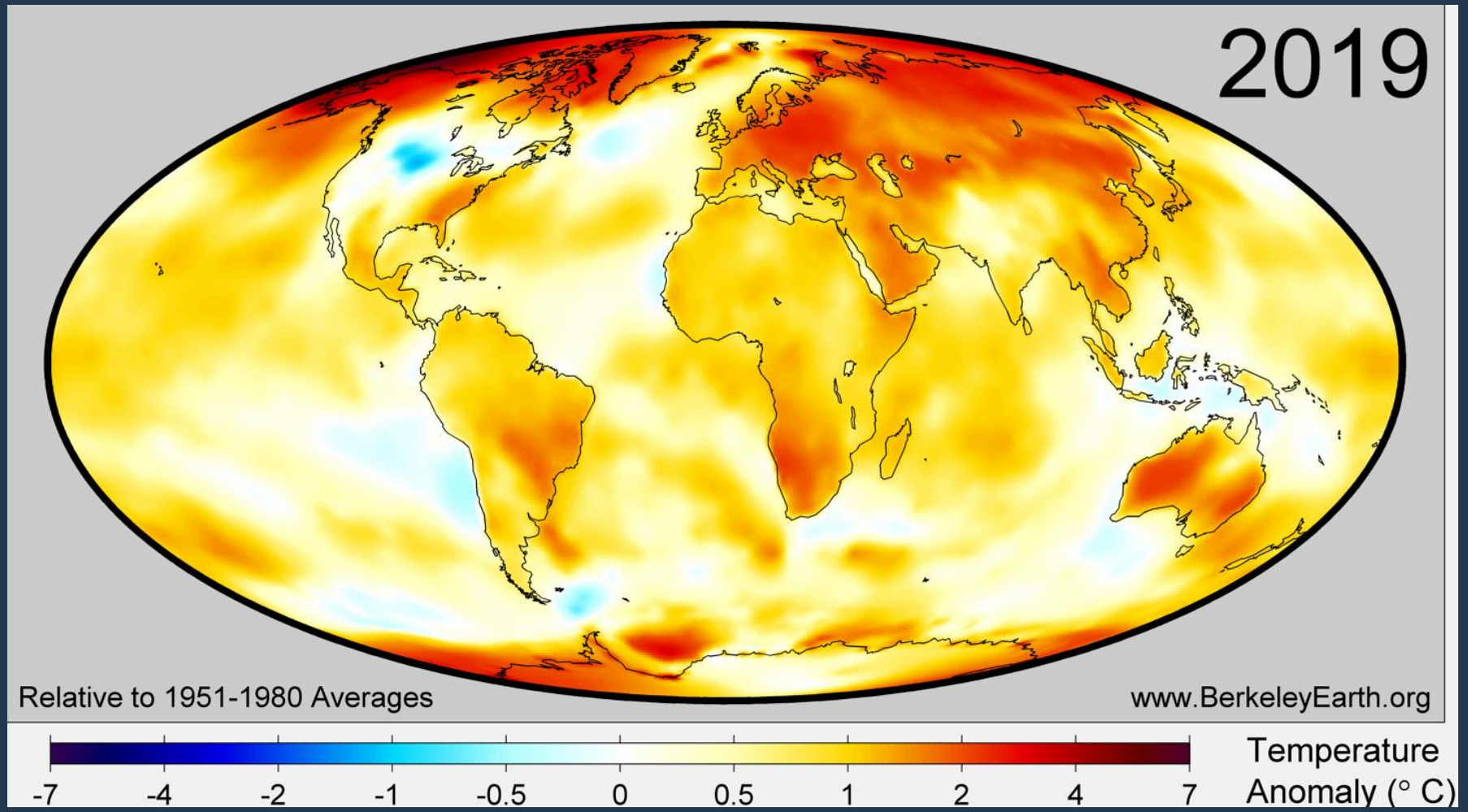
Slides will be shared later

Workshop Overview

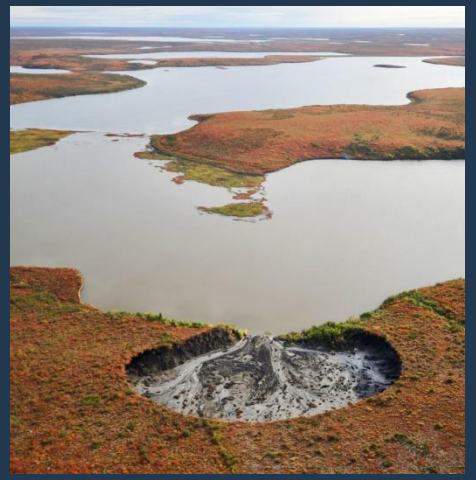
- ✓ **Recap on Carbon**
- ✓ **What is Net Zero: why** are we reducing carbon?
- ✓ **Carbon Reduction: What** actions can we use to reduce carbon?
- ✓ **Offsetting: What** do we do with residual carbon?
- ✓ **Science based targets: how** do we set targets?

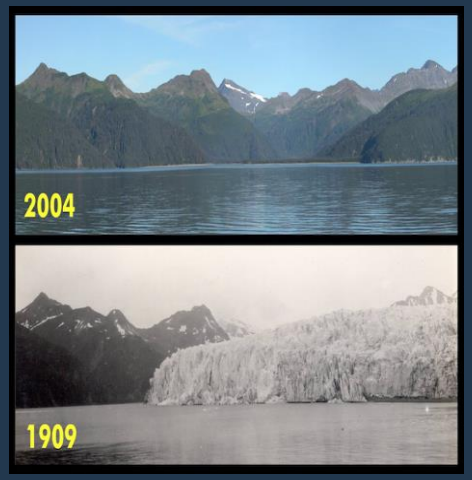
Why are we reducing carbon?

Global Temperature Anomalies in 2019



Scene Setting: The last few years





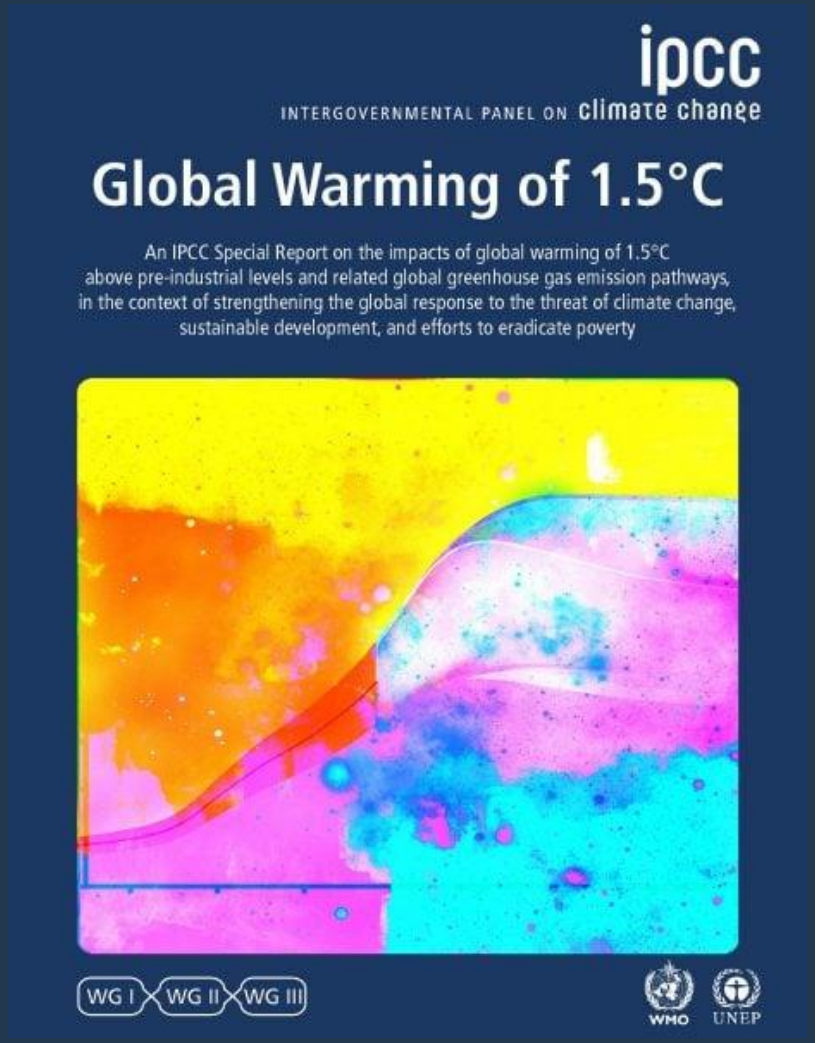
What is the response, target and progress?

The Paris Climate Change Agreement, COP21, 2015

- Reduce emissions of the basket of Kyoto Protocol GHGs
- In line with a well-below 2°C or 1.5°C warming scenario
- Each nation to make Nationally Determined Contributions – NDCs – UK's = 68% by 2030 vs 1990

UNITED NATIONS
PARIS CLIMATE AGREEMENT
SIGNING CEREMONY
22 APRIL 2016

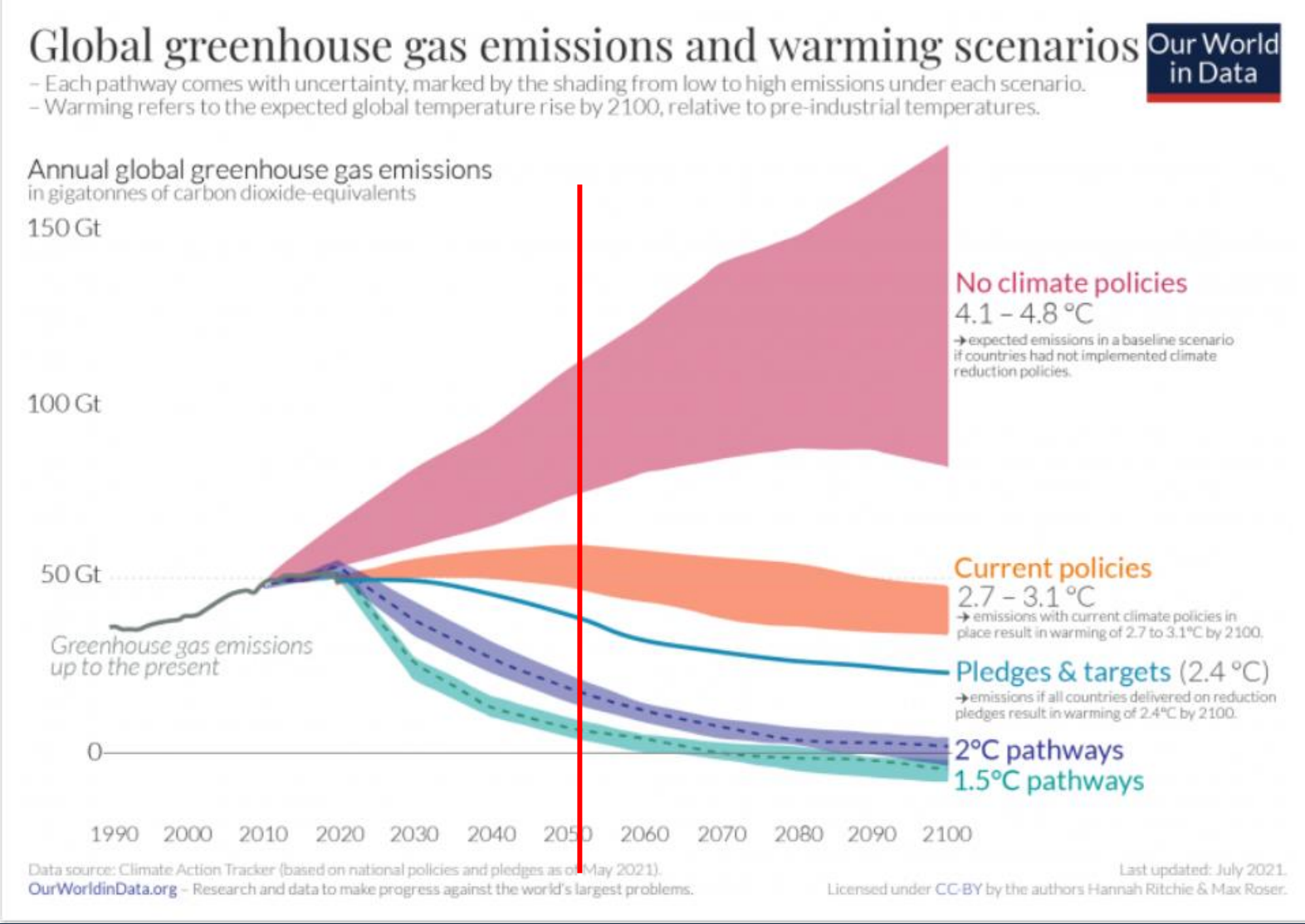
IPCC Special Report, 2018



An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

- 2°C is not enough - the impacts from a 1.5°C world are markedly less than a 2°C world: extreme weather events, impact on biodiversity, ice melt…
- "Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in **energy**, land, urban and **infrastructure (including transport and buildings**), and industrial systems.
- These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options "
- [For] 1.5°C … renewables are projected to supply 70–85% of electricity in 2050.

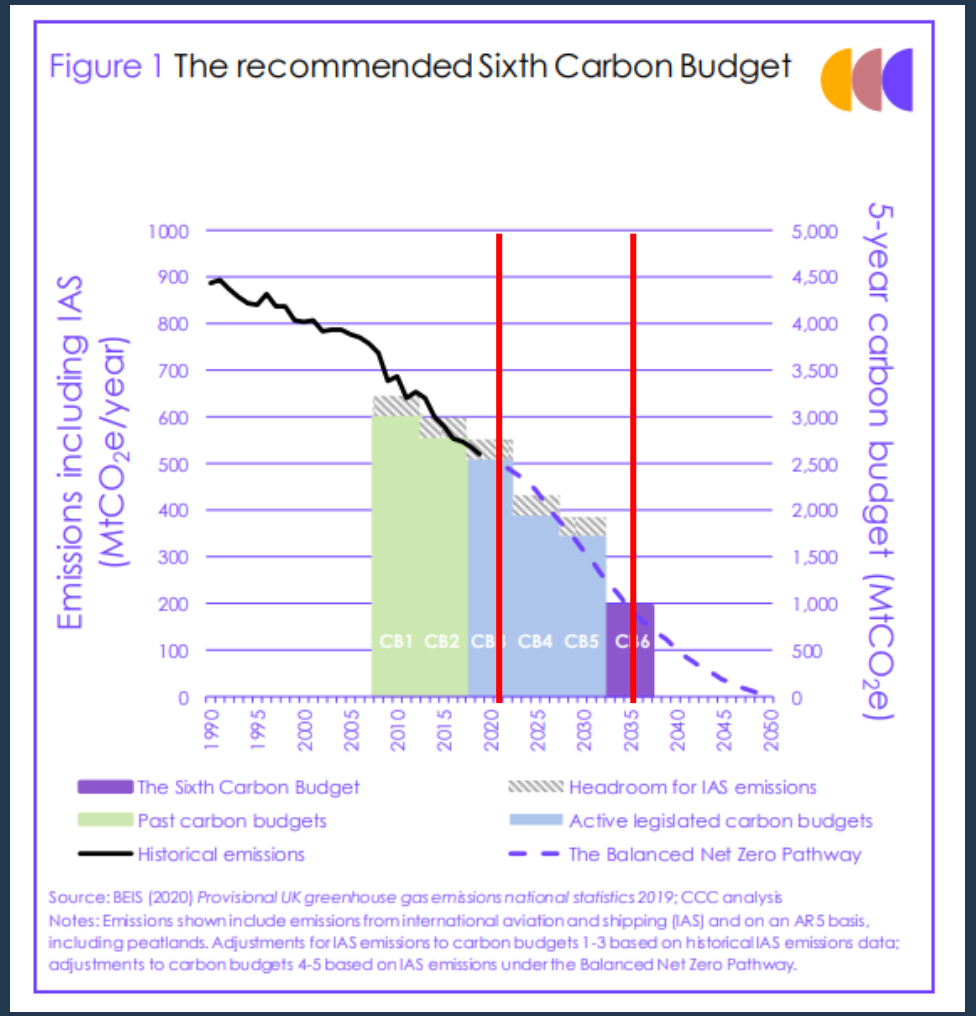
The science-based route to a lower carbon world



- SBT are the process of aligning with the science behind the Paris Climate Change Agreement
- Distilled into what that means at an organisational level
- Leading to reduction targets on a near-term and long-term timeframe for that organisation
- Hence targets are 'science-based' as they align with the science of the Paris Climate Agreement to limit warming to 1.5°C

The Law!

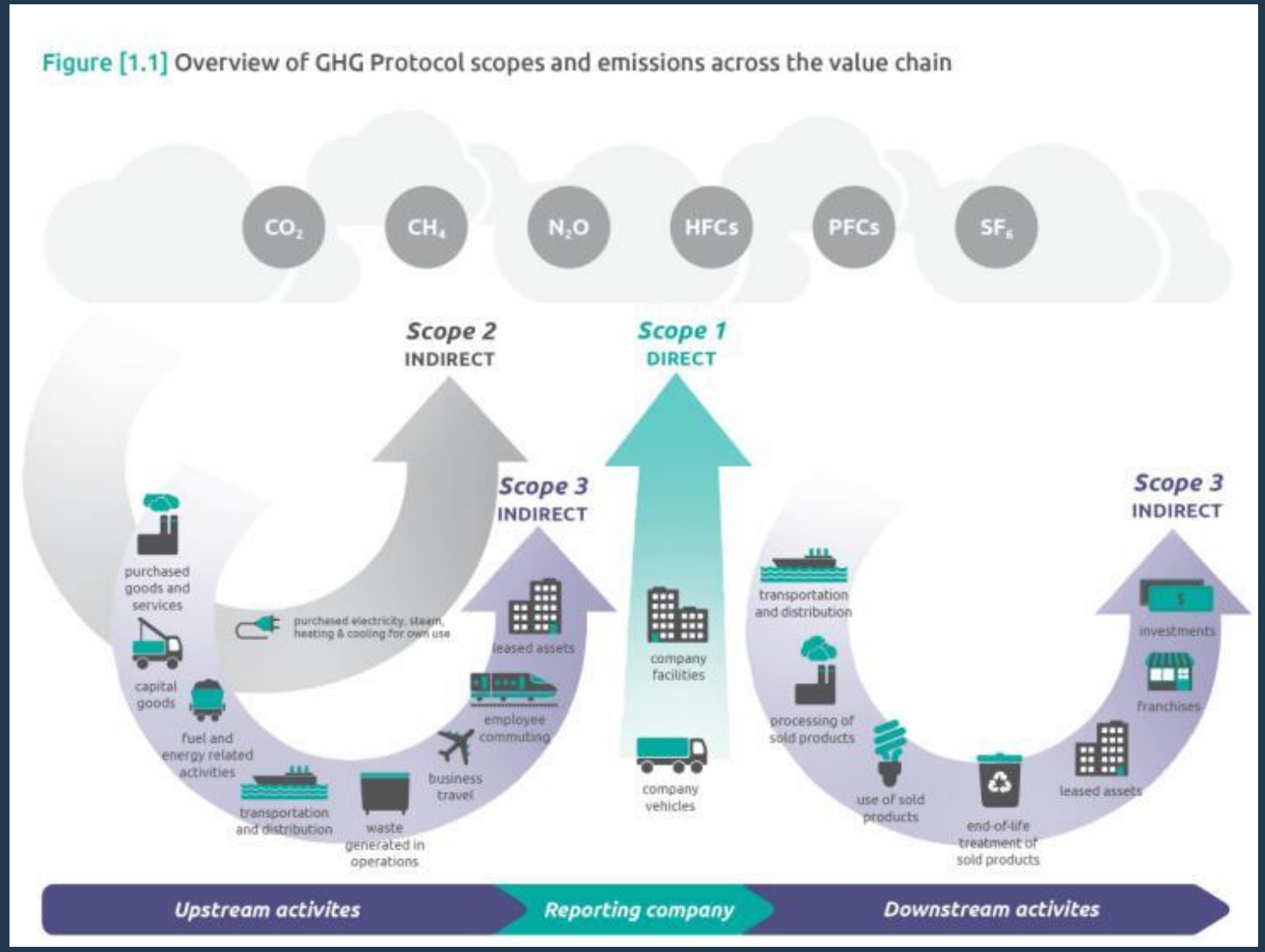
- UK Climate Change Act 2008 target of 80% reduction by 2050 updated to 'net zero' in 2019
- Scotland has legislated to hit net-zero by 2045
- Wales' target to reduce by 95% by 2050 but aiming for net zero
- Ireland has legislated to hit net-zero by 2050
- New intermediate target for UK of 78% by 2035 vs 1990 baseline



Recap on Scopes

Operational Boundaries – Scopes

- **Direct emissions** are emissions from sources that are owned or controlled by the reporting company
- **Indirect emissions** are emissions that are a consequence of the activities of the company but occur at sources owned or controlled by another company



SUPPLY CHAIN SUSTAINABILITY SCHOOL

What is Net Zero?

Net zero

- ‘Net zero’ is about reducing your GHG emissions as much as possible, following the carbon hierarchy and in line with Paris
- It covers the whole value chain – upstream and downstream – to reduce carbon, not just your organisation, and includes everything you use: transport, products & services, waste, etc
- For many organisations, more than 80% of the carbon could be outside the business, i.e. scope 3!
- Only once emissions have been reduced can you balance any remaining hard-to-decarbonise emissions with GHG Removals

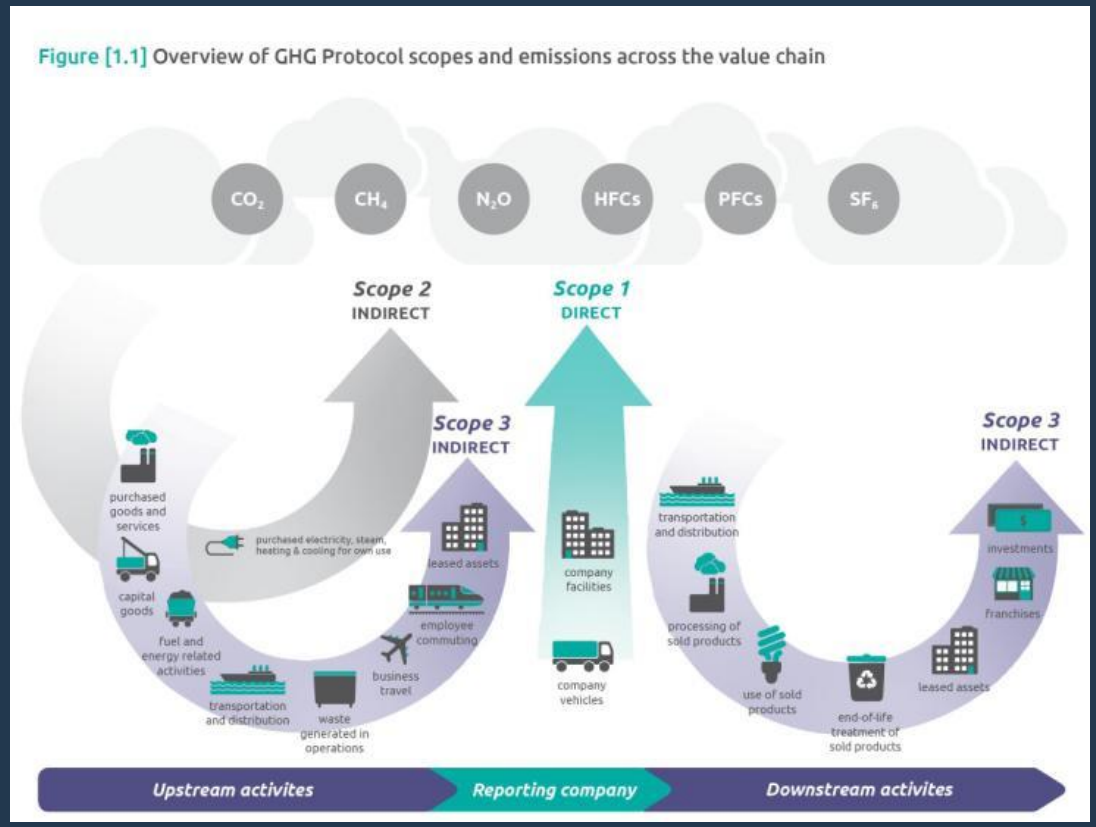
Net zero and carbon neutral

- Similar but different!
- Both are a zero-sum balance between GHG emitted and the same amount offset or sequestered – but different boundaries!
- ‘Carbon Neutrality’ generally focuses on Scopes 1 and 2. Scope 3 is optional but encouraged.
- There is no defined ambition for reduction.
- It allows offsetting.
- PAS 2060 is the Standard for Carbon Neutrality.

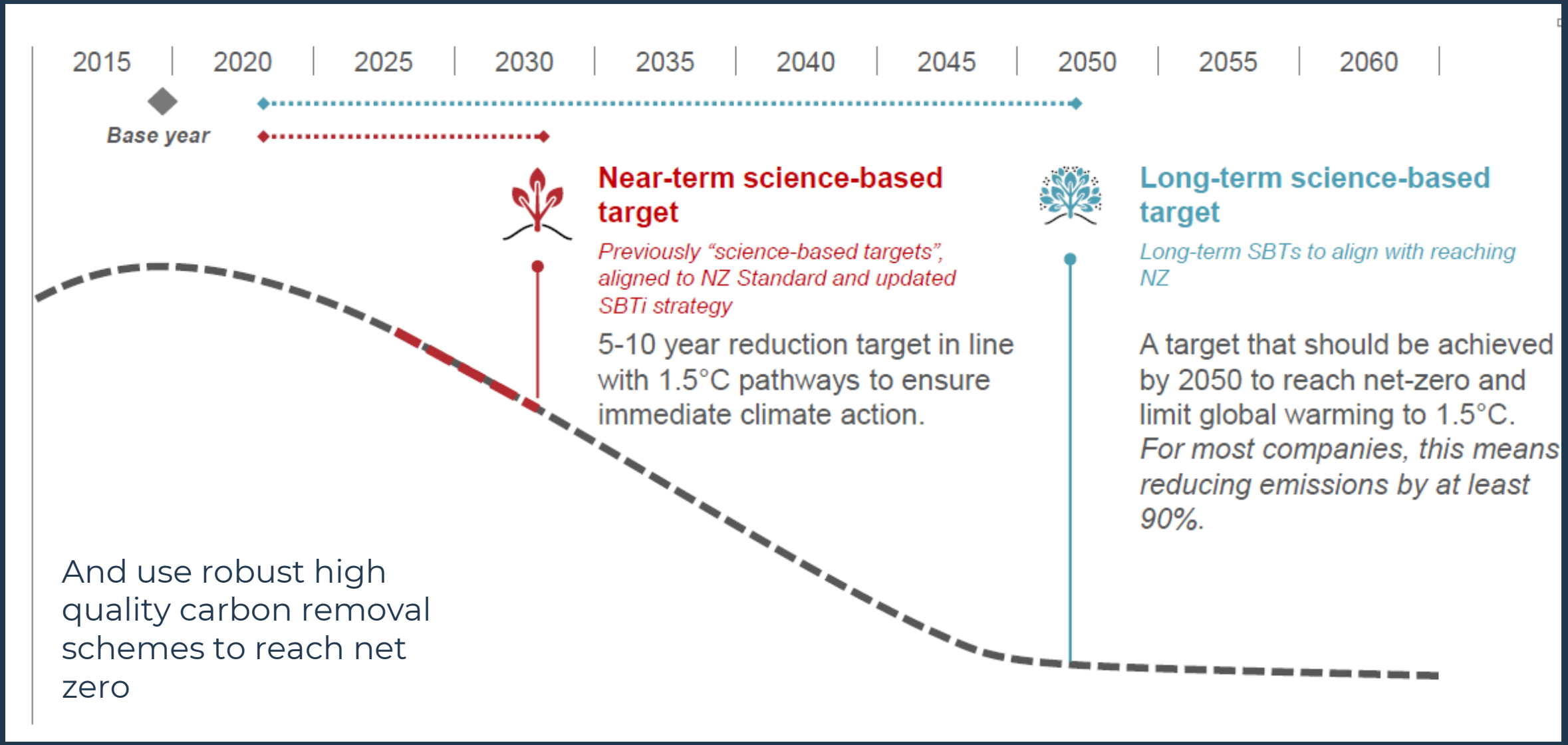
Some potential issues with ‘net zero’ and ‘carbon neutral’

- Take care when organisations say they are ‘carbon neutral’ or ‘net zero’. Is it their only their Scope 1 and 2, or is it Scope 3 also?

- Offsetting has its role to play with residual GHG emissions, and only after other actions have been taken – this is the carbon hierarchy



SBTs and Net Zero

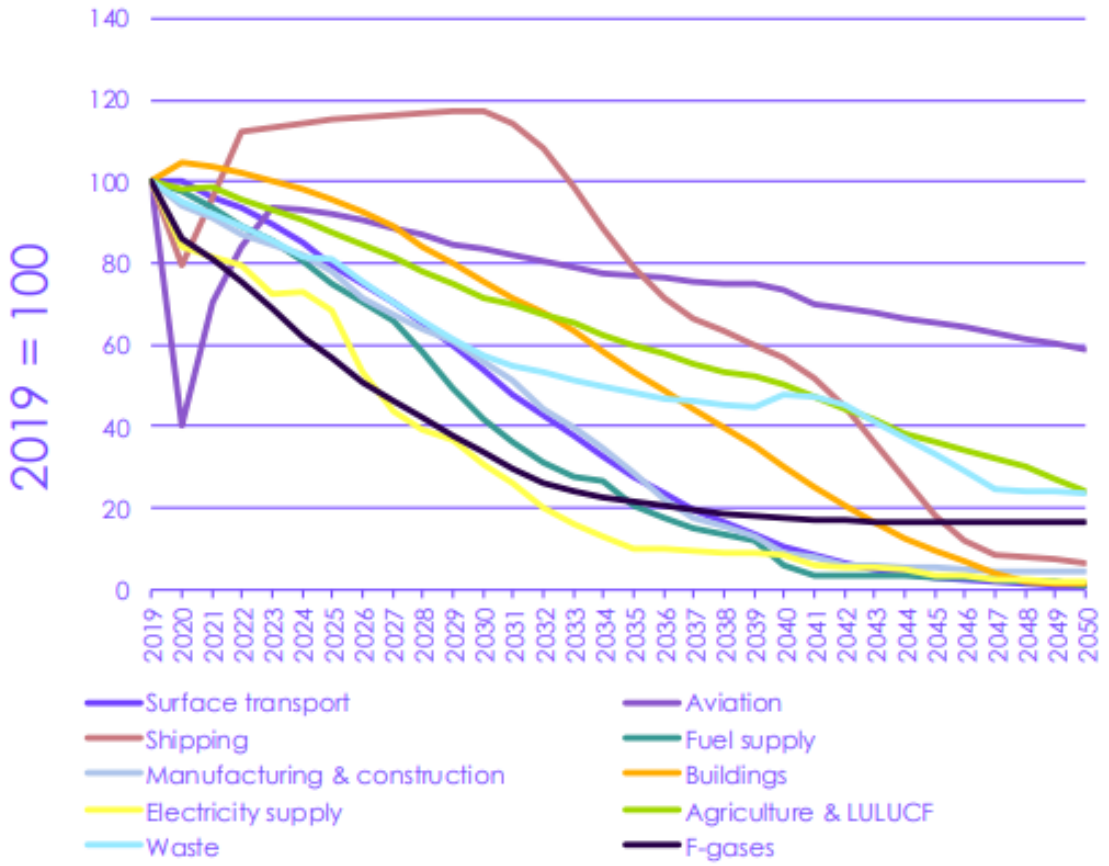


The UK’s approach to Net Zero

Reducing GHG to net zero

- **We should reduce emissions as far as possible, but**
- Some activities and sectors are hard to fully decarbonise, for good reason
- Due to the nature of what they do, and the currently available technology to reduce emissions further
- Sectors in this space include agriculture, aviation, waste, the use of F-gases and some manufacturing

Figure 2.5 Change in sectoral emissions in the balanced Net Zero pathway compared to 2019 levels



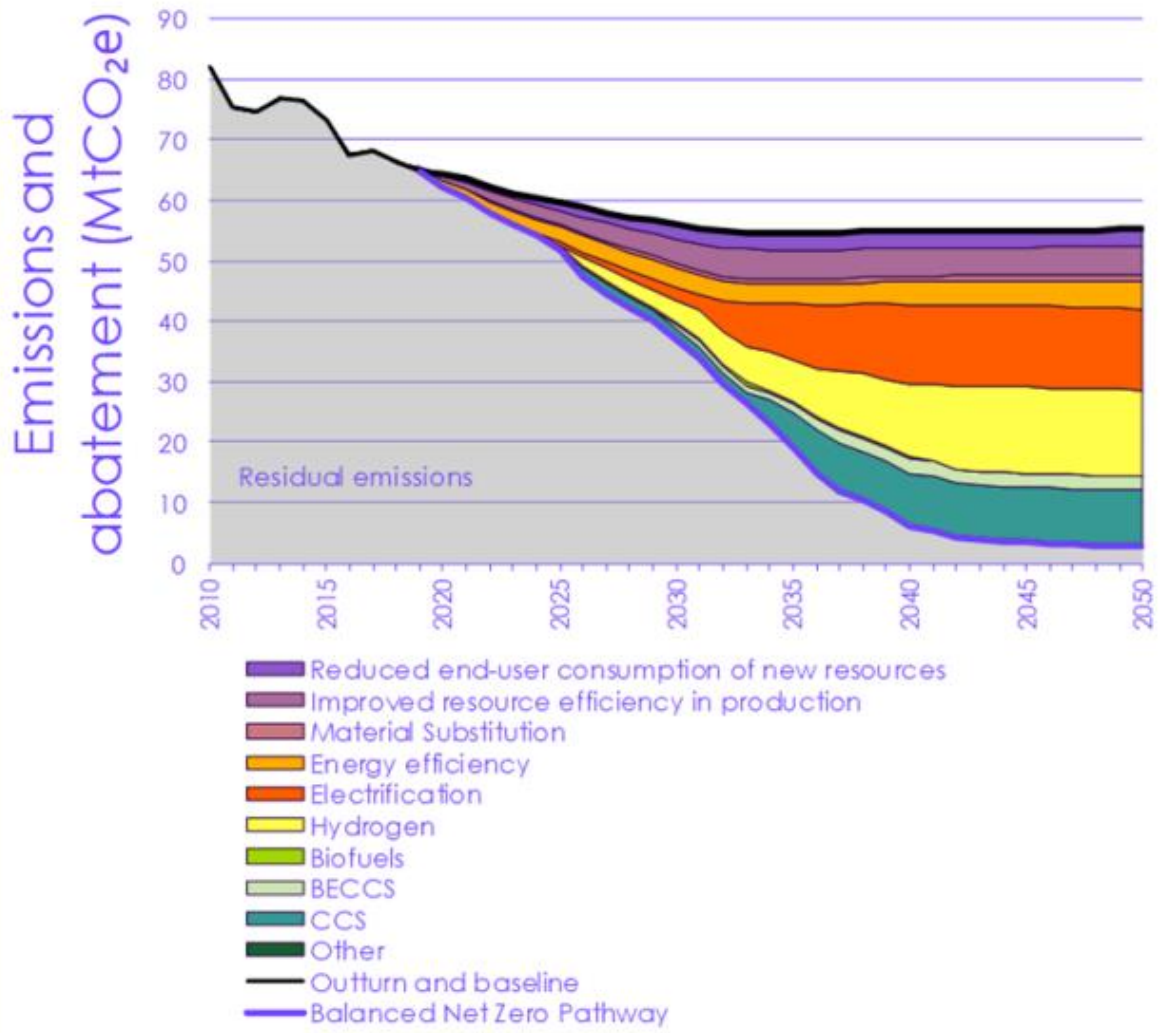
Source: CCC analysis.
Notes: Aviation and shipping pathways are lower in 2020 due to COVID-19. LULUCF = Land-use, land-use change and forestry.

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Decarbonising Manufacturing & Construction

- Combination of approaches
  - Energy & resource efficiency
  - Material substitution
  - Non-fossil power: biofuel, electric, H_2
  - Removal: CCS and BECCS

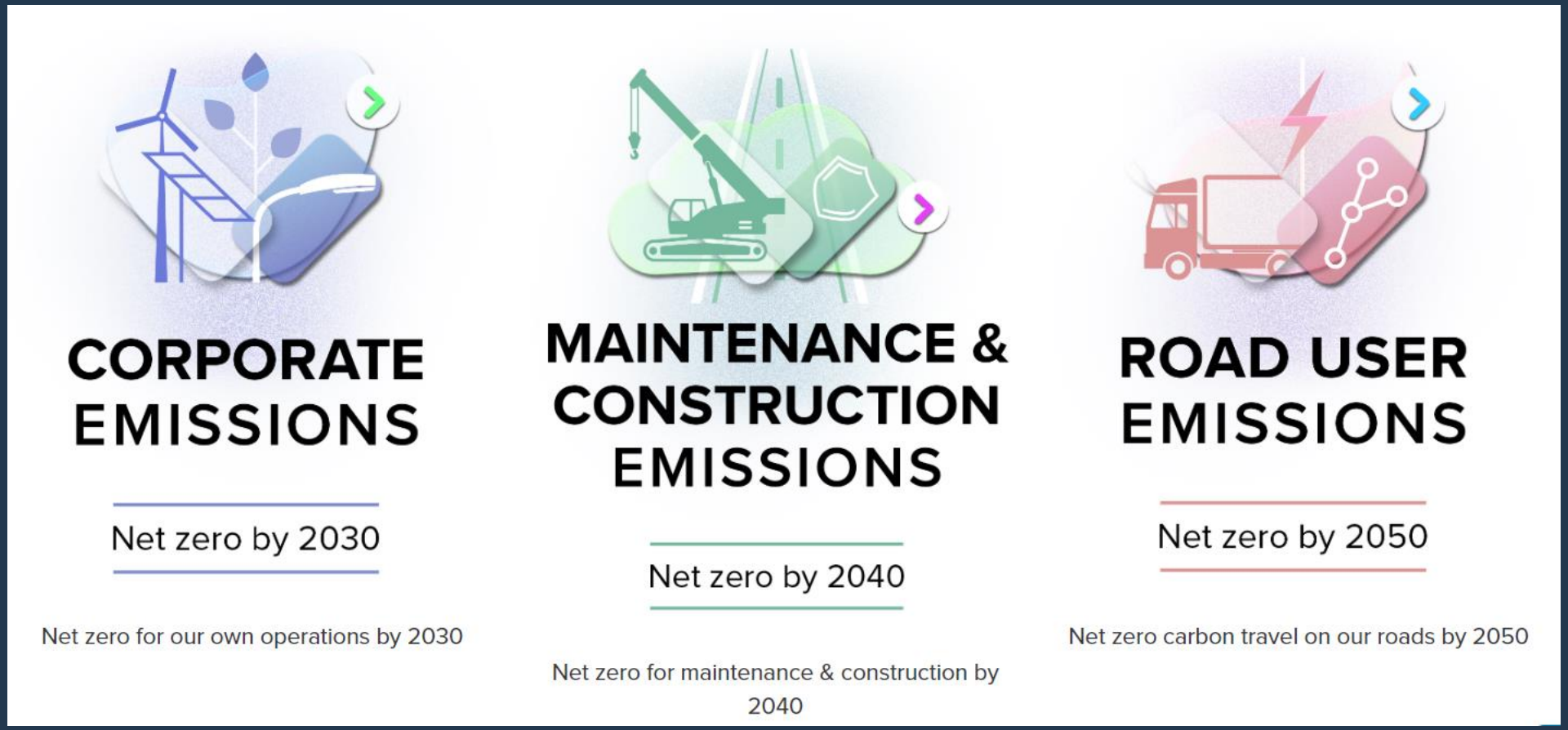
Figure 3.3.a Sources of abatement in the Balanced Net Zero Pathway for the manufacturing and construction sector



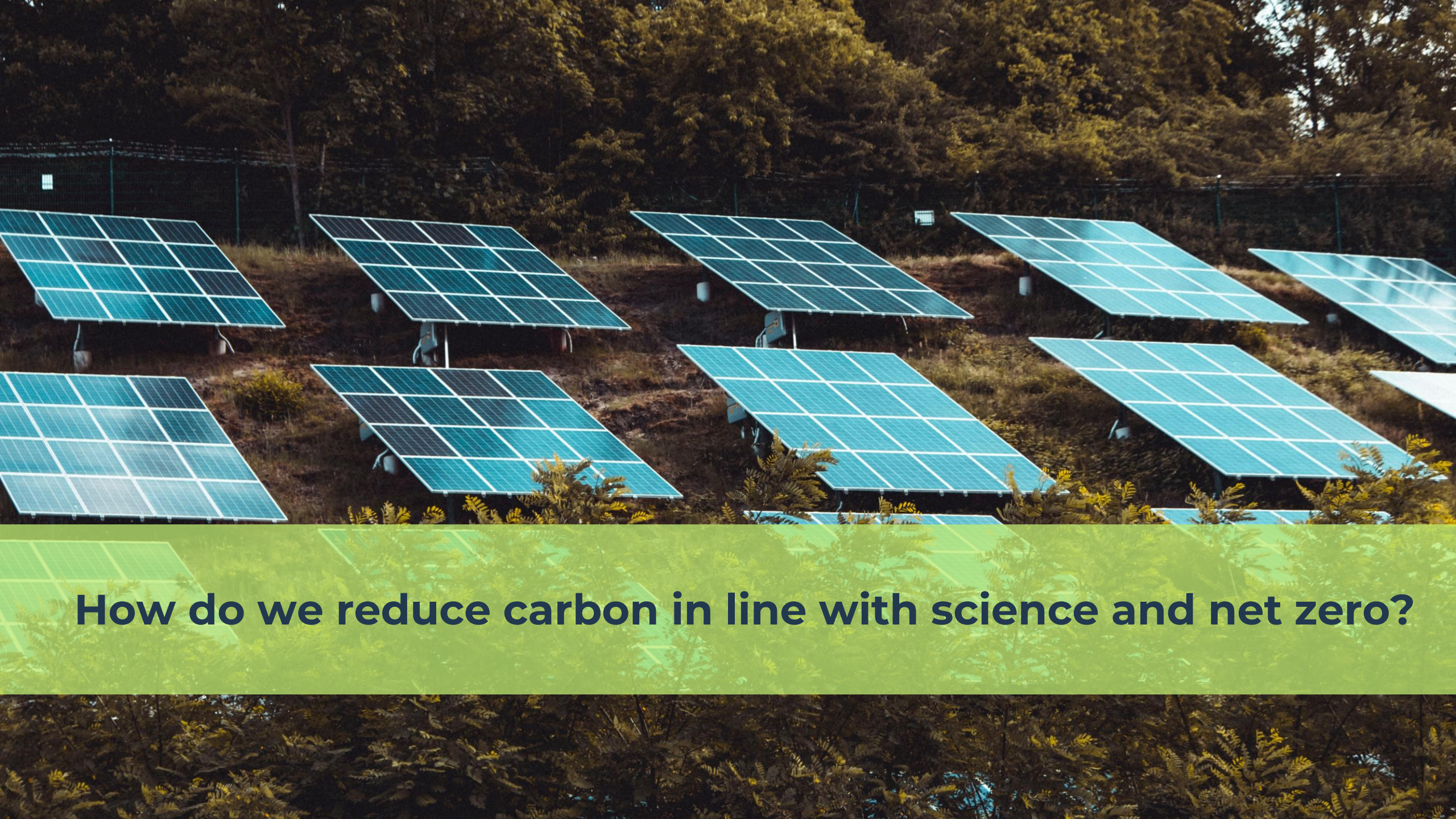
Source: BEIS (2020) *Provisional UK greenhouse gas emissions national statistics 2019*; CCC analysis.
Notes: The abatement from BECCS in the graph does not include the carbon captured, which is accounted for the in the removals subsection of Chapter 3.

SUPPLY CHAIN SUSTAINABILITY SCHOOL

National Highways – Net Zero Plan



For more information check out: https://nationalhighways.co.uk/netzerohighways/



How do we reduce carbon in line with science and net zero?

Responding to climate change

Mitigation

Actions that reduce the emissions that contribute to climate change

- Sustainable transportation
- Energy conservation
- Thermal mass / sinks for temperature regulation
- Insulation and heat recovery systems
- Renewable energy
- Energy & carbon efficient materials and products
- Improve vehicle fuel efficiency
- Capture and use landfill & digester gas

- Geothermal
- Green roofs
- District heating
- Building design for natural light & ventilation
- Tree planting & care
- Water harvesting & conservation
- Local food production

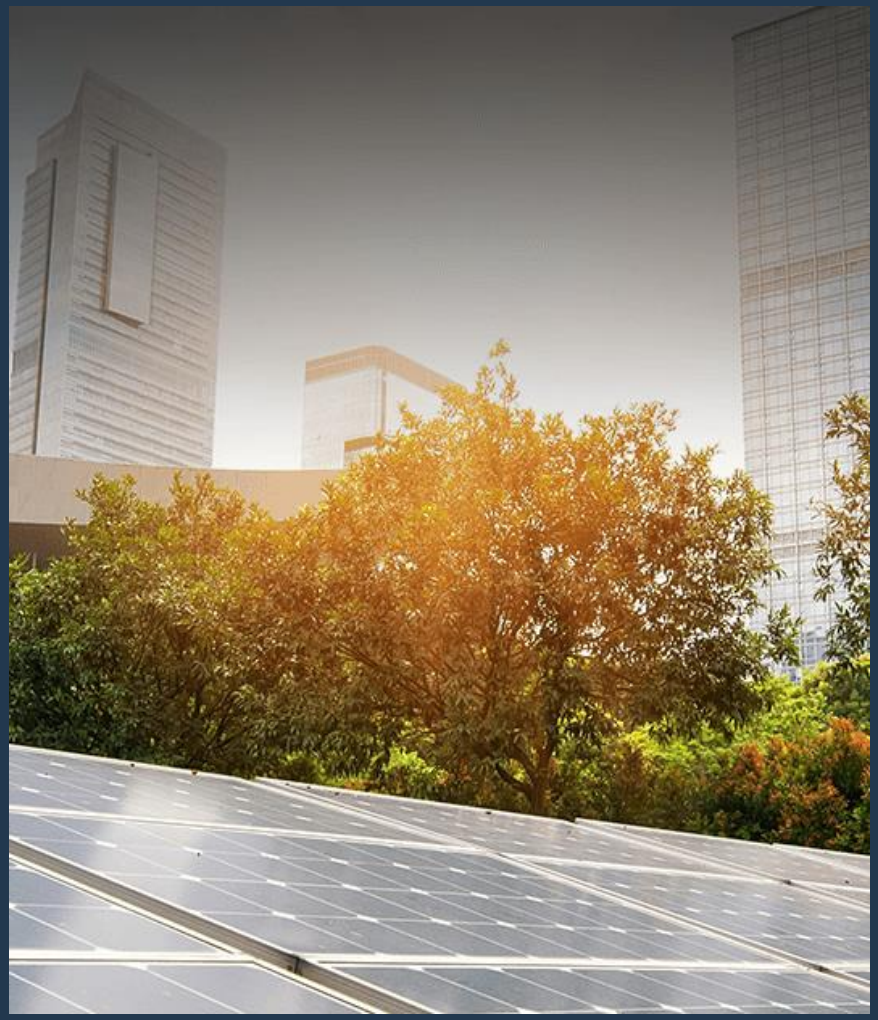
Adaptation

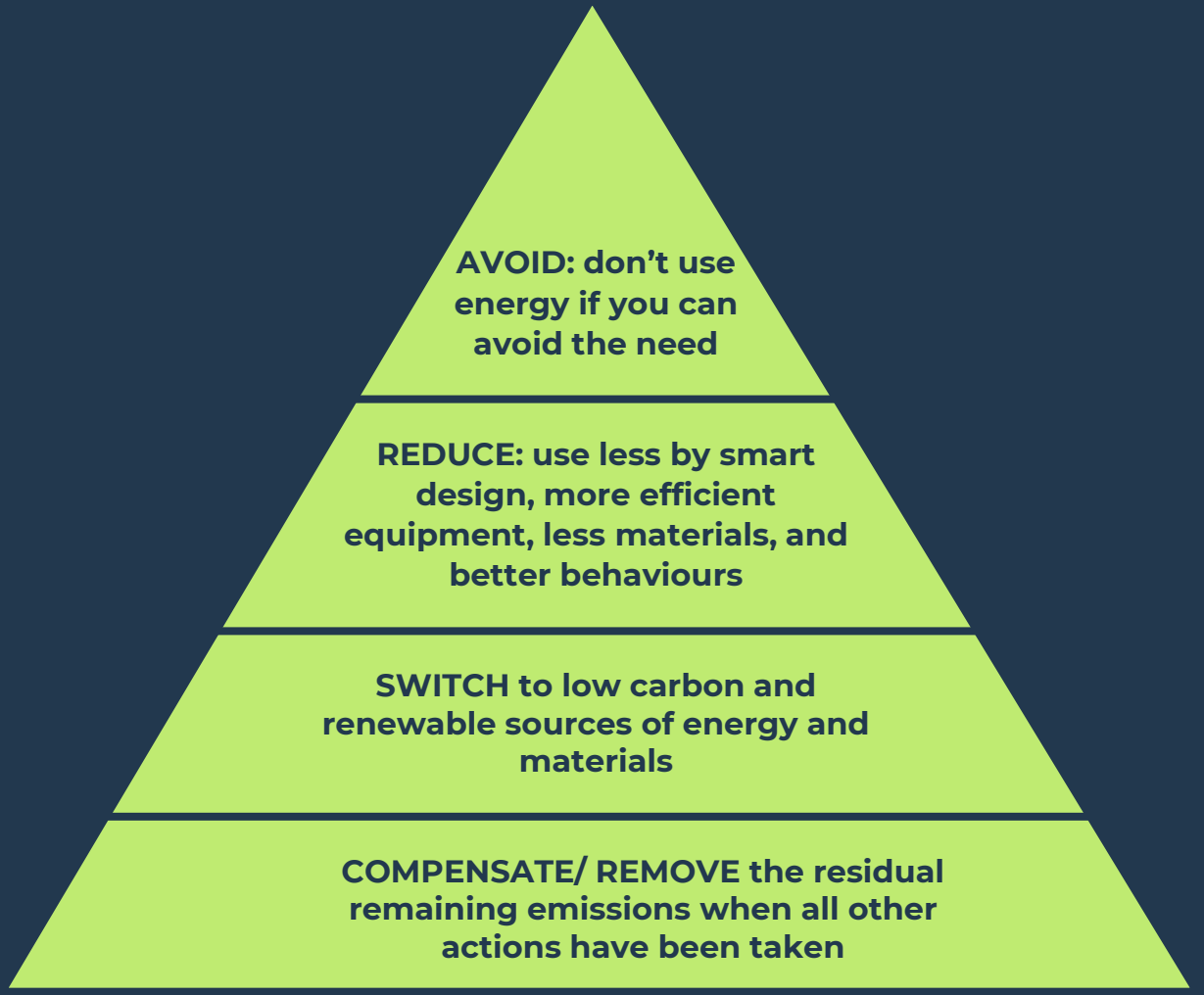
Actions that reduce vulnerability to the effects of climate change

- Infrastructure upgrades: SUDS, sewers & culverts
- Residential programs: sewer backflow & downspout disconnection
- Health programs and help for vulnerable people
- Emergency & business continuity planning
- Coastal and river bank protection and flood plain maintenance

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Use the Carbon & Energy Hierarchy





Carbon Reduction Actions

More efficient equipment and transport, e.g.

- **Invest in energy-efficient equipment,** e.g. lighting, welfare cabins, plant & equipment, HVAC, IT
- **Upgrade your fleet** to Euro 6 and plant to NRMM Stage V. Go further to electric / hybrid. Knock on air quality benefits

Consider the materials you are using, e.g.

- **Take an eco-design approach** to enable easier maintenance, repair and upgrade
- **Use less material in absolute terms** – work with design and procurement teams
- Switch to alternative **materials with lower embodied carbon impacts**: innovation
- **Increase reuse and the recycled content** of materials – engage suppliers

Improve behaviours and systems , e.g.

- Energy Management Systems and automatic switches & sensors
- Train colleagues and suppliers in how to use equipment efficiently:
  - Choose the right equipment for the job – don't overspec
  - Use correct power modes including in low / eco power modes
  - Turn off equipment that's not being used. Avoid machine idling
- **Pursue offsite production** where possible: lower environmental impacts as well as output efficiency, reduced safety risks

Carbon Reduction Actions – National Highways

100% electricity bought by a **certified renewable tariff** from 2020

Plant at least 3 million trees on or near our land by by 2030

Switch 70% of our **network lights to LED** by 2027

Aim to generate 10% of our **electricity from renewable sources** on, or near to, our own sites by 2030

75% reduction in corporate emissions by 2025, compared to 2017/2018 baseline

75% of our **cars and vans electric or hybrid** by 2025

Case studies

Case Study – The Forge (105 Sumner St): Landsec

- 139,000 sq ft office development in Southwark
  - Aims to be first commercial building constructed and operated in line with UKGBC's net zero carbon buildings framework
  - Work on both supply chain scope 3 emissions, and operational use
  - Using a platform-led approach to design & construction: P-DfMA, consists of a set of components that can be combined to produce highly customised structures

- The trial had positive results compared to a traditional construction site and techniques:
  - Construction productivity improved by 55%; Installation time 30% less; the final build achieved 33% cost savings
  - Final structure uses less material and less waste, and has an almost 20% reduction in embodied carbon
  - Further savings made in specifications, including high levels of recycled content and cement replacement in the main building materials.
  - Passive design techniques to reduce the energy demand, air source heat pumps for heating and cooling, and solar PV for electricity. Once in operation, these will be run on a 100% renewable electricity tariff.

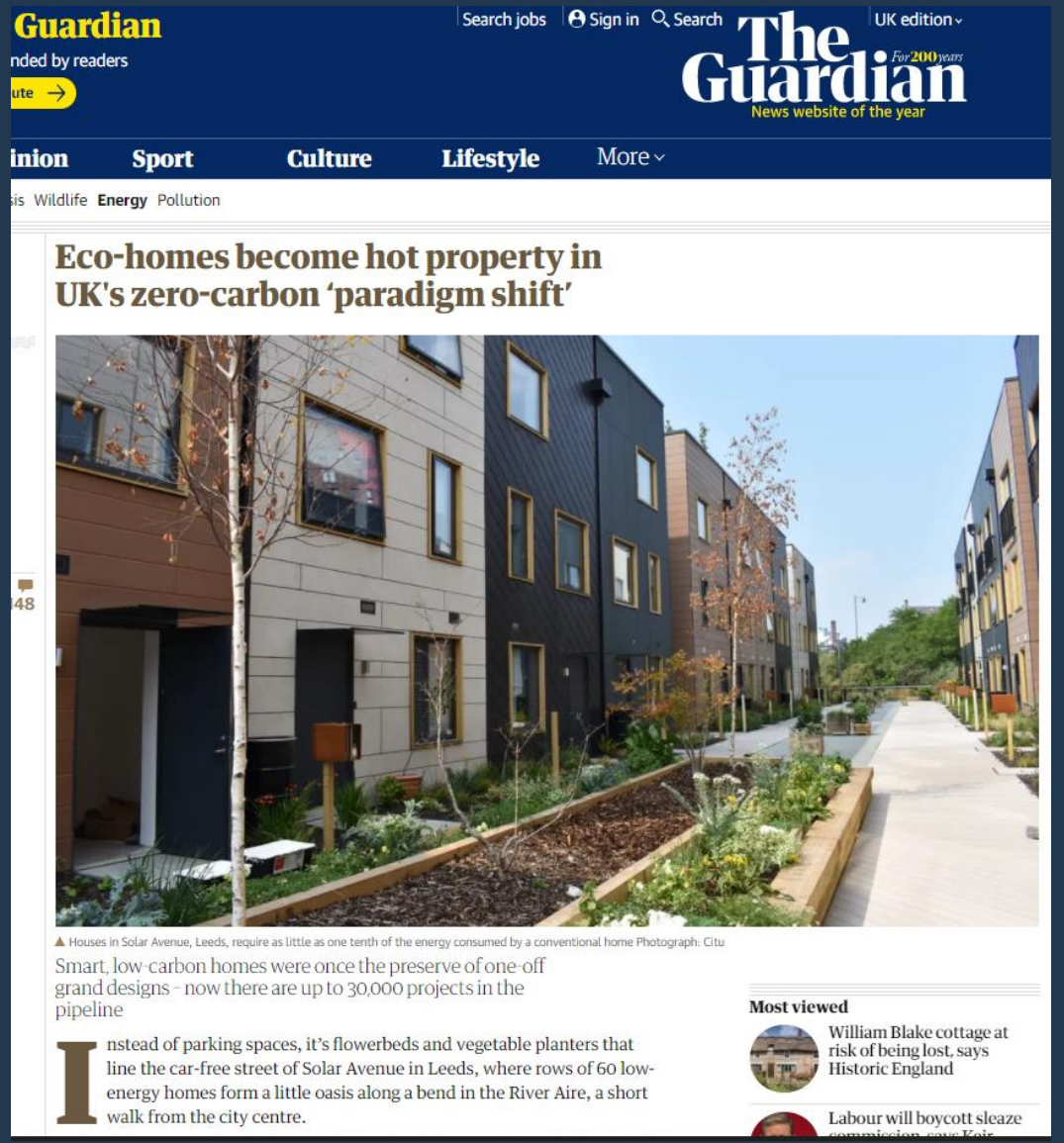
https://www.futureoflondon.org.uk/2020/11/23/achieving-net-zero-case-study-zero-carbon-commercial-development/

https://www.youtube.com/watch?v=NQjcvSFU8Wk

Case Study – Solar Avenue in Leeds

- Avenue of 60 low energy homes in Leeds
- Built in a factory across the road
- Each erected in less than a week
- Made from airtight timber panels containing wood-fibre insulation
- Triple-glazed windows and solar panels on rooves
- They use up to 10 times less energy than a conventional house
- Excess electricity from the PV is fed into a community grid to charge shared electric cars.
- There will soon be 1,000 such homes in this location, along with a combined primary school and care home, as well as a timber office building

- https://www.theguardian.com/artanddesign/2021/mar/06/eco-homes-become-hot-property-in-uks-zero-carbon-paradigm-shift



Guardian
nded by readers
ute
Search jobs Sign in Search
The Guardian For 200 years
News website of the year
UK edition
inion Sport Culture Lifestyle More
is Wildlife Energy Pollution

Eco-homes become hot property in UK's zero-carbon 'paradigm shift'

Houses in Solar Avenue, Leeds, require as little as one tenth of the energy consumed by a conventional home Photograph: Citu

Smart, low-carbon homes were once the preserve of one-off grand designs – now there are up to 30,000 projects in the pipeline

Instead of parking spaces, it's flowerbeds and vegetable planters that line the car-free street of Solar Avenue in Leeds, where rows of 60 low-energy homes form a little oasis along a bend in the River Aire, a short walk from the city centre.

Most viewed

William Blake cottage at risk of being lost, says Historic England

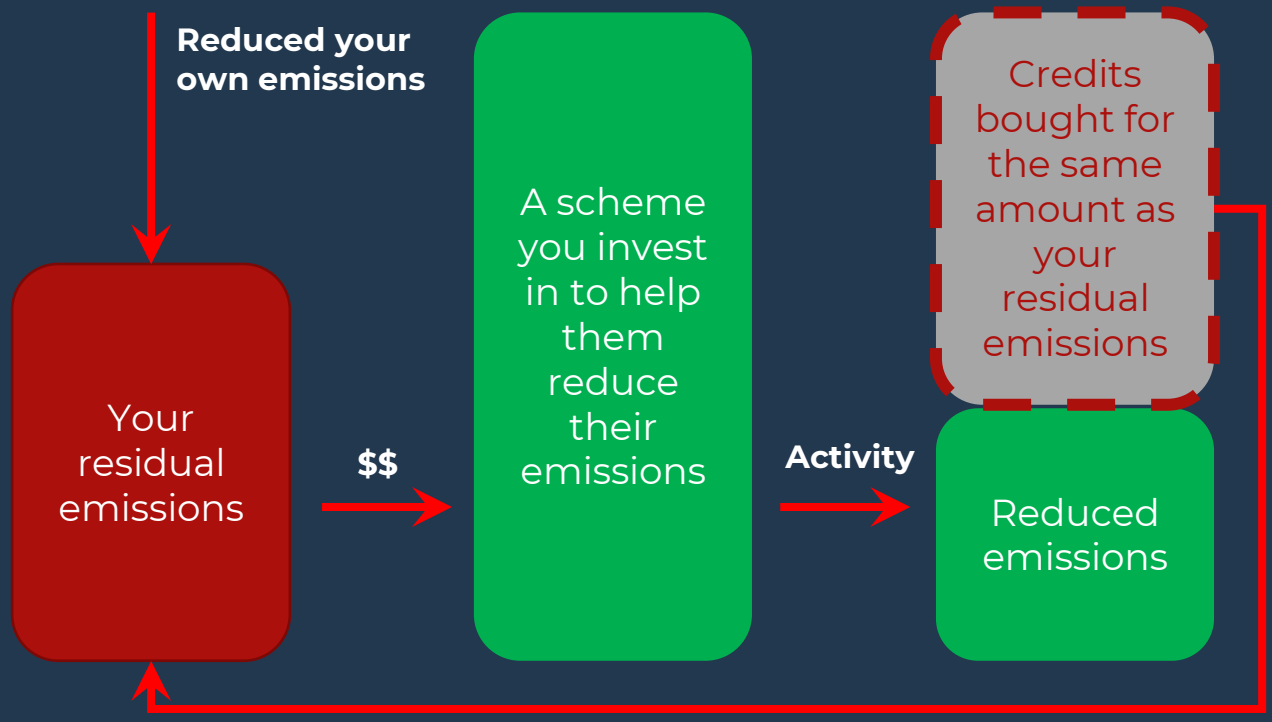
Labour will boycott sleaze

What do we do with hard to decarbonise residual carbon?

What does ‘carbon offsetting’ mean?

- Compensating for GHG emissions that arise from an organisation, product or project in one place through GHG avoidance, reduction or removal activities elsewhere

- Achieved by investing in projects that will lead to lower carbon emissions overall when compared to a business-as-usual situation, that would not have otherwise happened without the investment



The benefits of carbon offsetting

- Provides a ‘polluter pays’ mechanism that affords a level of responsibility to the emitter and puts a price on carbon
- Helps investment in low and zero carbon schemes, reduces reliance on fossil fuels
- Other benefits: reducing poor air quality, improving health and wellbeing benefits, increasing biodiversity gain, creating jobs and social value
- The final piece of the carbon reduction strategy puzzle after reduction actions have been taken.

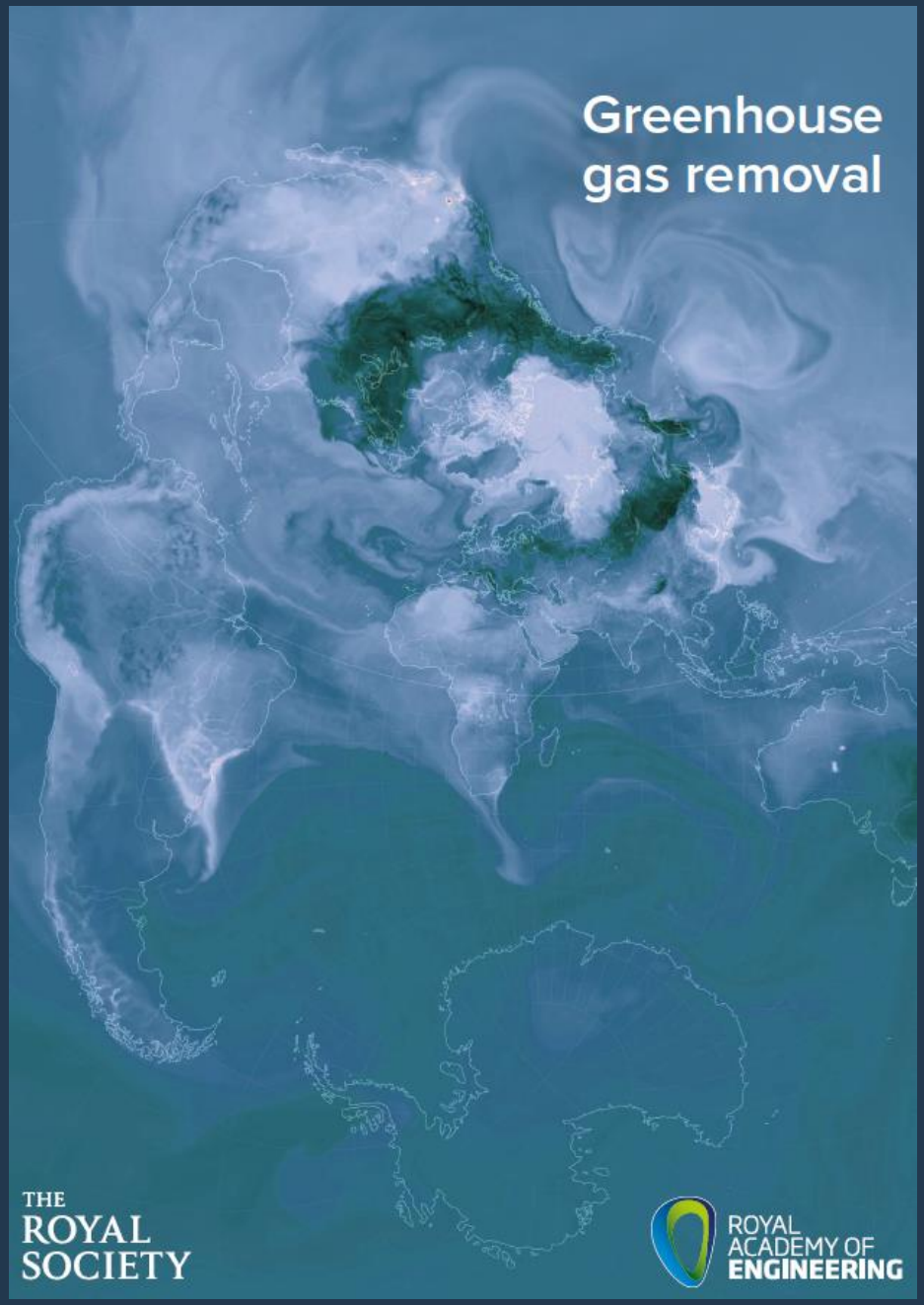
What does ‘good’ offsetting look like?

- To be robust the offsetting needs to be
- ***Real (verifiable and traceable)***
- ***Additional***
- ***Measurable***
- ***Permanent***

- Backed by a mechanism that is
- Independent, transparent, inclusive, with robust governance, avoids double counting

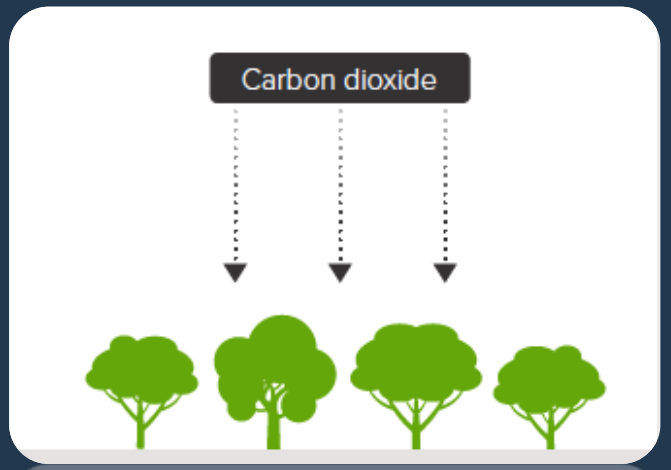
Going further: GHG Removal

- **Actively removing GHG from the atmosphere**
- Goes further than compensating for emissions in one place with reduced emissions elsewhere by actually removing the carbon from the atmosphere
- Variety of different routes and technologies to sequester carbon
- Some more developed than others
- Required for true, deep decarbonisation and net zero targets

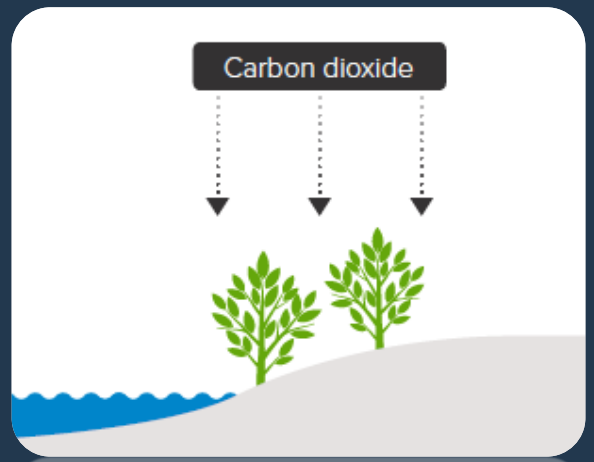


Going further than offsetting: GHG Removal

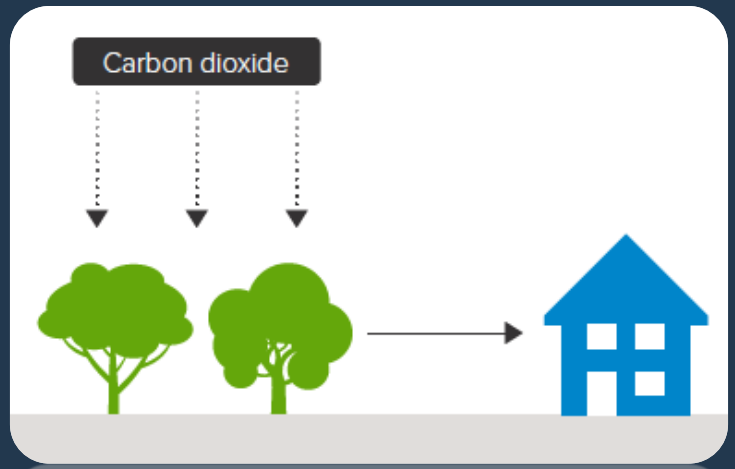
Afforestation, reforestation



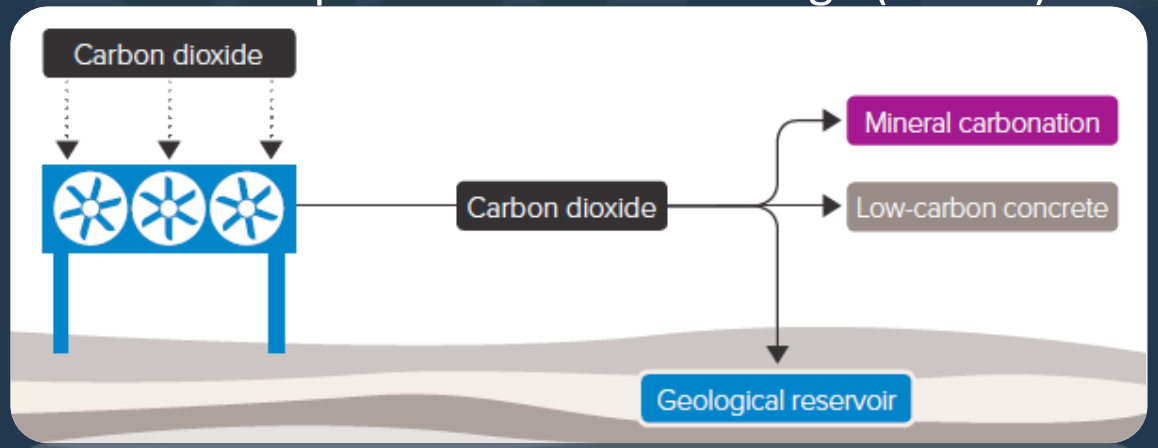
Wetland, peatland and coastal habitat restoration



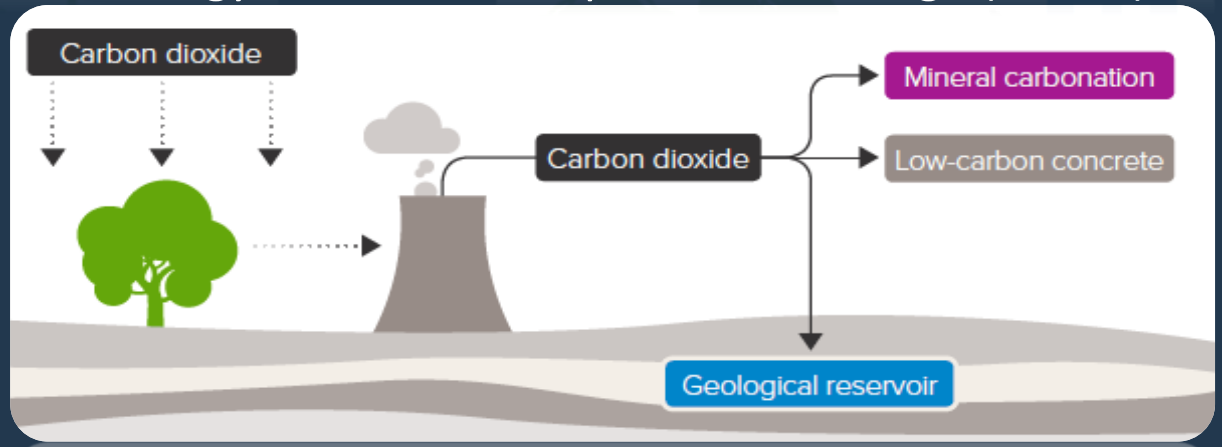
Building with biomass



Direct air capture and carbon storage (DACCS)

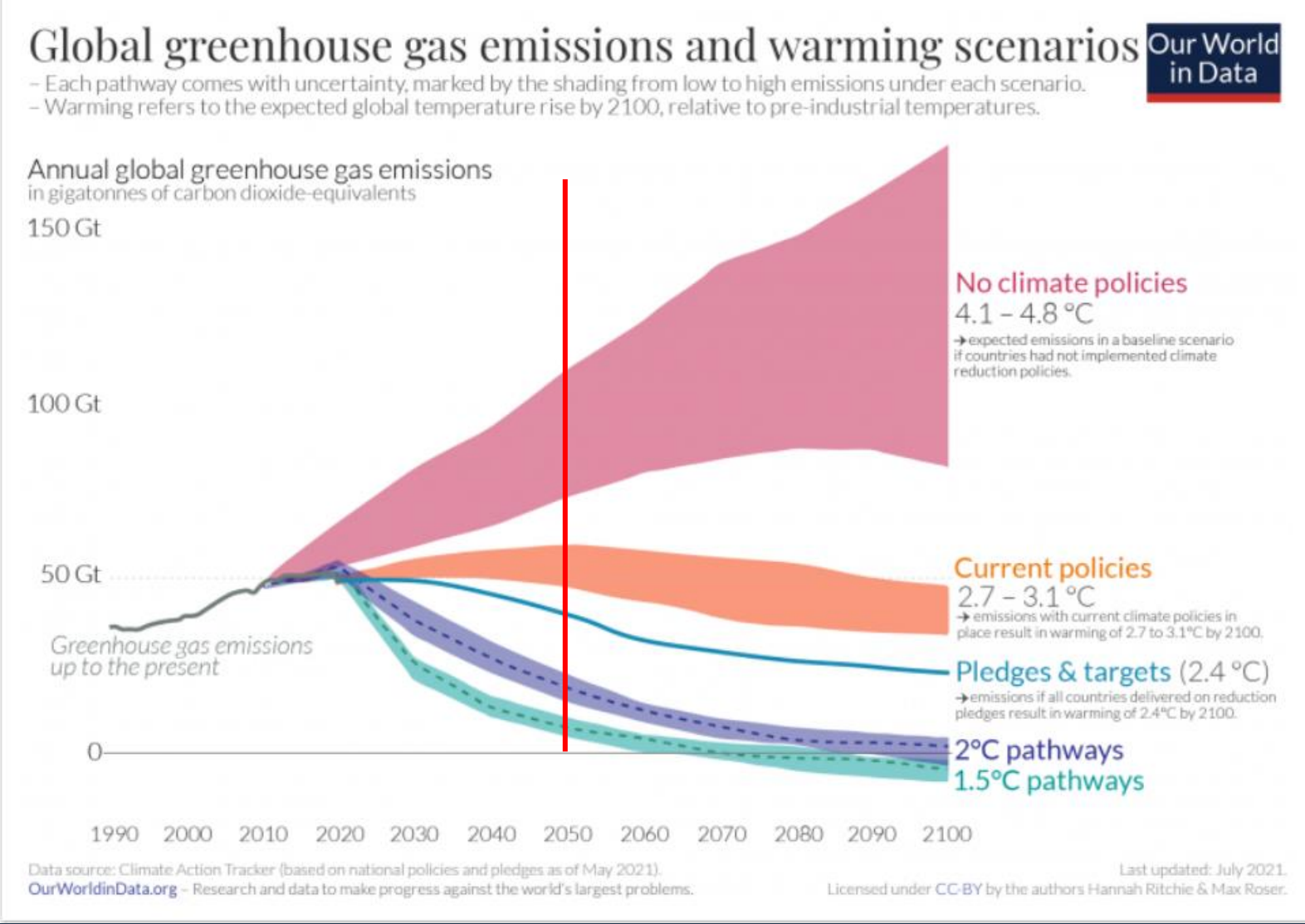


Bioenergy with carbon capture and storage (BECCS)



Science Based Targets

The science-based route to a lower carbon world



- SBT are the process of aligning with the science behind the Paris Climate Change Agreement
- Distilled into what that means at an organisational level
- Leading to reduction targets on a near-term and long-term timeframe for that organisation
- Hence targets are 'science-based' as they align with the science of the Paris Climate Agreement to limit warming to 1.5°C

Science Based Targets Initiative (SBTi)

- Who they are and their purpose:
  - A partnership between CDP, the UN Global Compact, the World Resources Institute and the World Wildlife Fund
  - A method for any organisation to set carbon emissions reduction targets in line with the Paris Climate Agreement that has long term goals for the planet and global economy
  - Identify opportunities to reduce carbon and cost, and report to your clients

Route to Setting a Target: SMEs

(The SBTi define an SME as a non-subsidiary, independent company with fewer than 500 employees)

DAY 1

Company submits its SME Target Setting Letter to the SBTi, which will perform the review of the information submitted

ONCE COMPANY RECEIVES FORMAL APPROVAL

And upon payment, the company's target is published on the website

AFTER APPROVAL

Company reports its GHG inventory and progress against target on an **annual basis**

Route to Setting a Target: Large organisations

(The SBTi define an SME as a non-subsidiary, independent company with fewer than 500 employees)

DAY 1 | **24 MONTHS** | **AFTER APPROVAL**

COMMIT

Company submits a letter establishing its intent to set a science-based target

DEVELOP

Company works on an emissions reduction target in line with the SBTi criteria

SUBMIT

Company presents the target to the **SBTi for official validation**

COMMUNICATE

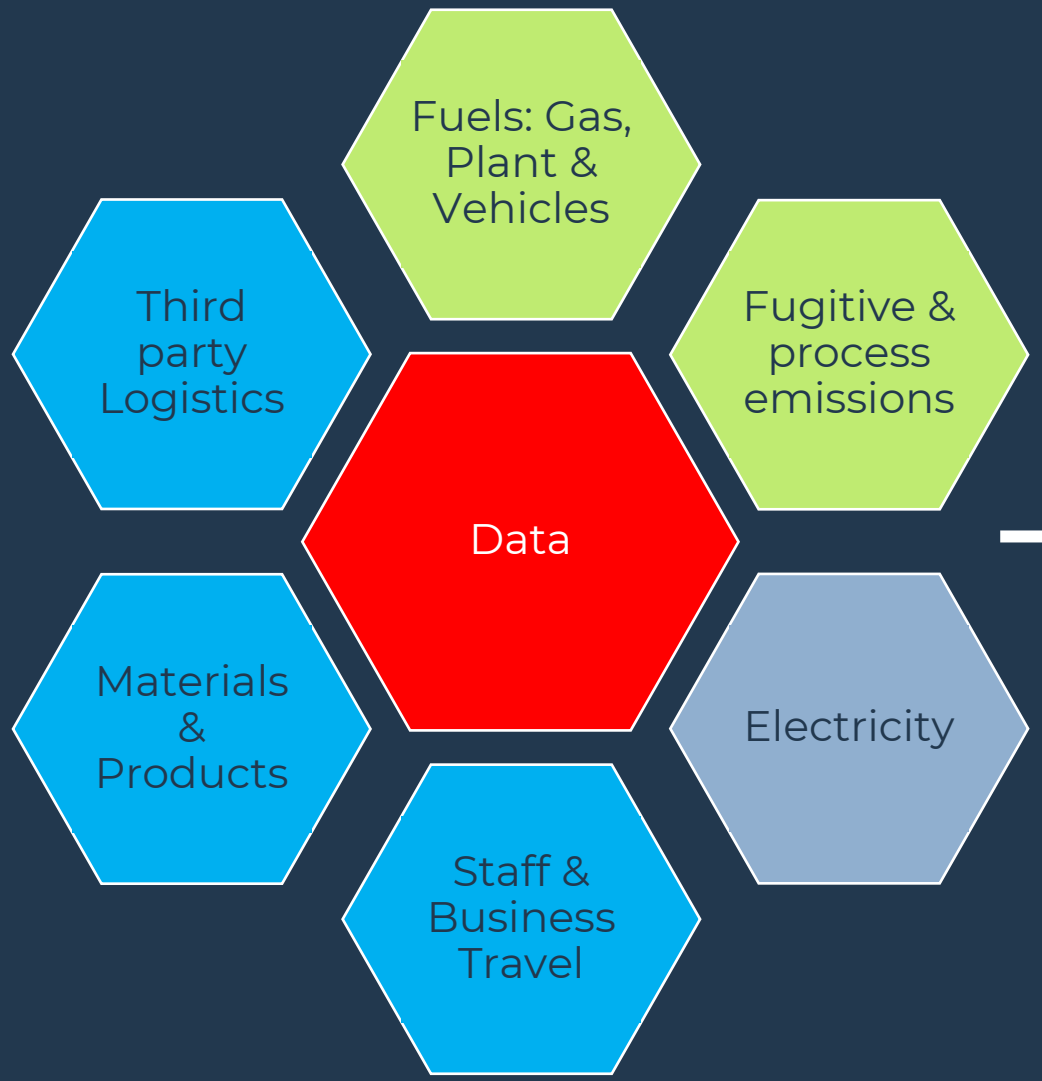
Company announces the target and informs stakeholders

DISCLOSE

Company report its emissions and progress against targets on an annual basis

Where do we get data from?

Where does Activity Data come from



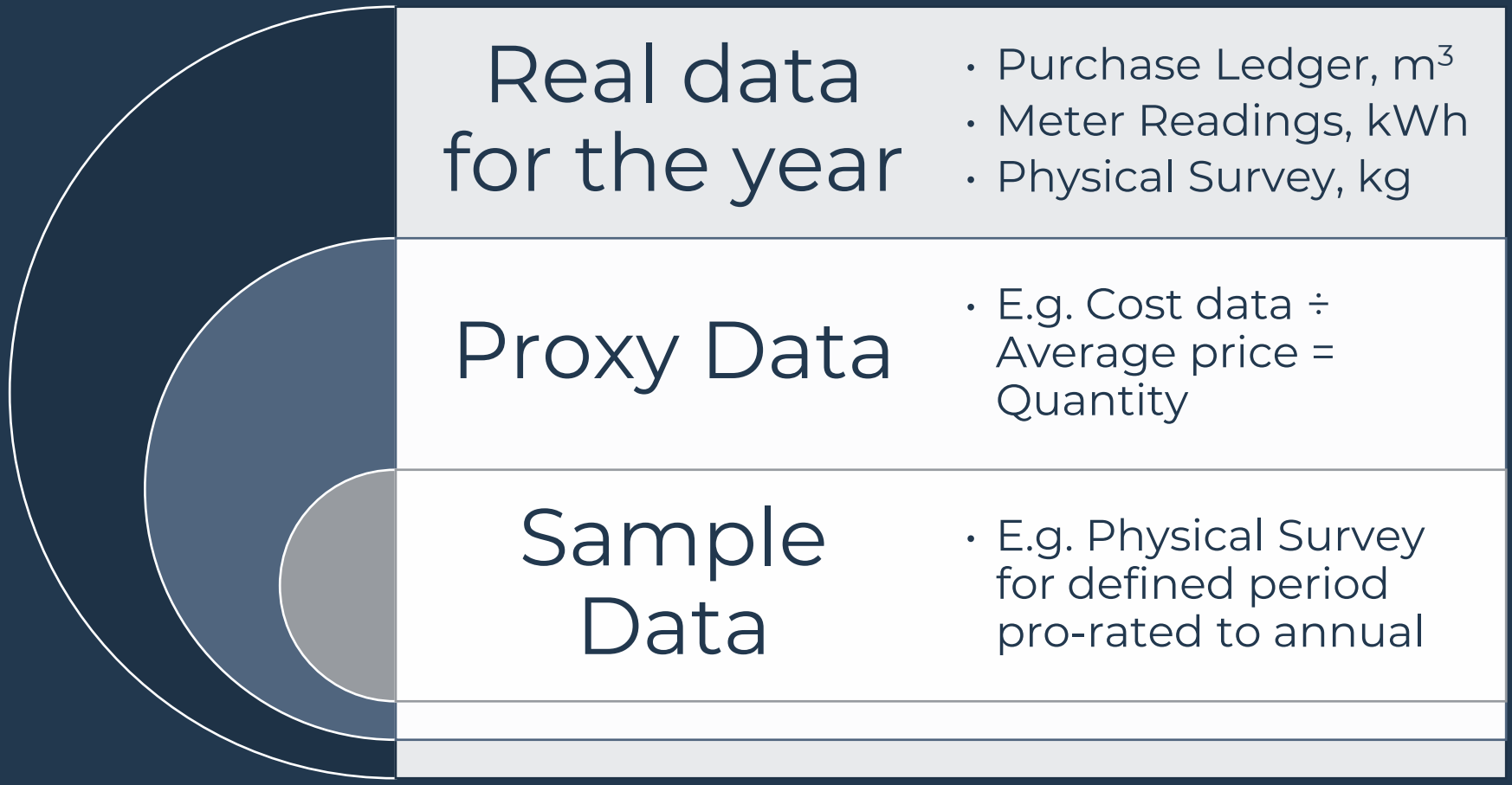
Kinds of Data

- Litres of fuel (diesel, LPG…)
- Litres of refrigerant
- kWh of electricity
- Mileage travelled
- Tonnes, m^3 of materials

Where is the Data

- Fleet
- Estates
- HR / Travel agent
- Procurement
- Suppliers

Sources of Activity Data



Relevance, accuracy and bias

Data

- Relevant data to your situation
- Reliable, unbiased data
- Up-to-date data

Time

- Control and influence
- Time constraints - what do you have time to collect?
- Pareto 80/20

Resources Guidance – Free Carbon Data and Tools

- **Defra/BEIS 2021 Greenhouse gas reporting conversion factors :** the UK Government's database of carbon factors for fuel, energy, transport, and materials, updated annually. https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021
- **Bath Inventory of Carbon and Energy (ICE)** database: a well-established database of embodied carbon factors for a variety of materials, updated periodically. http://www.circularecology.com/embodied-energy-and-carbon-footprint-database.html
- **Supply Chain School Carbon Calculator:** a free tool from the School to measure scope 1, 2 and 3 emissions in your supply chain. https://carbon.sustainabilitytool.com/
- **The Embodied Carbon in Construction Calculator (EC3) Tool:** a database of EPDs for construction products https://buildingtransparency.org/ec3
- **Carbon Trust Carbon Calculator** for SMEs: The Carbon Footprint Calculator has been designed to help UK based SMEs measure their corporate emission footprint following GHG Protocol Guidance, including direct emissions from fuel and processes (Scope 1 emissions) and those emissions from purchased electricity (or Scope 2 emissions) for the assets they operate https://www.carbontrust.com/resources/tools/carbon-footprint-calculator
- **Highways England Carbon Tool:** a free-to-download Excel tool to calculate carbon emissions for operational, construction and maintenance activities undertaken on behalf of Highways England that draws on Defra and Bath ICE datasets www.gov.uk/government/publications/carbon-tool
- **The RSSB Rail Carbon Tool** is a web-based tool that allows you to calculate, assess, analyse, report and reduce your rail project carbon footprint by evaluating low-carbon options using verified, centrally-available carbon factor data that draws on Defra and Bath ICE datasets https://www.railindustrycarbon.com/
- **Environment Agency Carbon Calculator:** a free-to-download tool to calculate the carbon impact of different material and transport options in your project www.ice.org.uk/knowledge-and-resources/best-practice/environment-agency-carbon-calculator-tool
- **Hawkins\Brown: Emission Reduction Tool \.** An open source Revit-based tool that enables design teams to quickly analyse and clearly visualise the embodied carbon emissions of different building components and construction material options at any time during the design process. https://www.hawkinsbrown.com/services/hbert

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Thank you!

Stefania Chica Jacome
stef@actionsustainability.com

www.actionsustainability.com
@Action_Sustain