



**Welcome to the SSEN Climate
Academy Webinar on Net Zero**

We will begin at 12pm

SUPPLY CHAIN SUSTAINABILITY



SSEN Climate Academy #2 Net Zero

James Cadman,
Action Sustainability



SSEN Climate Academy

- This is the second of six sessions in the SSEN Climate Academy:
 - *Net Zero*
- There are four more *Climate Change* sessions:
 - *Climate Adaptation – 9th February*
 - *Climate and Nature – 16th February*
 - *Climate and People – 23rd February*
 - *Climate and Resource Efficiency – 2nd March*

Session 2 - Agenda

- ✓ Scene setting: Andrew Roper
- ✓ Explanation of net zero
- ✓ Your Questions and Answers
- ✓ By the end you will know
 - ✓ Where net zero has come from
 - ✓ What net zero means
 - ✓ How we are working towards it, and
 - ✓ What we do with residual carbon



HOUSE RULES



- Use the chatbox for questions



- Share your feedback at the end



- Slides will be shared



**ANDREW ROPER, DIRECTOR
SSEN DISTRIBUTION SYSTEM OPERATIONS**



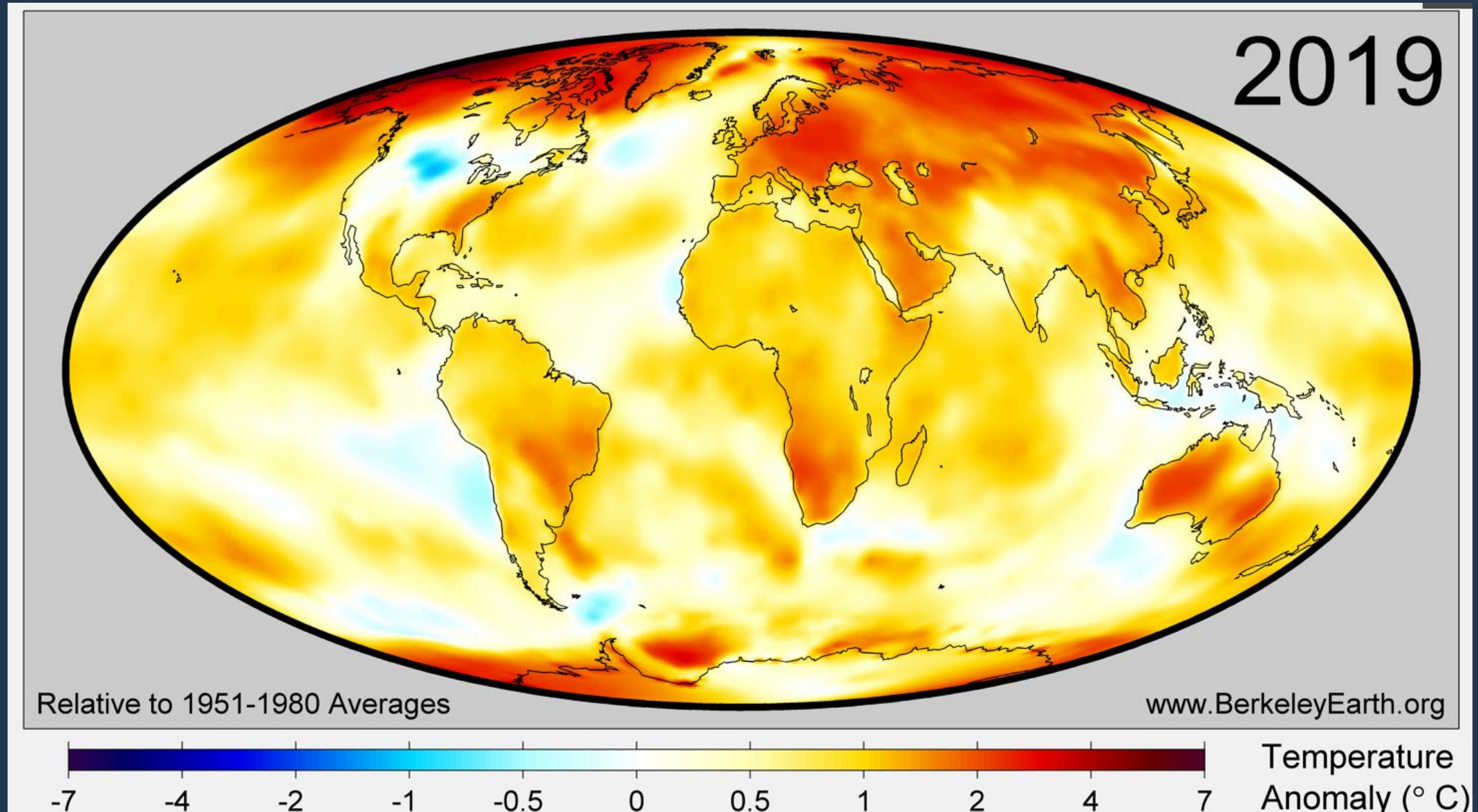
Scottish & Southern
Electricity Networks

Audience Poll

SECTION 1: Where has the idea of 'net zero' come from?



Global Temperature Anomalies in 2019



The UK's Response – the Stern Review, 2006

52% Emissions from Buildings

27% Emissions from Transport

Government target of 80% by 2050

Doing nothing will cost 5%-20% of GDP

Taking action now could reduce this to 2% or further



The UK's Climate Change Act, 2008

- World-leading in legislation against climate change
- 80% reduction in emissions by 2050, vs 1990 baseline

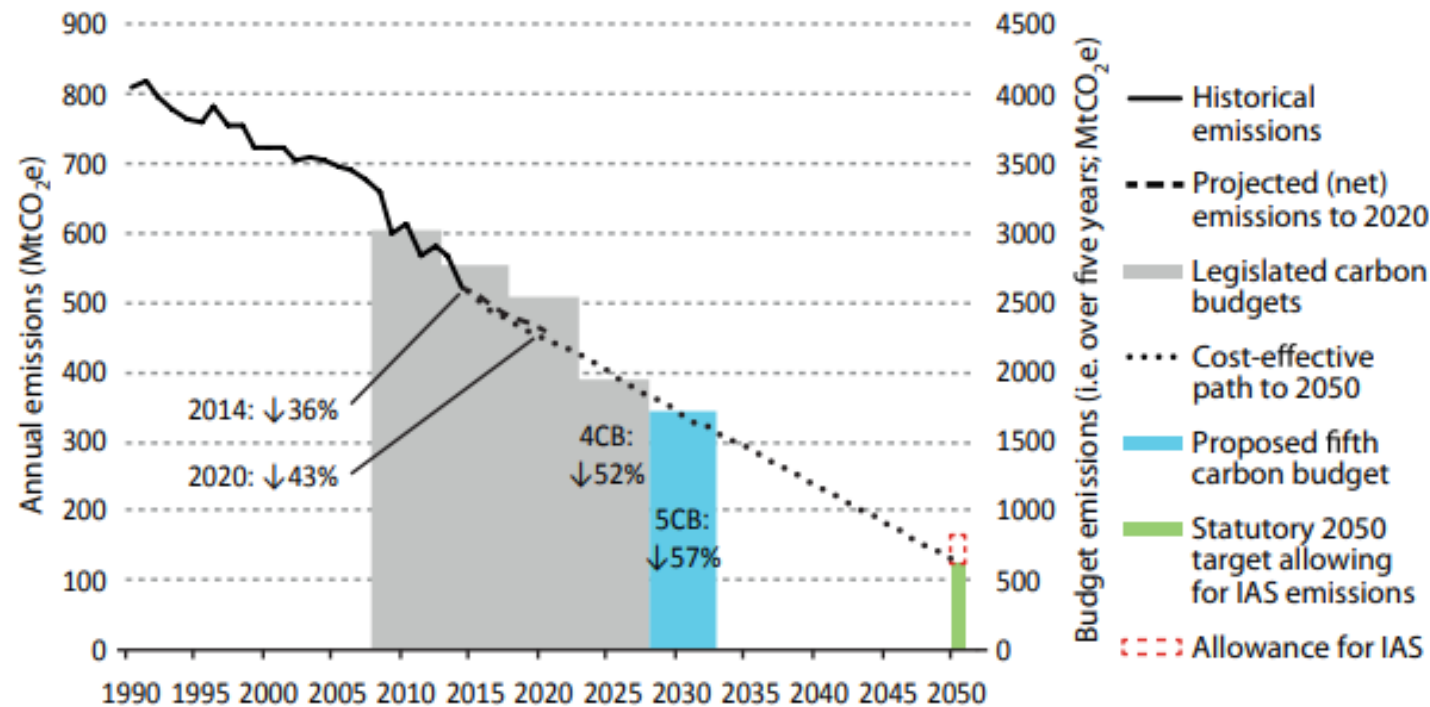


Committee on
Climate Change



Climate Change Act 2008

Figure 1: The recommended fifth carbon budget would continue emissions reduction on the path to the UK's 2050 target



The Paris Climate Change Agreement, COP21, 2015

- Reduce emissions of the “basket of 6” Kyoto Protocol GHGs
- In line with a 2°C warming scenario
- Each nation to make Nationally Determined Contributions - NDCs



IPCC Special Report, 2018



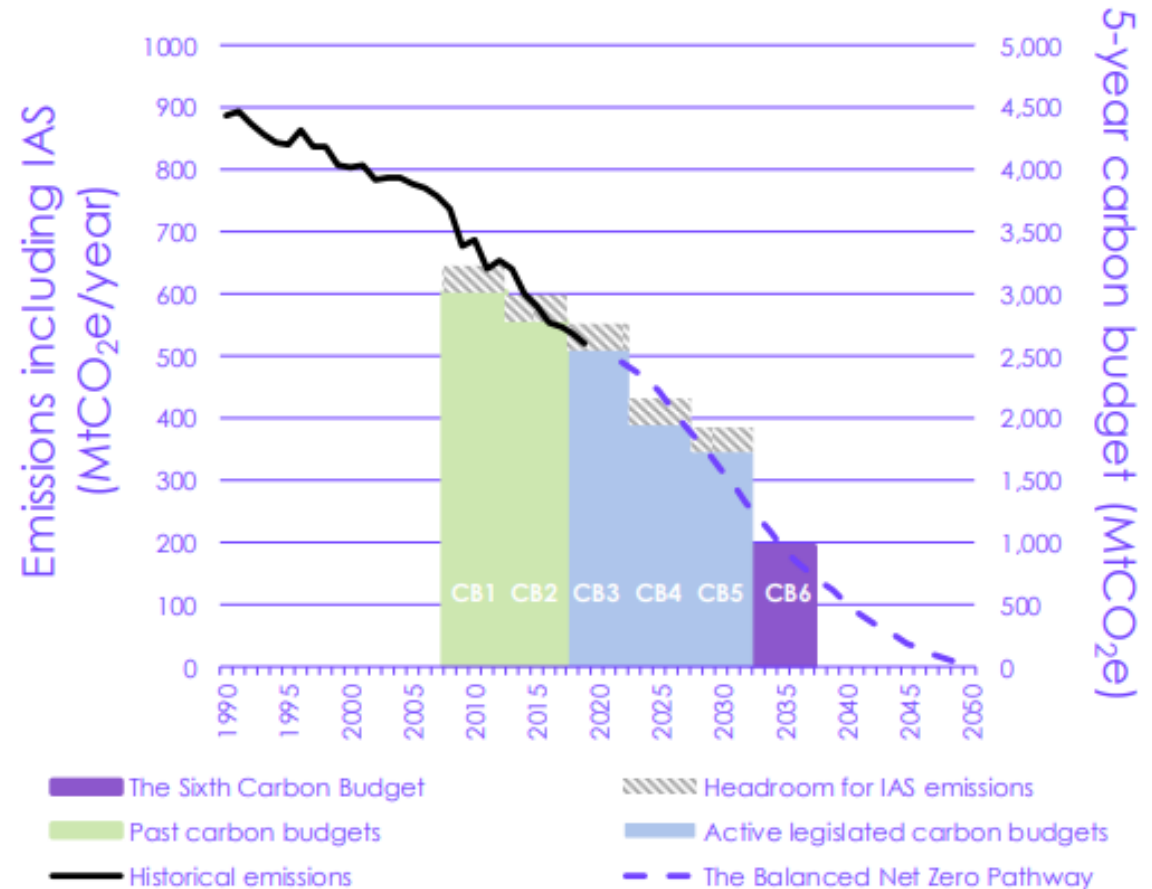
An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

- 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.**

UK and Ireland Law on Climate Change

- UK Climate Change Act 2019 target of 100% reduction by 2050 – ‘net zero’
- Scotland has legislated to hit net-zero by 2045
- Wales’ target to reduce by 95% by 2050 but aiming for net zero
- Ireland Climate Action and Low Carbon Development Bill 2020: net-zero by 2050

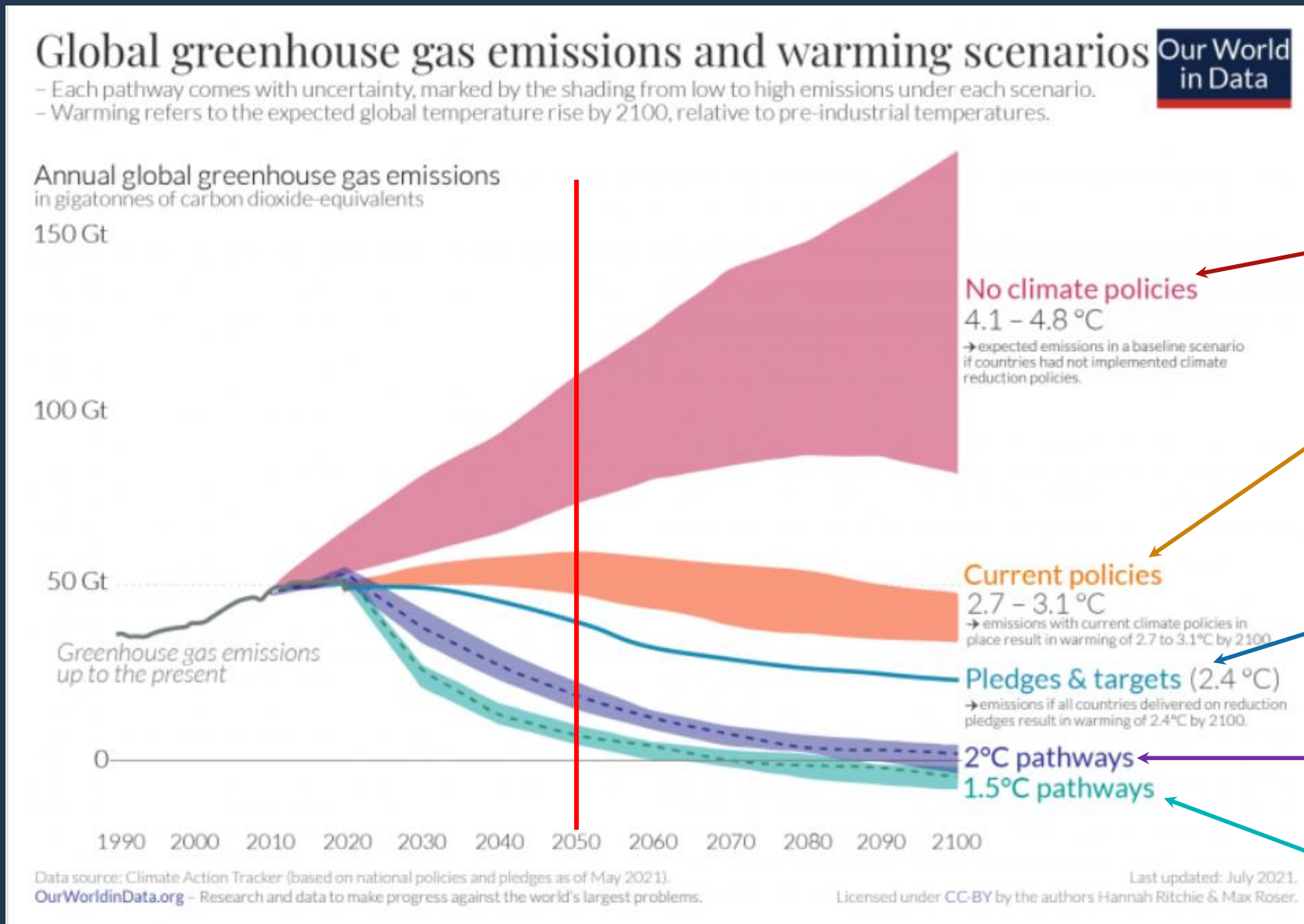
Figure 1 The recommended Sixth Carbon Budget



Source: BEIS (2020) Provisional UK greenhouse gas emissions national statistics 2019; CCC analysis

Notes: Emissions shown include emissions from international aviation and shipping (IAS) and on an AR5 basis, including peatlands. Adjustments for IAS emissions to carbon budgets 1-3 based on historical IAS emissions data; adjustments to carbon budgets 4-5 based on IAS emissions under the Balanced Net Zero Pathway.

The science-based route to a lower carbon world



• We do nothing

• We carry on as we are

• We make some pledges

• We make a concerted effort

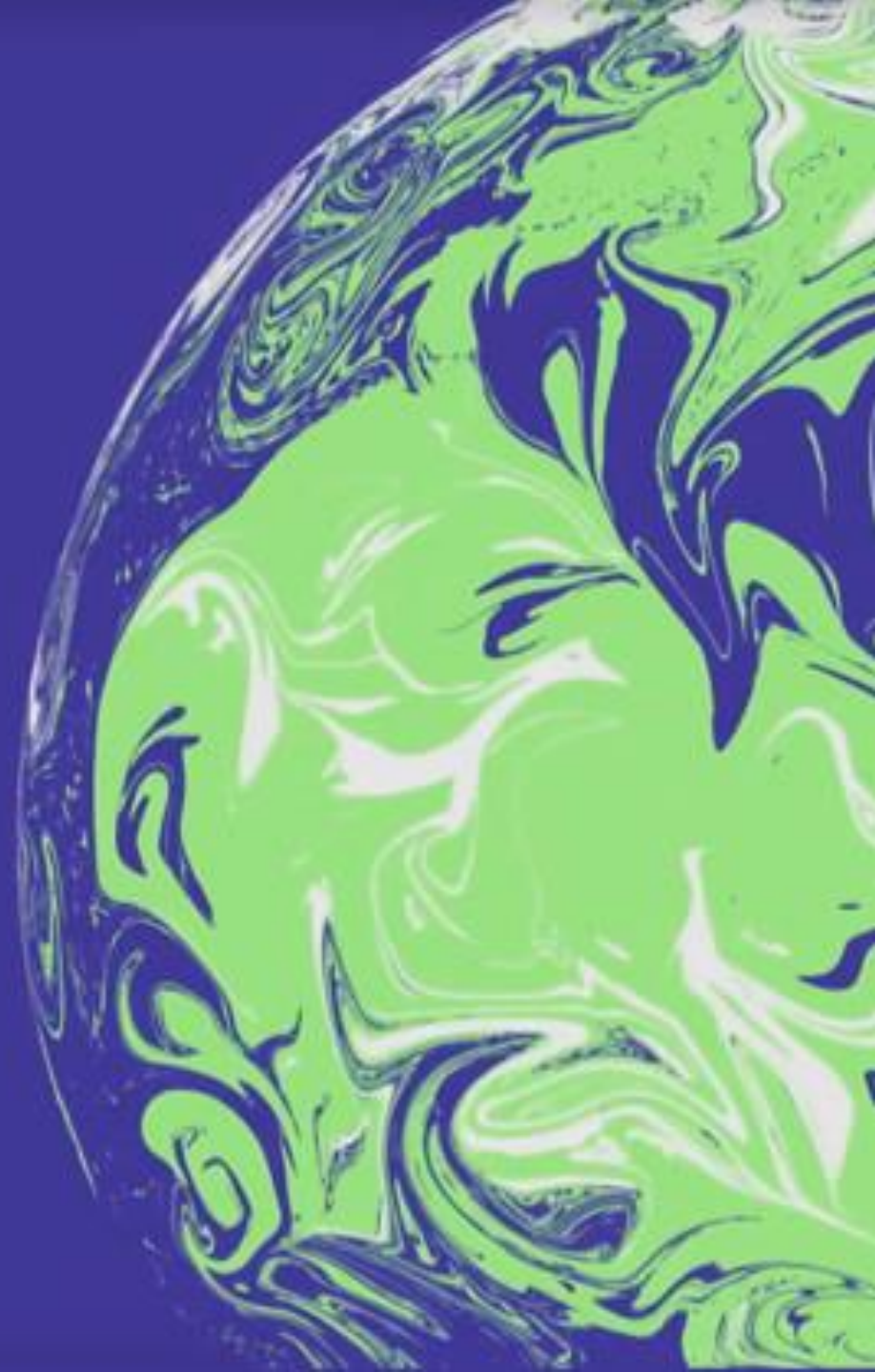
• We go all out

01-12 NOV 2021

GLASGOW

COP26

IN PARTNERSHIP WITH ITALY



SECTION 2: What does 'net zero' mean?



Net zero – what is it?

- ‘Net zero’ is about reducing your GHG emissions as much as possible, following the carbon hierarchy and in line with Paris reduction trajectories
- It covers the whole value chain to reduce carbon, not just your organisation and includes everything: transport, products & services, and waste
- For many organisations, more than 80% of the carbon could be outside the business, i.e. scope 3!
- But for SSE, about 30% is in the value chain due to the nature of the business: 64% of SSE’s emissions are scope 1 from energy generation
- Only once emissions have been reduced can you balance any remaining *hard-to-decarbonise* emissions with GHG Removals



Net zero and Carbon neutral

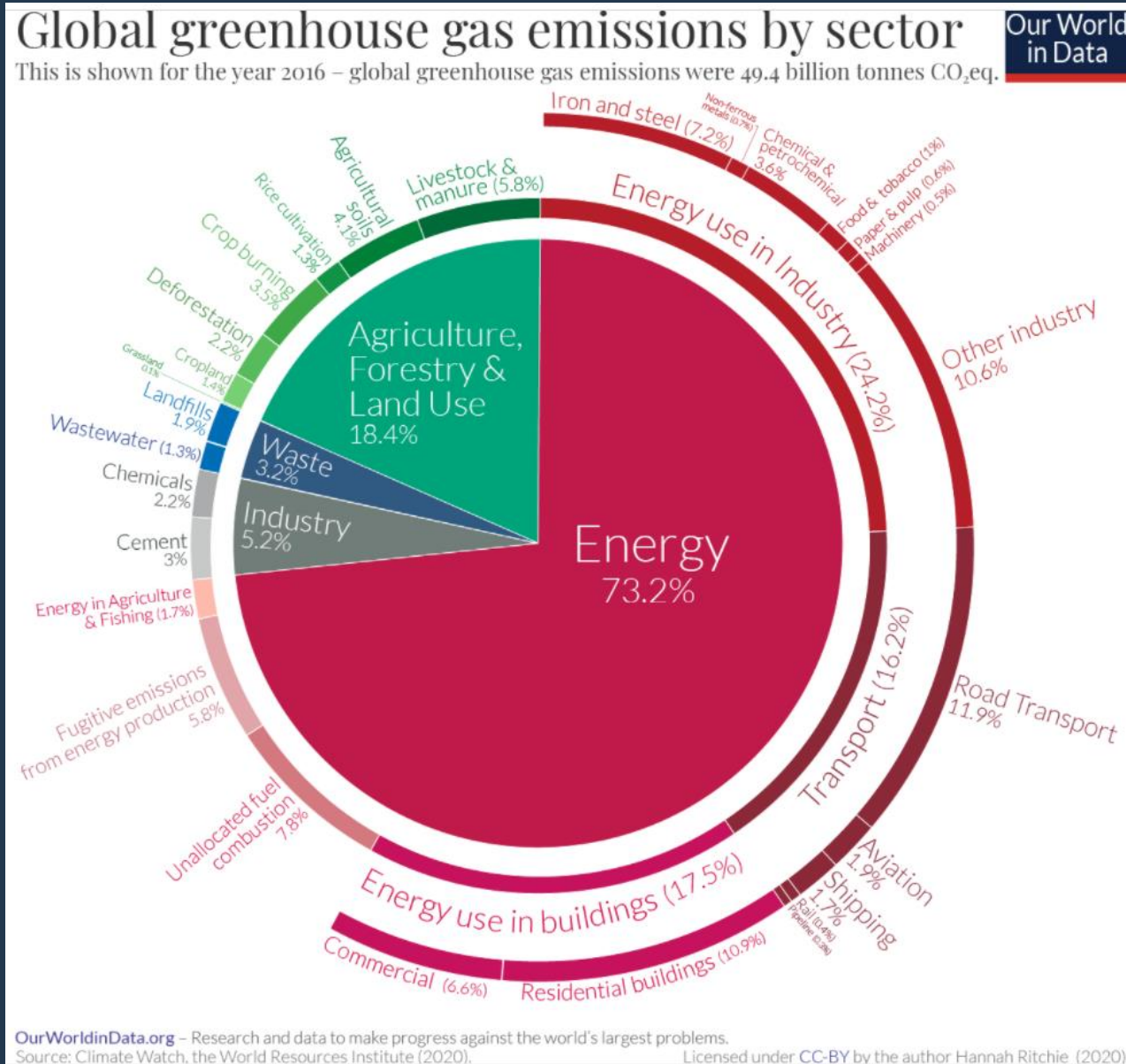
- Similar but different!
- Both are a zero-sum balance between GHG emitted and the same amount offset or sequestered – but different boundaries!
- ‘Carbon Neutrality’ generally focuses on Scopes 1 and 2. Scope 3 is optional but encouraged. It allows offsetting.
- Take care when organisations say they are ‘carbon neutral’ or ‘net zero’: does it include only their direct emissions and electricity, or does it include their supply chain too?



SECTION 3: The power sector's role - how net zero applies to SSE



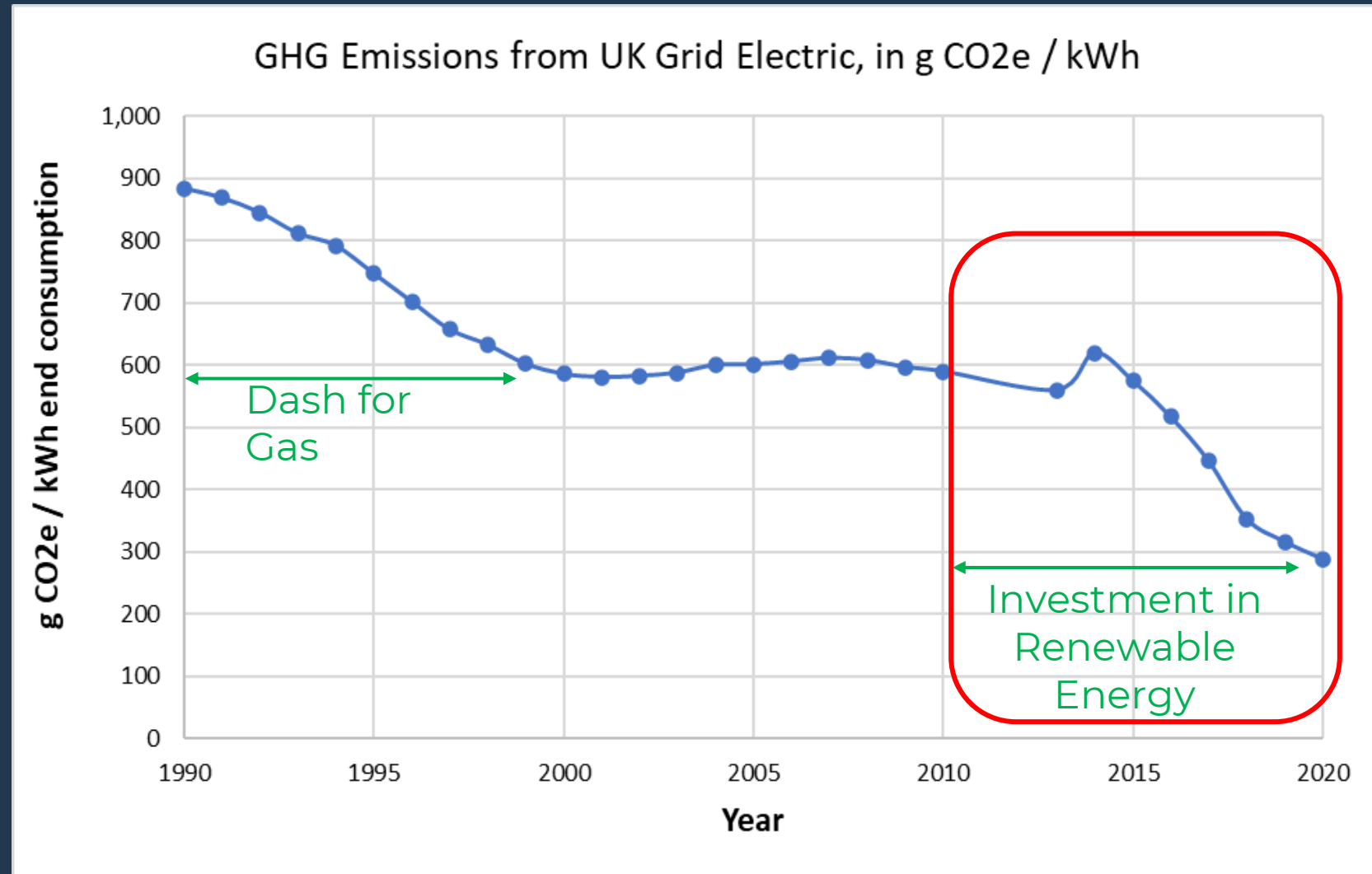
Where do GHG emissions come from?



- Industry 29.4%
- Agriculture & Forestry 21.1%
- Buildings 17.5%
- Transport 16.2%
- Use of grid energy 47.5%

Power Sector's role to date in decarbonising the UK

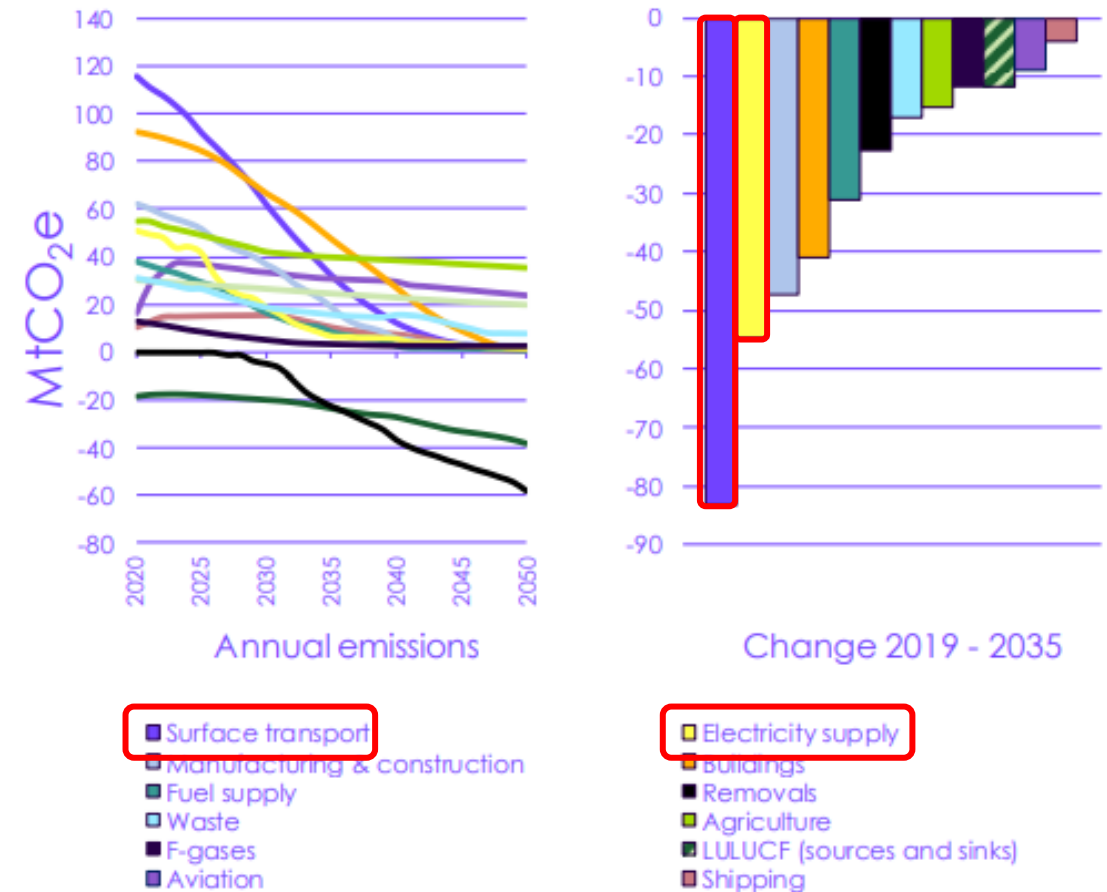
- Significant progress to reduce carbon intensity of the UK's grid electric
- Reduced 67% since 1990 when it was 900 gCO₂/kWh (includes T&D, and WTT)
- But why? Two big reasons
- 'Dash for gas' in 1990's
- Five-fold increase in renewable energy production since 2010: on- & offshore wind, solar PV, and biomass



Sectoral decarbonisation

- Different approaches, and rates, to decarbonisation for different sectors: changes to travel, diets, consumption and waste
- Electricity supply second only to surface transport in absolute reductions
- Reduce from 55 MtCO₂ per year to 10 MtCO₂ / year by 2035 (CB6)
- Then further reductions towards zero emissions

Figure 2.4 Sectoral emissions under the Balanced Net Zero Pathway



Source: CCC analysis.

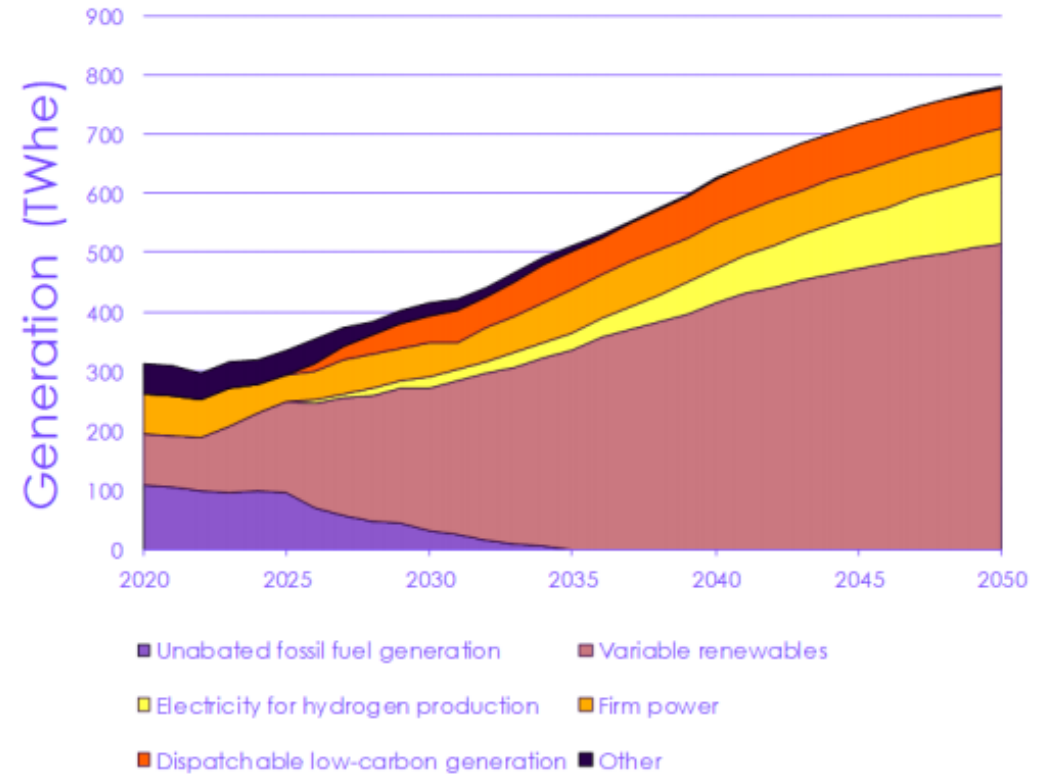
Notes: LULUCF = Land-use, land-use change and forestry.

Power decarbonisation

- Reduce carbon intensity of electricity from
 - 220 gCO₂/kWh in 2019, to
 - 10 gCO₂/kWh in 2035, to
 - 2 gCO₂/kWh in 2050
- Mix of options to achieve this
 - Drastically reduced fossil fuels
 - Significantly more renewables
 - Some nuclear and hydrogen

Figure 3.4.b Carbon intensity in the Balanced Net

Figure 3.4.c Illustrative generation mix for the Balanced Net Zero Pathway (2020-50)

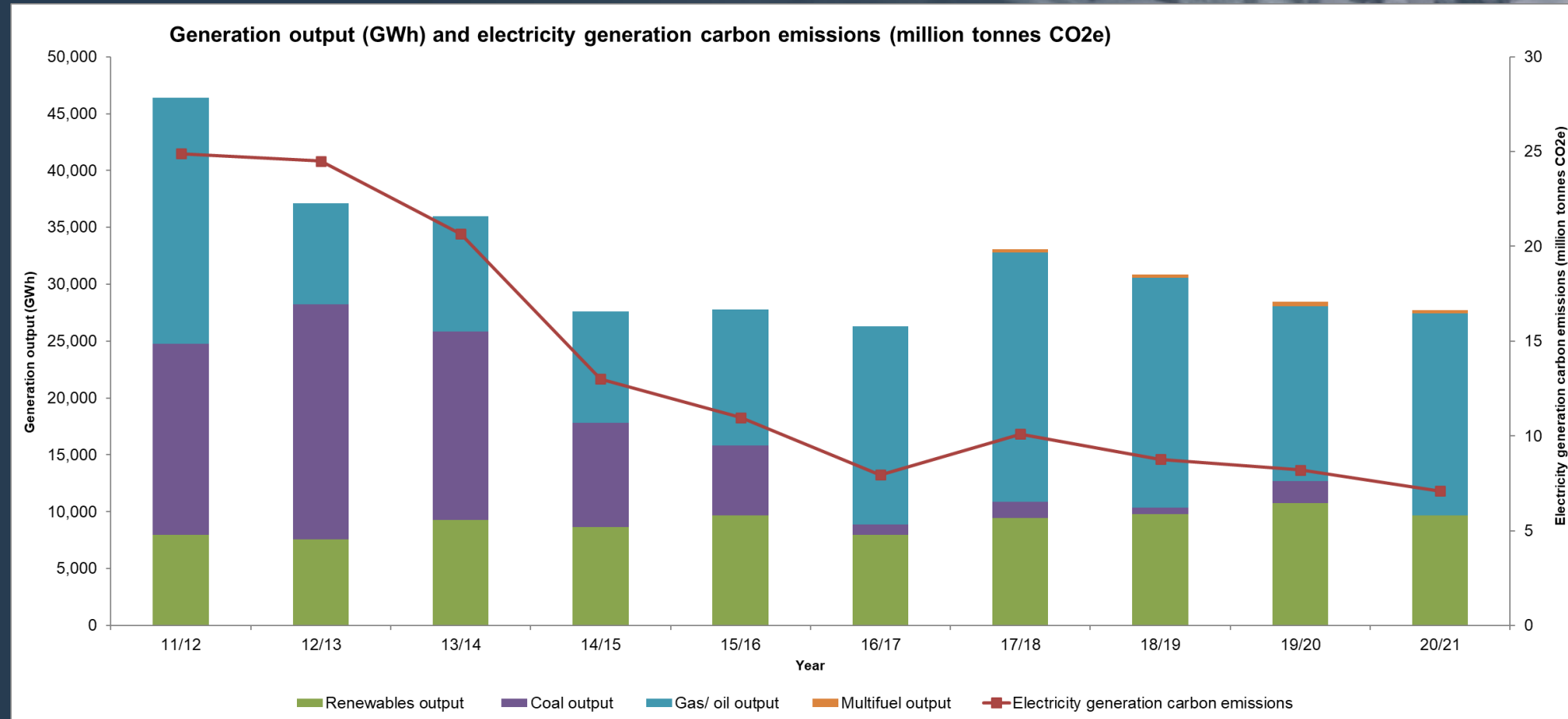


Source: CCC analysis.

Notes: Chart reflects UK electricity generation. Additional capacity is available through interconnection. Unabated fossil fuel generation includes coal and gas. Variable renewables include wind and solar. Firm power includes nuclear. Dispatchable low-carbon generation includes gas CCS, BECCS and hydrogen.

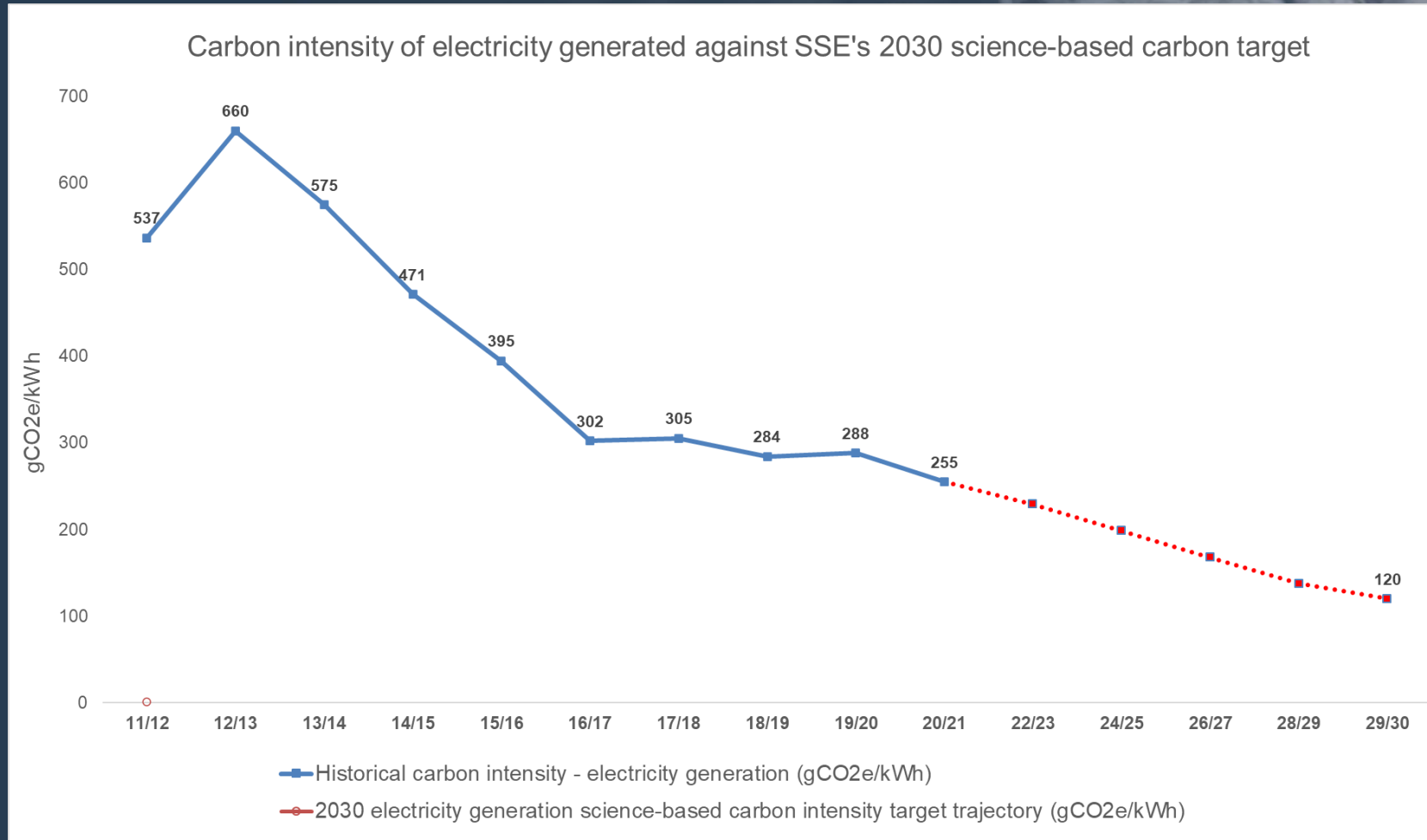
Decarbonising SSE's electricity generation output

How well is SSE doing in its decarbonisation transition?



- SSE have reduced absolute scope 1 generation carbon emissions by **71%** since their peak in **2011/12**.
- Phasing out high-carbon coal generation has significantly reduced emissions in recent years.

Decarbonising SSE's electricity generation output



- SSE have reduced the carbon intensity of its generated electricity by 61% since their peak in 2012/13.
- Phasing out coal generation and growing the share of renewable electricity output has reduced carbon emissions.
- SSE will still need to more than halve its 2021 carbon intensity in order to reach its 2030 science-based target.

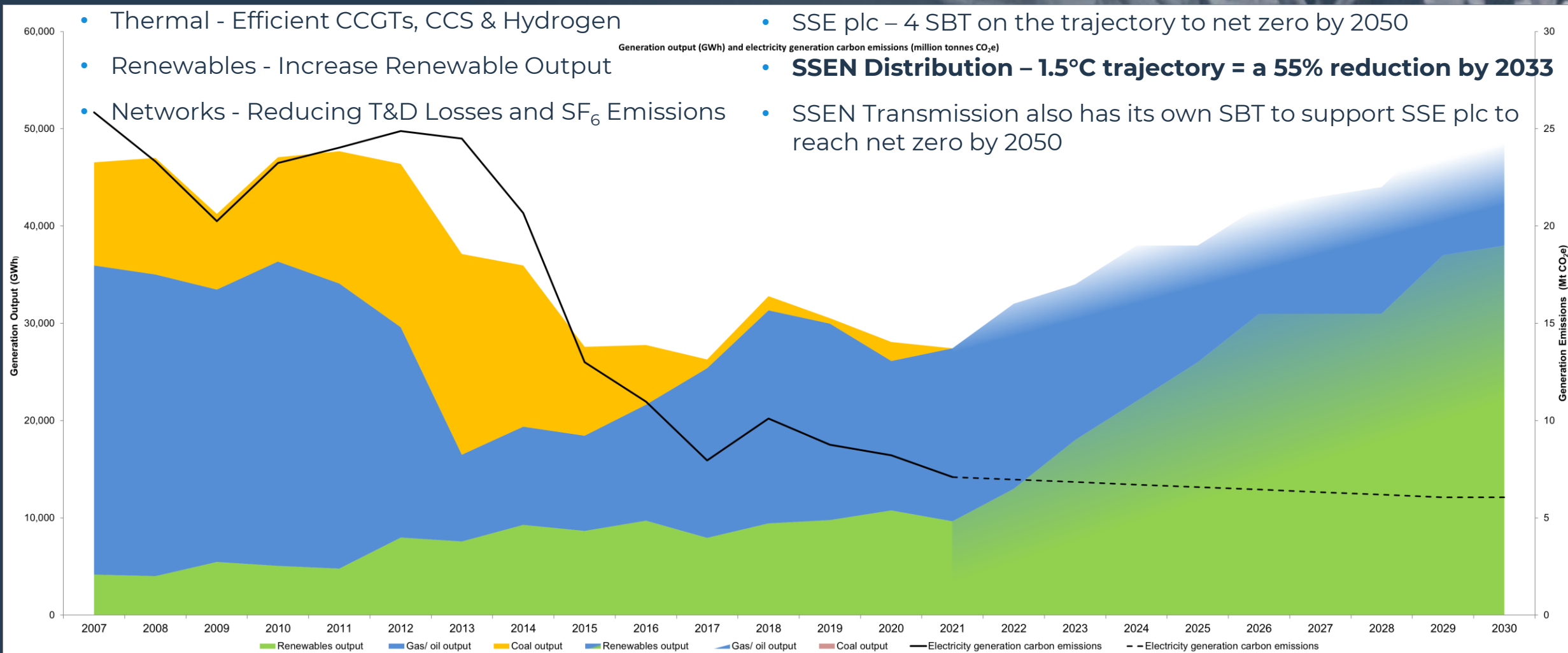
SSE's 2050 net zero transition plan in a nutshell

Strategy

- Thermal - Efficient CCGTs, CCS & Hydrogen
- Renewables - Increase Renewable Output
- Networks - Reducing T&D Losses and SF₆ Emissions

Science-based targets to 2030

- SSE plc – 4 SBT on the trajectory to net zero by 2050
- **SSEN Distribution – 1.5°C trajectory = a 55% reduction by 2033**
- SSEN Transmission also has its own SBT to support SSE plc to reach net zero by 2050



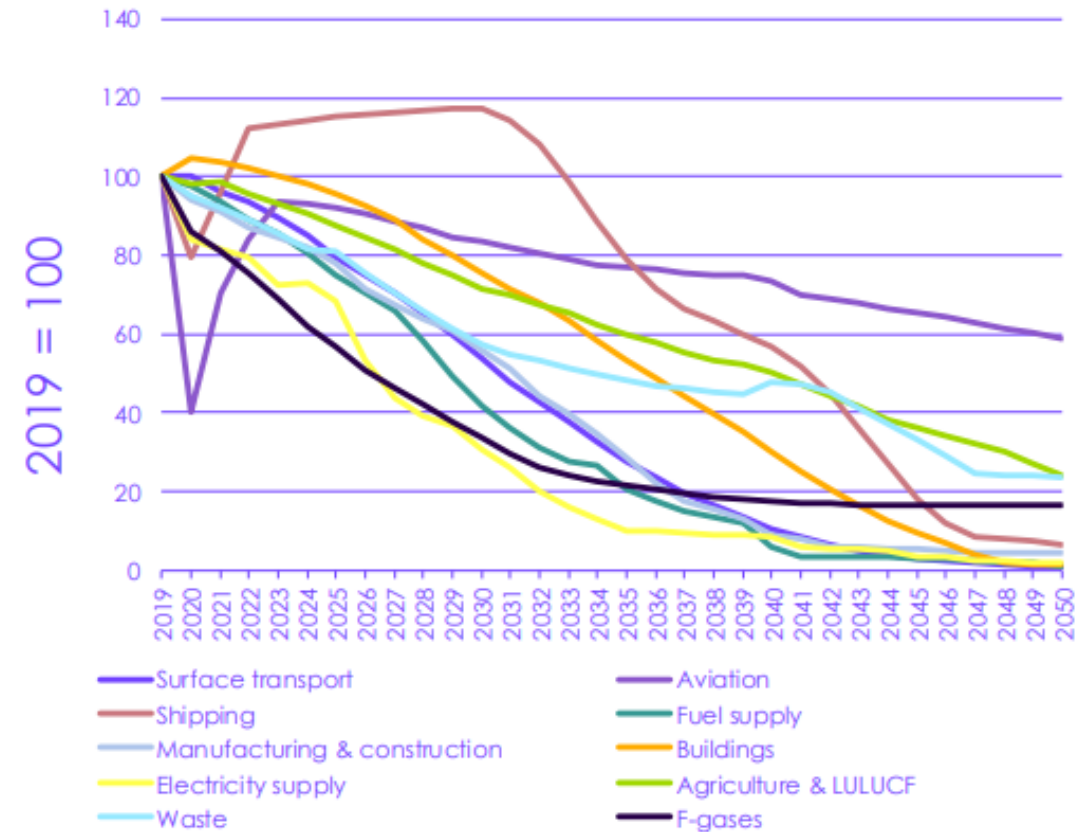
SECTION 4: How do you deal with residual carbon?



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
 - Electricity generation also has some hard to decarbonise emissions, including gas, SF₆, fuel for heavy vehicles (e.g. vessels).

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

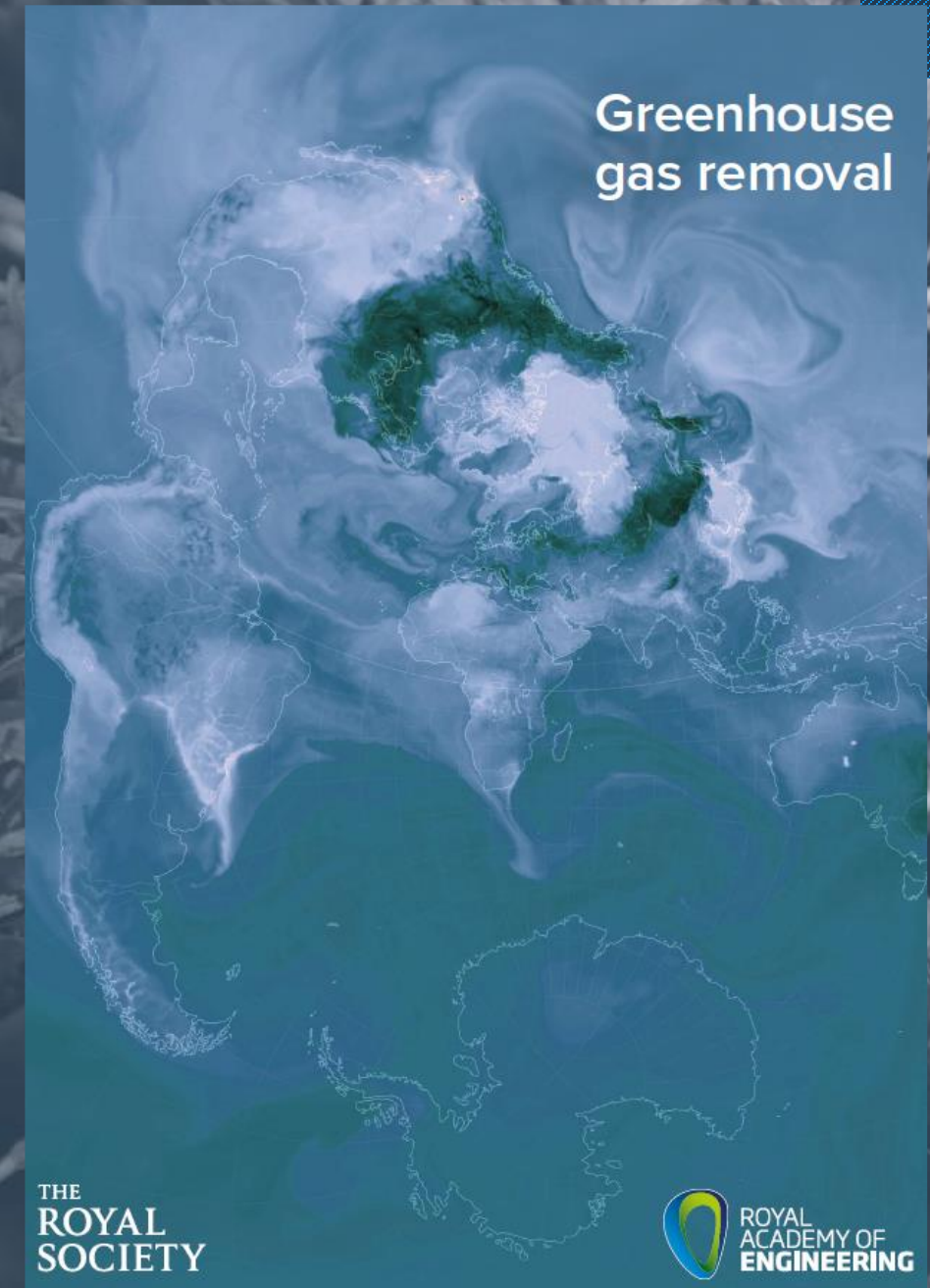


Source: CCC analysis.

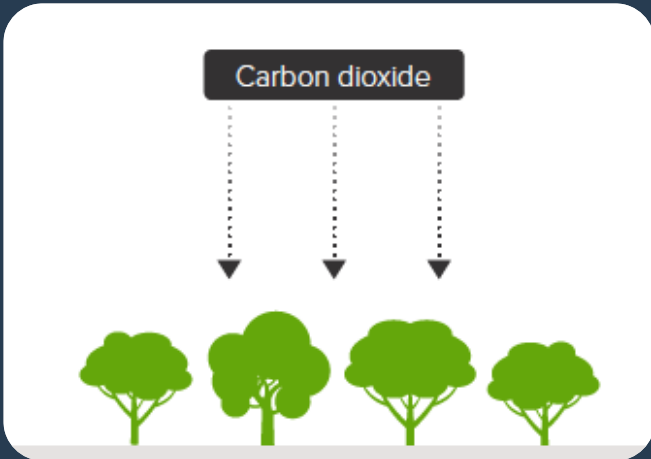
Notes: Aviation and shipping pathways are lower in 2020 due to COVID-19. LULUCF = Land-use, land-use change and forestry.

Going further: GHG Removal

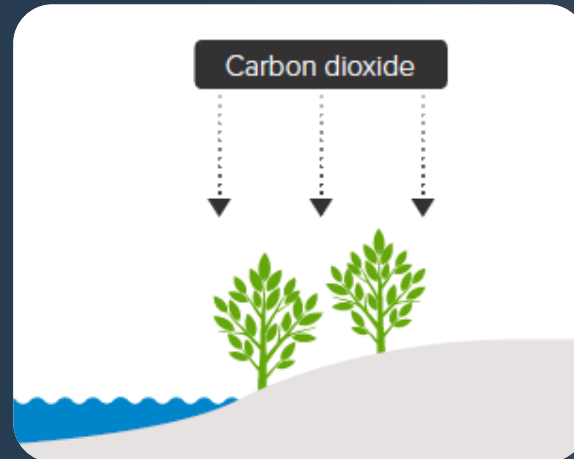
- **Actively removing GHG from the atmosphere**
 - Goes further than compensating for emissions in one place with reduced emissions elsewhere by actually removing the carbon from the atmosphere
 - Variety of different routes and technologies to sequester carbon, some more developed than others
 - Balance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



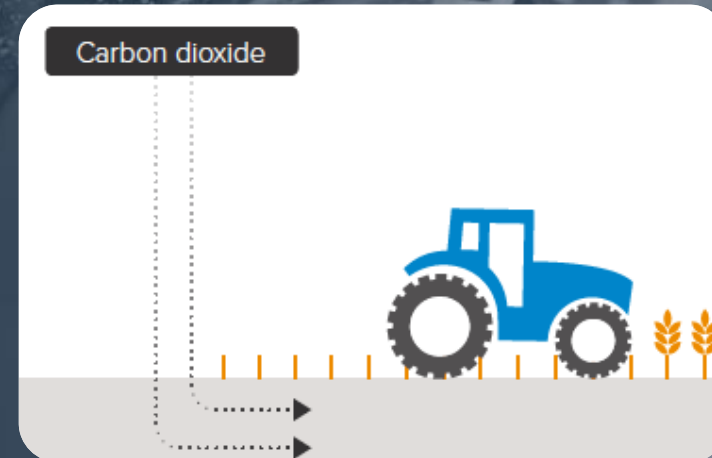
Going further: GHG Removal



Afforestation, reforestation



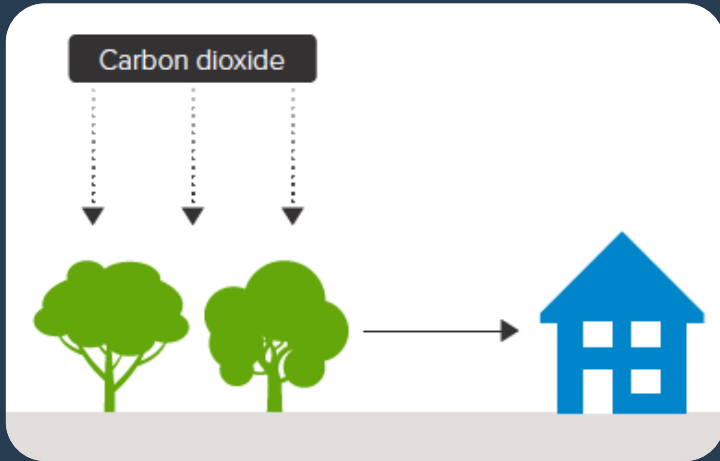
Wetland, peatland and coastal habitat restoration



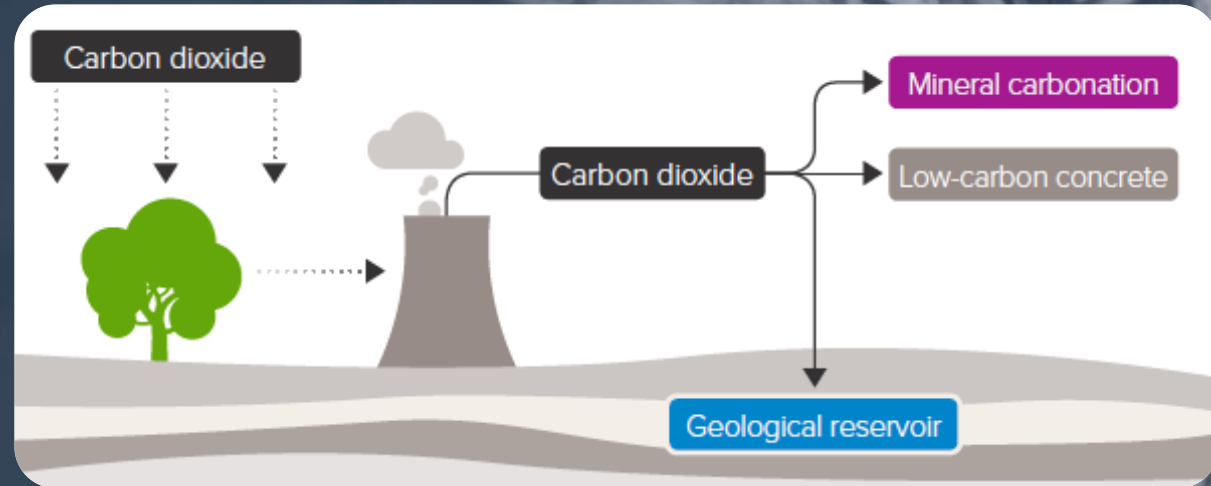
Soil carbon sequestration

Going further: GHG Removal

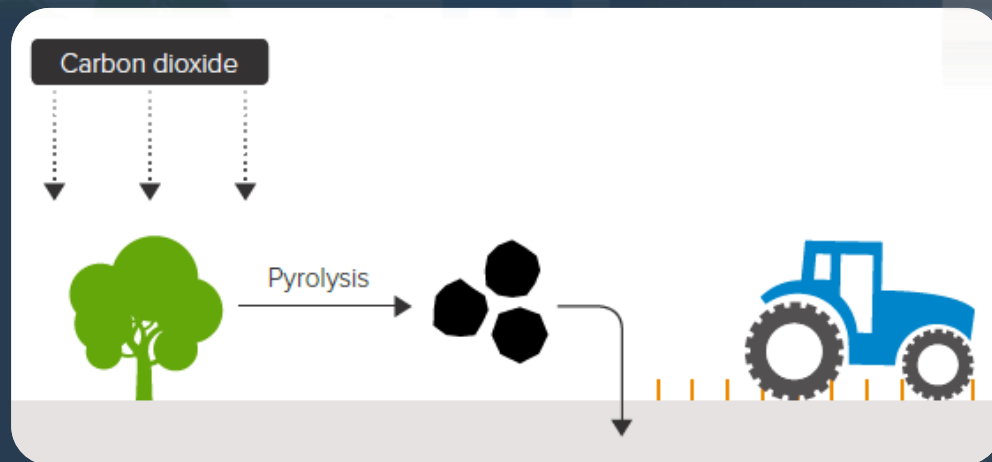
Building with biomass



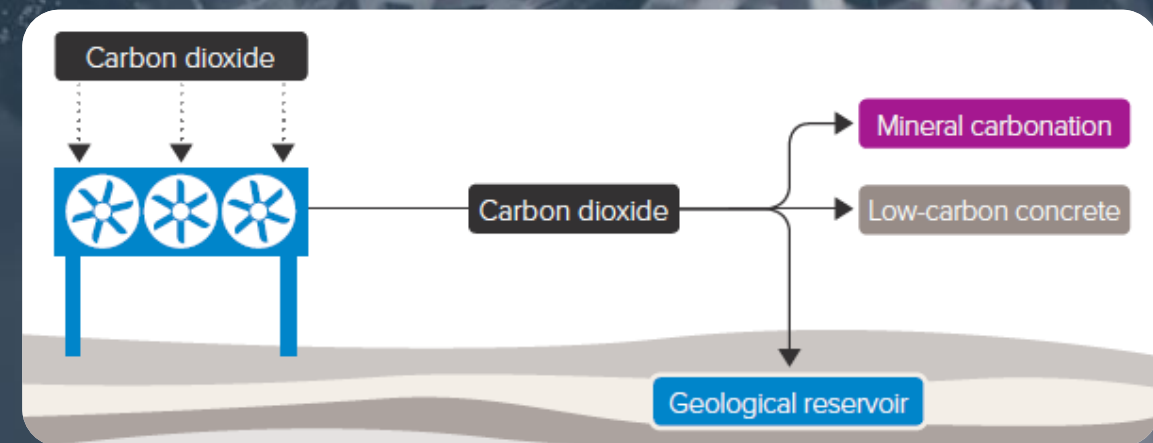
Bioenergy with carbon capture and storage (BECCS)



Biochar



Direct air capture and carbon storage (DACCS)



Use the Carbon & Energy Hierarchy

Global greenhouse gas emissions and warming scenarios

Our World
in Data

- Each pathway comes with uncertainty, marked by the shading from low to high emissions under each scenario.
- Warming refers to the expected global temperature rise by 2100, relative to pre-industrial temperatures.

Annual global greenhouse gas emissions
in gigatonnes of carbon dioxide-equivalents

150 Gt

100 Gt

Greenhouse gas emissions
up to the present

0

1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100

No climate policies

4.1 – 4.8 °C

→ expected emissions in a baseline scenario if countries had not implemented climate reduction policies.

Current policies

2.7 – 3.1 °C

→ emissions with current climate policies in place result in warming of 2.7 to 3.1°C by 2100.

Pledges & targets (2.4 °C)

→ emissions if all countries delivered on reduction pledges result in warming of 2.4°C by 2100.

2°C pathways

1.5°C pathways

Data source: Climate Action Tracker (based on national policies and pledges as of May 2021).
OurWorldinData.org – Research and data to make progress against the world's largest problems.

Last updated: July 2021.

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AVOID: don't
use energy if
you can avoid
the need

use less by smart design,
efficient equipment, less
losses, and better behaviours

low carbon and renewable
sources of energy and materials

NEUTRALISE / REMOVE the residual
remaining emissions when all other
actions have been taken





The Benefits of Net Zero

Working towards Net Zero has many benefits

- A more stable climate with fewer extreme weather events and the damage they cause
- Less demand on nature for the resources we consume, living *within* the earth's limits
- More biodiversity supporting our agriculture, providing resilience and personal wellbeing
- Cleaner air for us all to breathe
- Creation of long term 'green' employment and more stable economies

Henrik Poulsen, CEO, Ørsted: "Speeding up the green transformation of the energy system is crucial to combatting climate change, but will also **improve our quality of life in many other ways. Globally we can save 4 million lives per year through improved air quality, countries can achieve greater energy independence and millions of new green jobs can be created.**"

*What
others are
saying
about net
zero*

Mark Carney, UN special envoy for climate action: [achieving net zero targets on GHG requires] **"a whole economy transition, involving every company, bank, insurer and investor... to change consumer preferences – it is the greatest commercial opportunity of our time".**

Alistair Phillips-Davies, Chief Executive, SSE: **"To secure a green recovery and put the EU on the path to net zero, an ambitious European Green Deal is needed.** To put the right signals in place to drive investment in low carbon infrastructure, the EU should increase its 2030 climate target from 40% to at least a 55% reduction on 1990 levels in the run up to COP26."

Jon Abrahamsson Ring, CEO, IKEA: **"We all need to contribute to limit global warming** to 1.5°C. We ask governments to step up their actions to drastically reduce the EU's GHG emissions by 2030. In the current COVID-19 crisis, **it is more important than ever that sustainable living is made affordable to the many people. It cannot be a luxury for the few.** IKEA is committed to lead by example together with partners and enable a sustainable and more affordable tomorrow."

Chris Stark, CEO, CCC: "State intervention is necessary to ensure costs and benefits are spread fairly across regions and corporate sectors. Policies are needed to encourage modest lifestyle changes, including less meat consumption and a switch to electric cars. The market will play a vital role ... to support investment decisions that would decarbonise and upgrade the nation's transport, heating, energy and building stock. I estimate this would require an eighth more capital expenditure in the UK than is currently the case. From 2030 onwards, this would require about £50bn a year of extra spending, mostly by the private sector. **Low interest rates and high efficiency benefits would take this to less than 1% of GDP. The economic and geopolitical benefits of taking a leadership position would outweigh the costs. ... It can be done.**"

The end of the training... for now...



...but the start of your journey. Next time: Climate Adaptation



Audience Poll

Your Questions



Thank you!

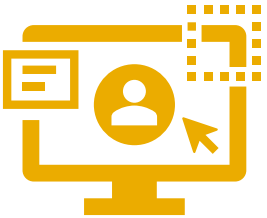
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WANT TO ENGAGE MORE WITH SSEN ON NET ZERO?

Join our stakeholder database!



Register now at:

SSEN.co.uk/StakeholderEngagement/HaveYourSay/



We own and maintain the electricity networks across central southern England and northern Scotland.



Scottish & Southern
Electricity Networks