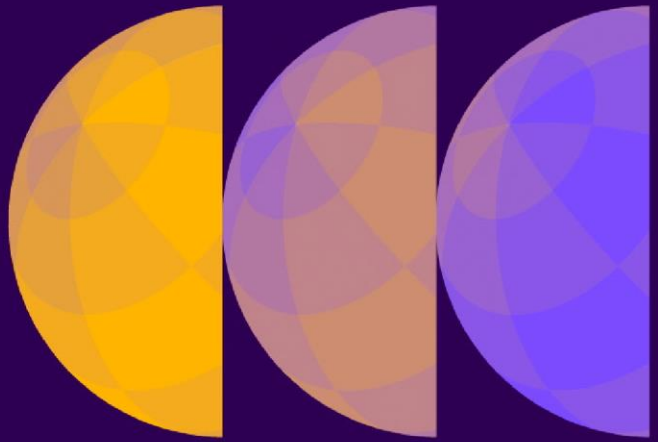
15th December 2020

Unpacking the Sixth Carbon Budget – The transition for manufacturing, construction and fossil fuel supply

Professor Keith Bell (member of the Climate Change Committee)

Dr Aaron Goater, Dr Cheryl Mackenzie, Louis Worthington, Dr David Joffe (CCC Secretariat)

Richard Simon (Element Energy)



Climate
Change
Committee

Agenda

1. **Our recommended path: the overall picture**
   Recommendations for Sixth Carbon Budget

2. **Our approach**
   Outline of methodological approach to the Sixth Carbon Budget

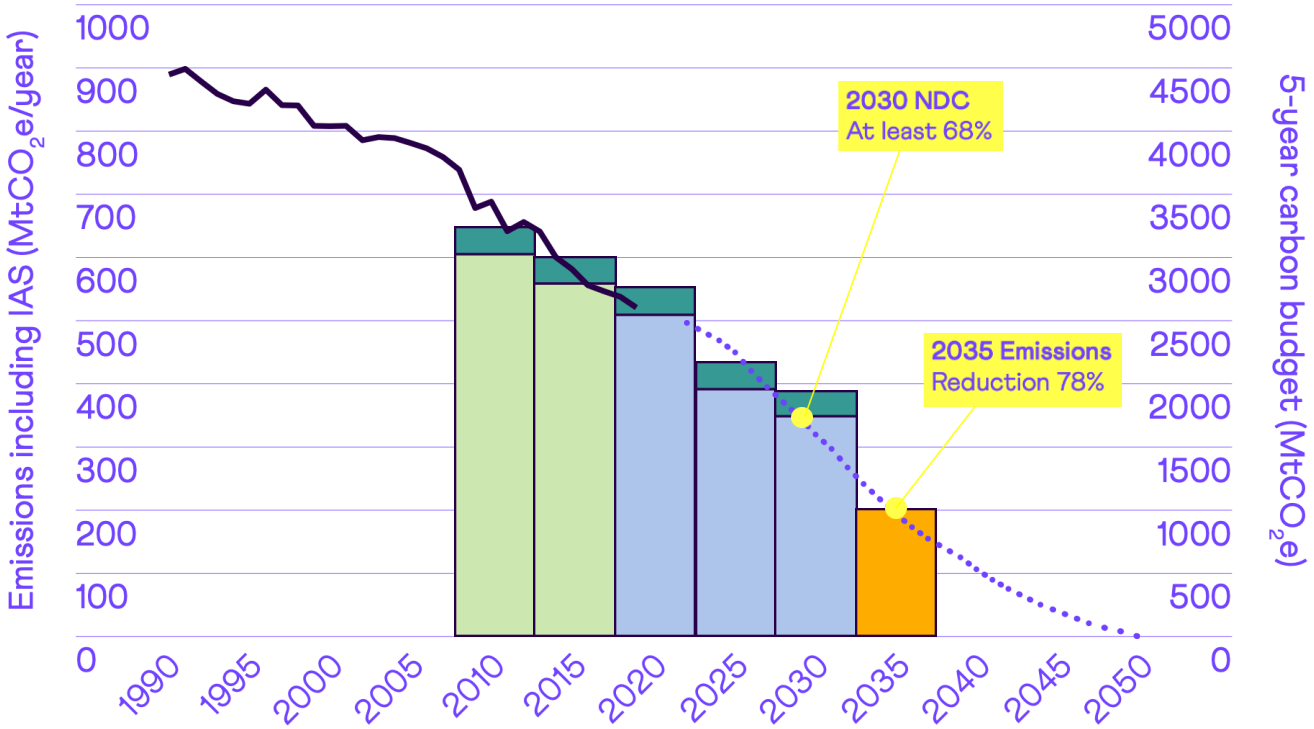
3. **What changes will we see on the Balanced Pathway?**
   Pathways for industrial emission, action, costs and co-impacts

4. **Policy recommendations**
   Policies required to enable the Balanced Pathway

Our recommended path

The overall path

The recommended sixth carbon budget and 2030 NDC



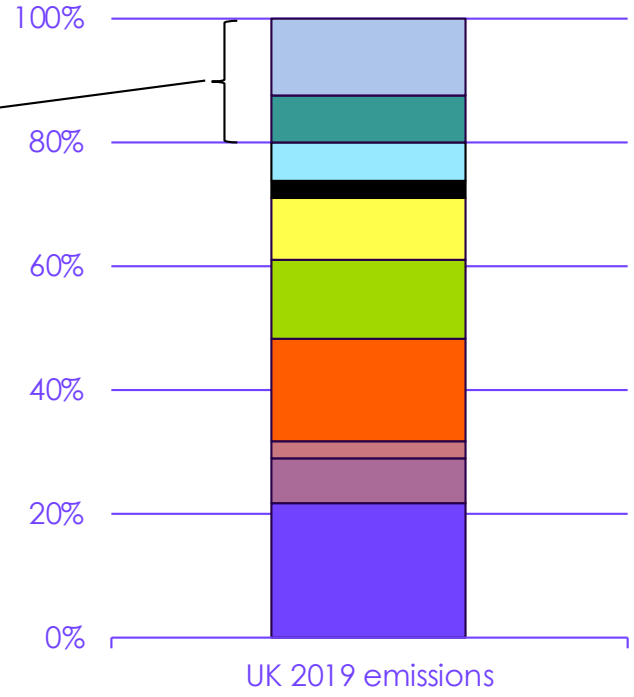
Notes:
Emissions shown including emissions from international aviation and shipping (IAS) and on an AR5 basis, including peatlands. Adjustments for IAS emissions to carbon budgets 1-3 based on historical IAS emissions data; adjustments to carbon budgets 4 and 5 based on IAS emissions under the Balanced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

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

Our approach

Our bottom up approach

Emissions formerly categorised as 'industry'

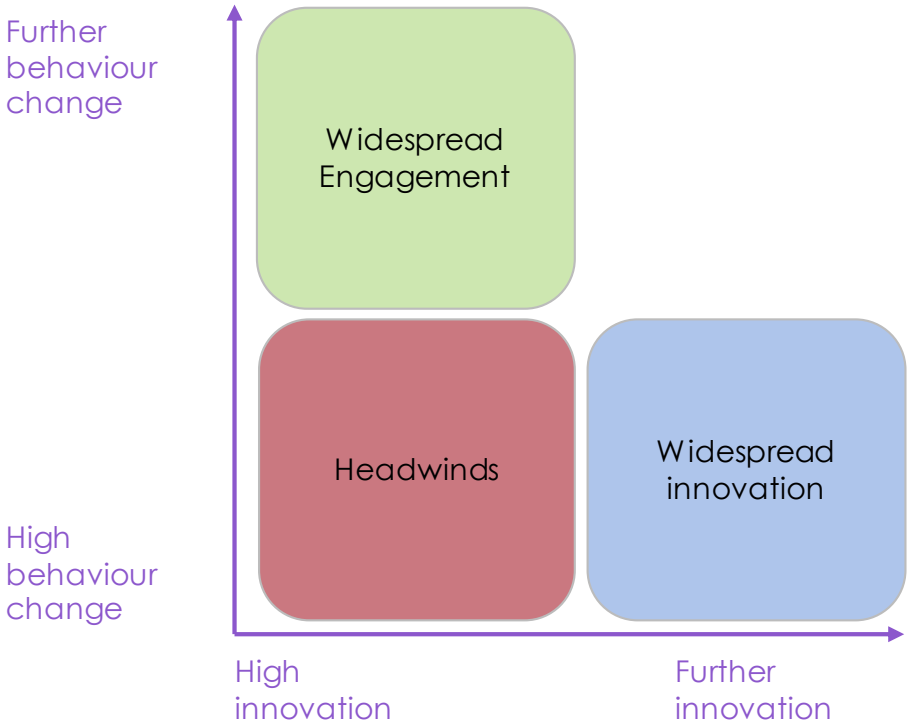


- Manufacturing and construction
- Fuel supply
- Waste
- F-gases
- Electricity supply
- Agriculture + LULUCF
- Buildings
- Shipping
- Aviation
- Surface transport

Note: All existing emissions in the Fuel Supply sector come from fossil fuel supply. However, Fuel Supply also includes production of hydrogen, ammonia and synthetic fuels for use as fuels, which may result in some emissions in future.

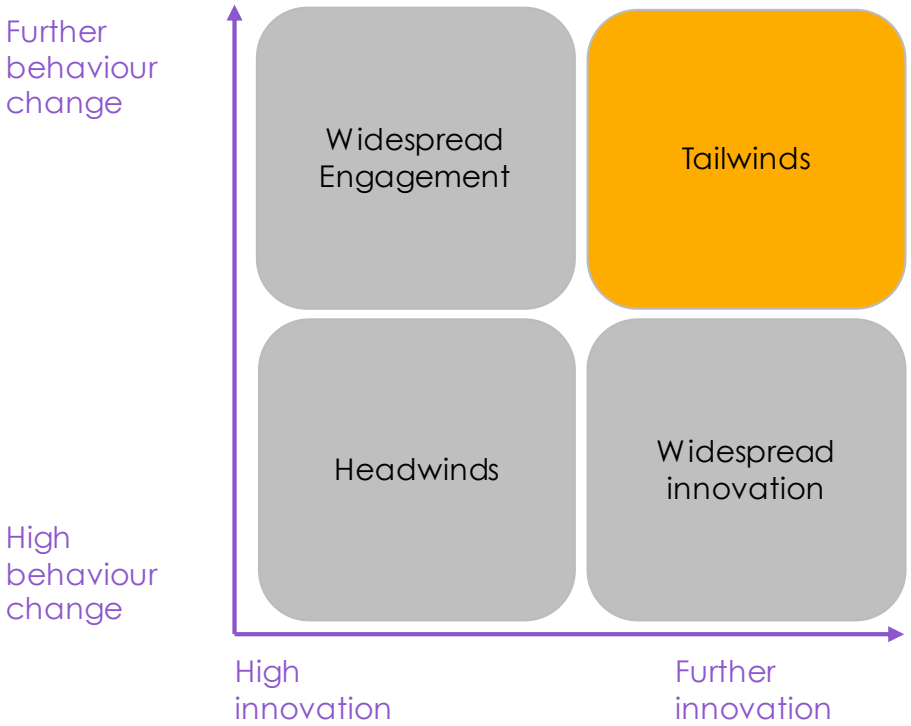
Our approach

Three exploratory scenarios to reach Net Zero by 2050

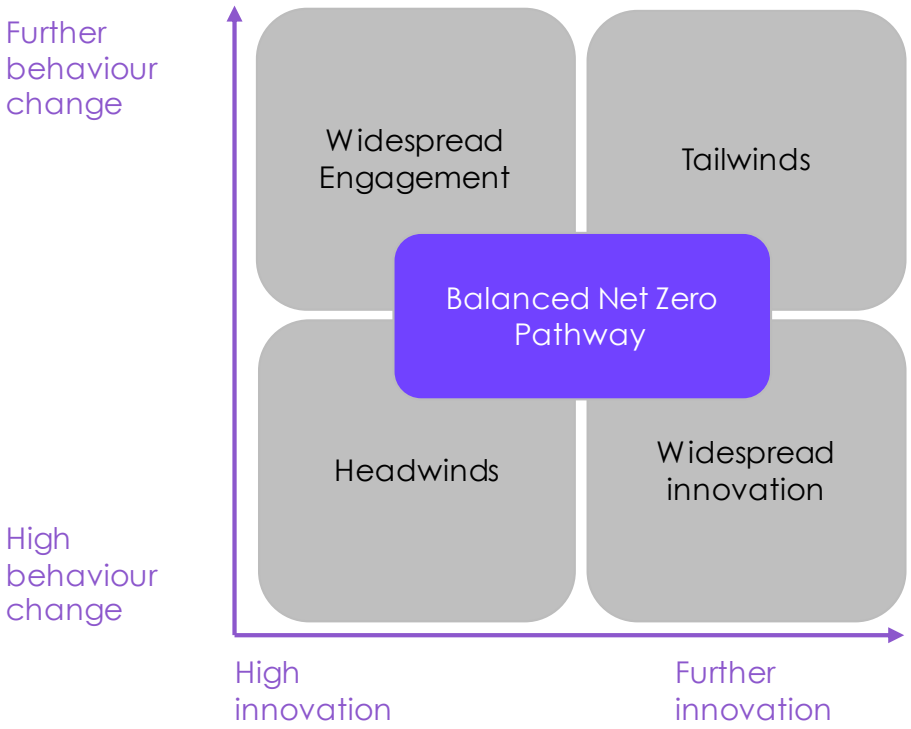


Our approach

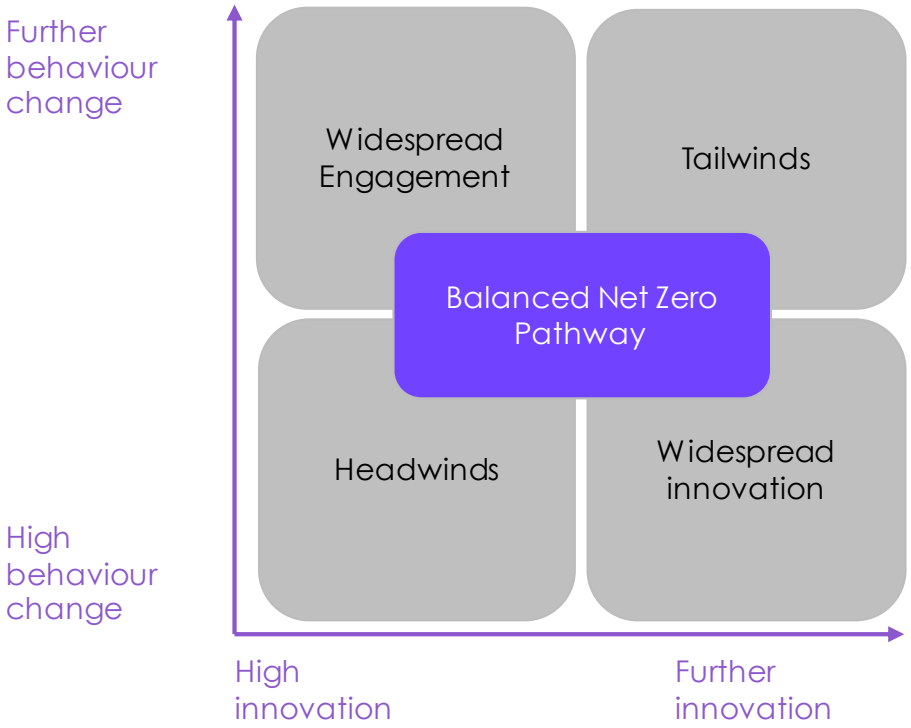
One highly optimistic scenario with success on infrastructure, innovation, societal and behavioural change



Our approach
A balanced pathway to keep options open



Our approach
Consistent with the Paris Agreement



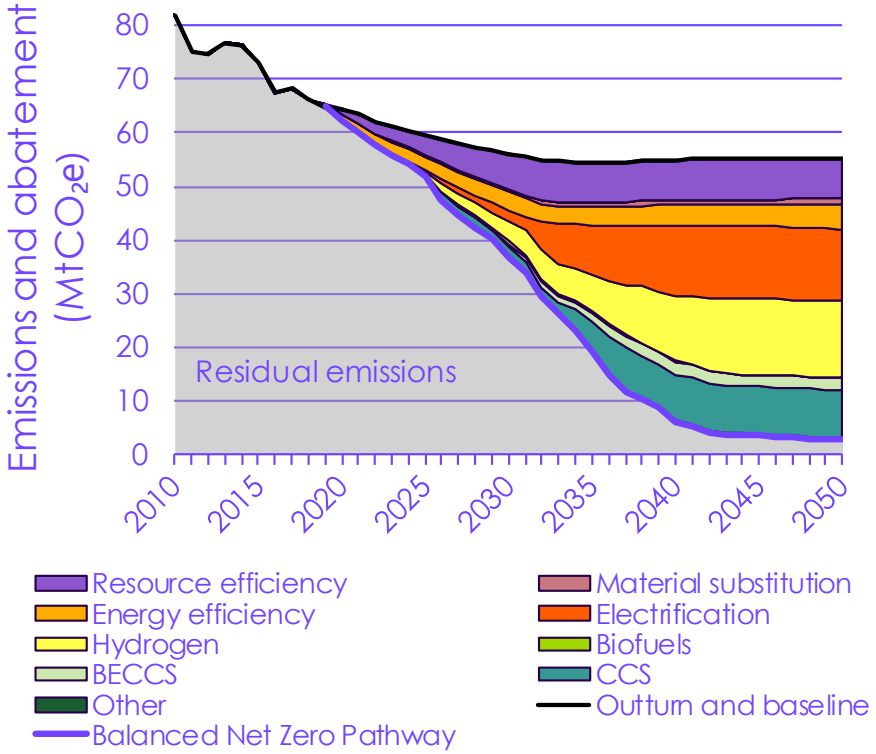
Climate science and international circumstances

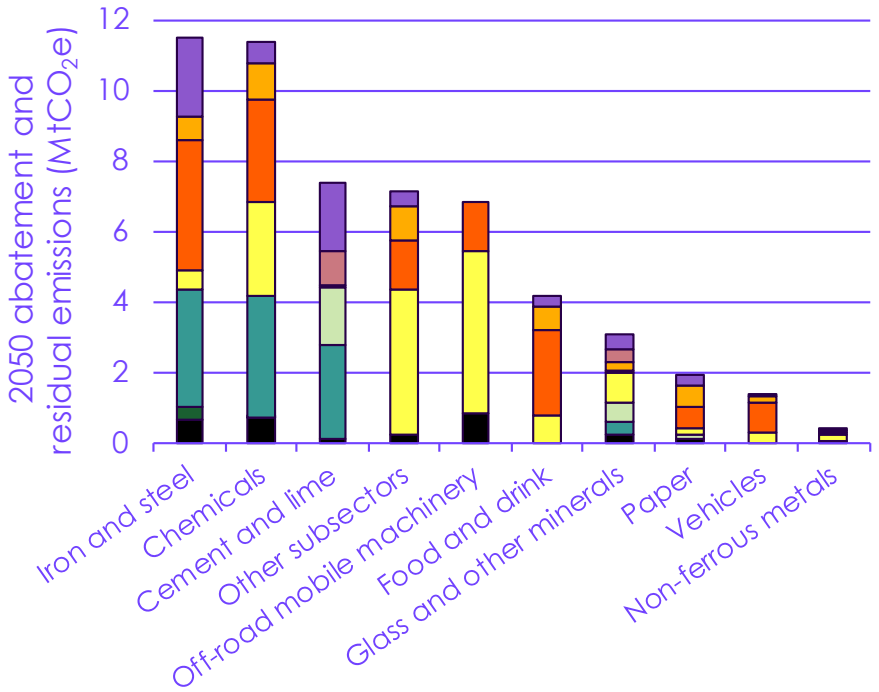
- Need deep reductions globally to 2030 to keep 1.5°C in play
- Paris demands 'highest possible ambition'
- UK leadership matters as President of COP26
- Equity arguments reinforce need for strong UK action

What changes will we see on the Balanced Pathway?

The Balanced Pathway for manufacturing, construction and fossil fuel supply

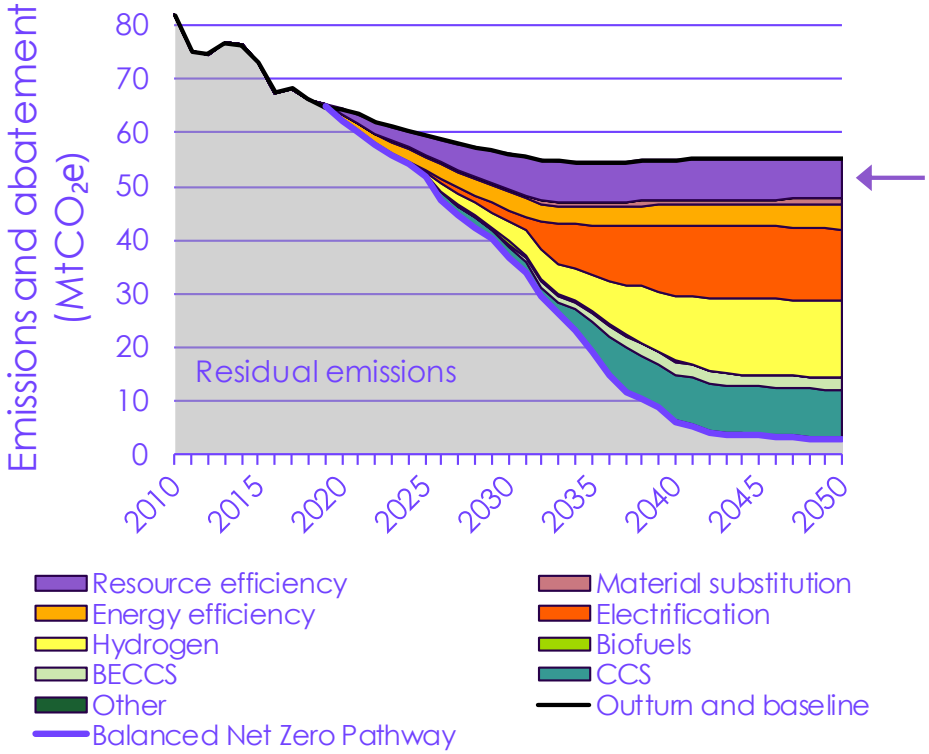
The Balanced Pathway for manufacturing and construction

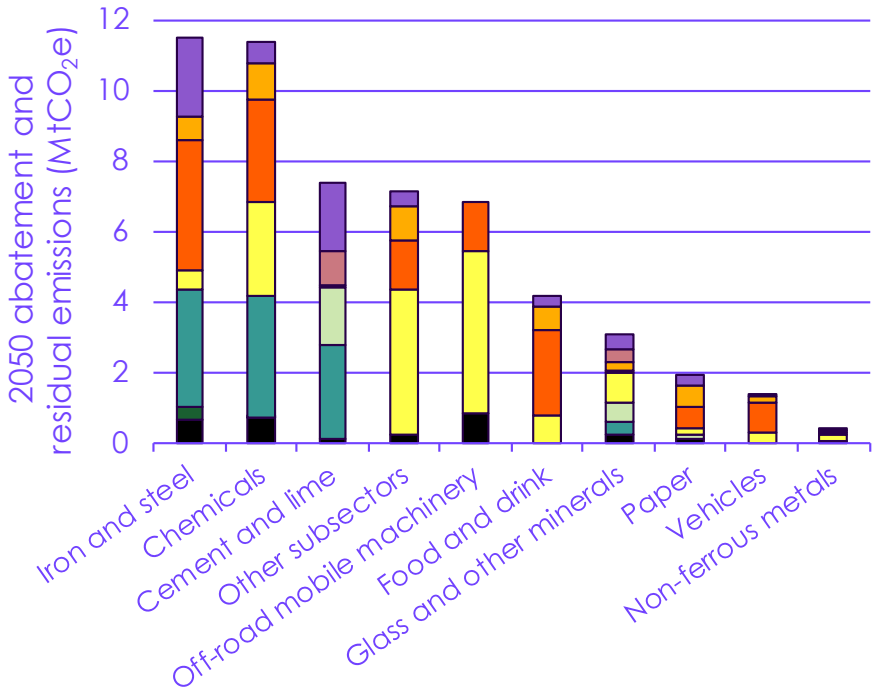




Note: Cement includes correction vs published report

The Balanced Pathway for manufacturing and construction





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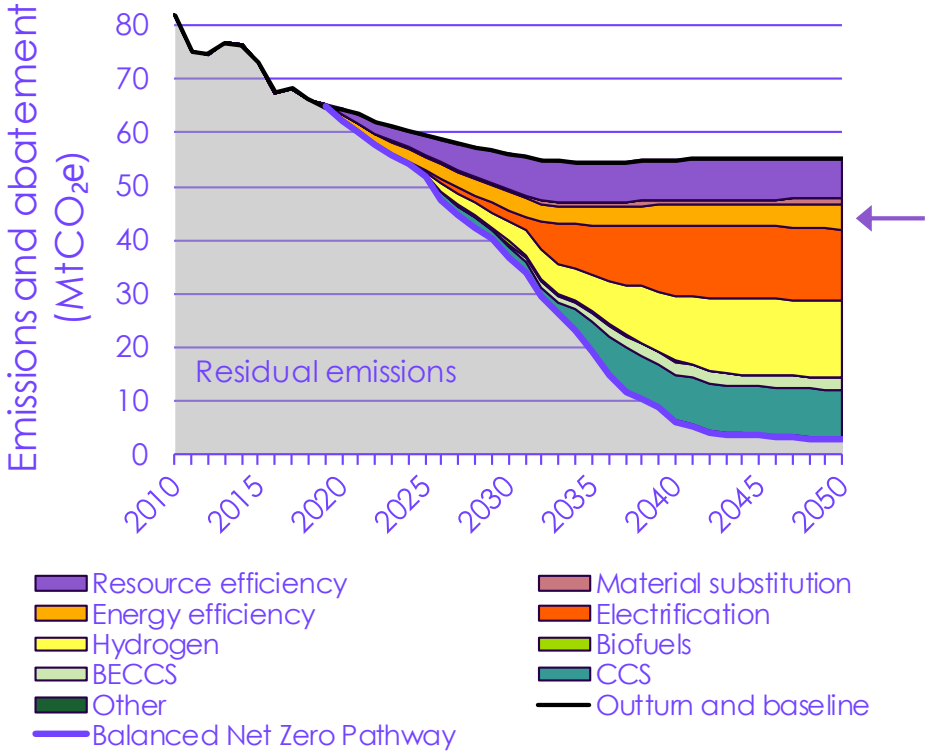

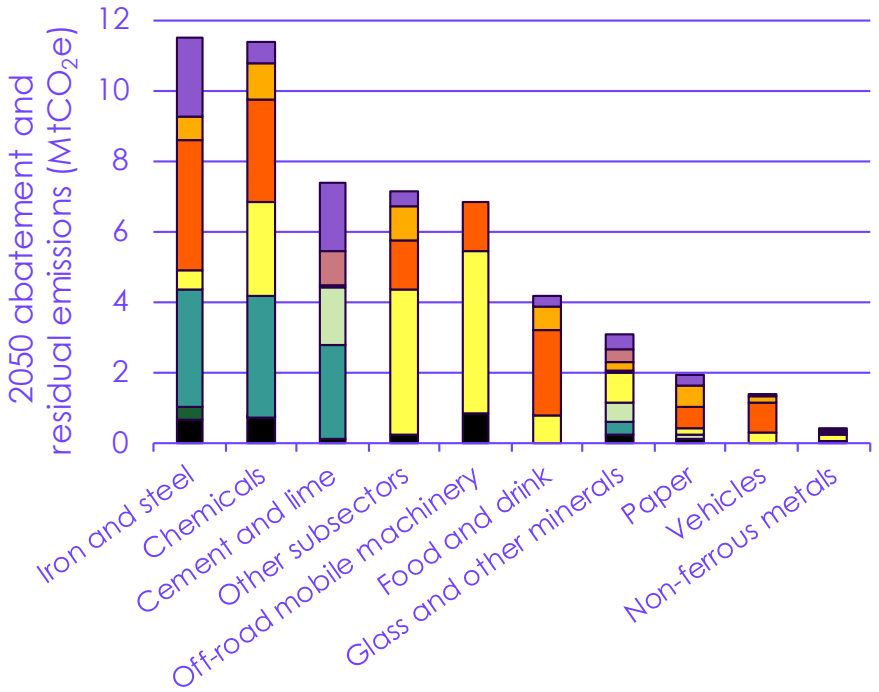

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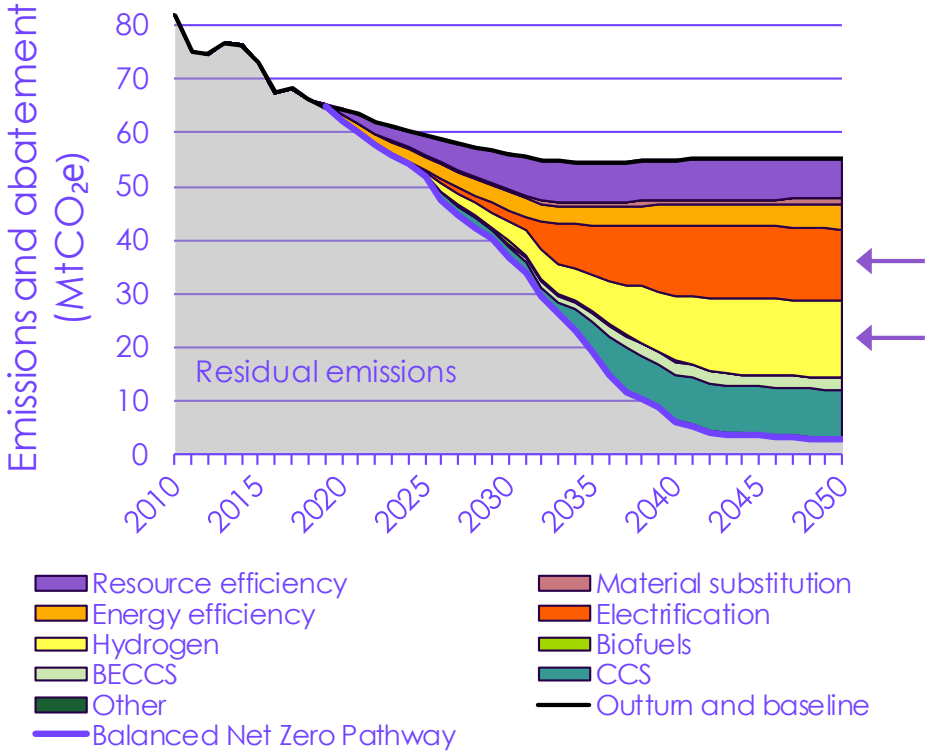

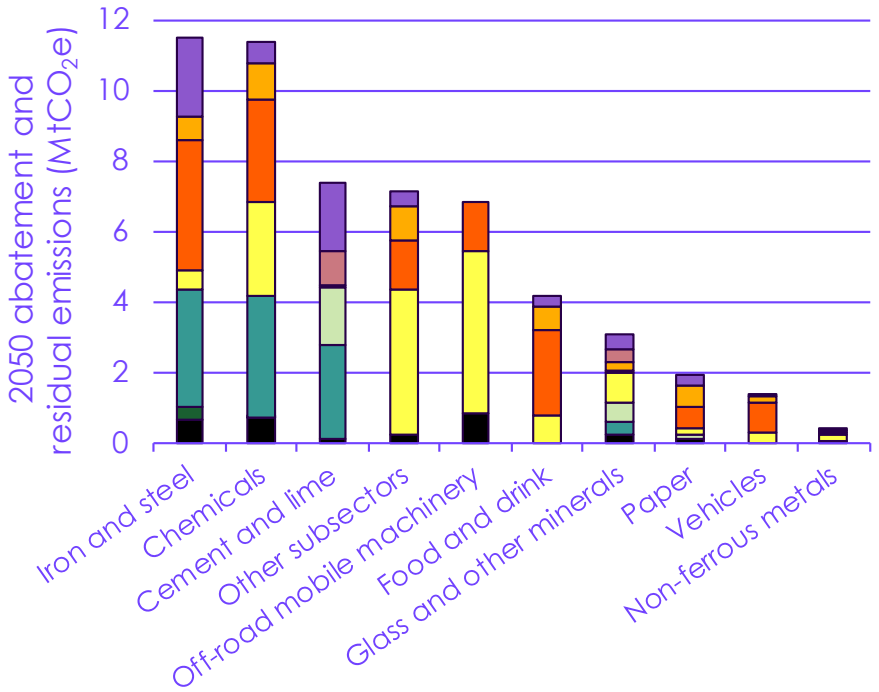

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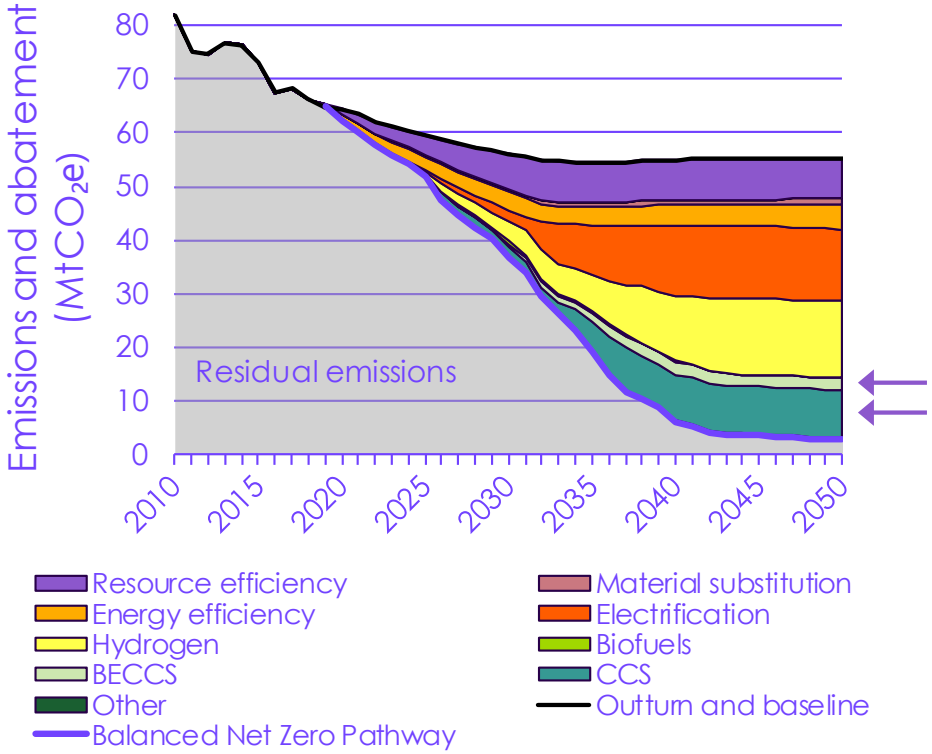

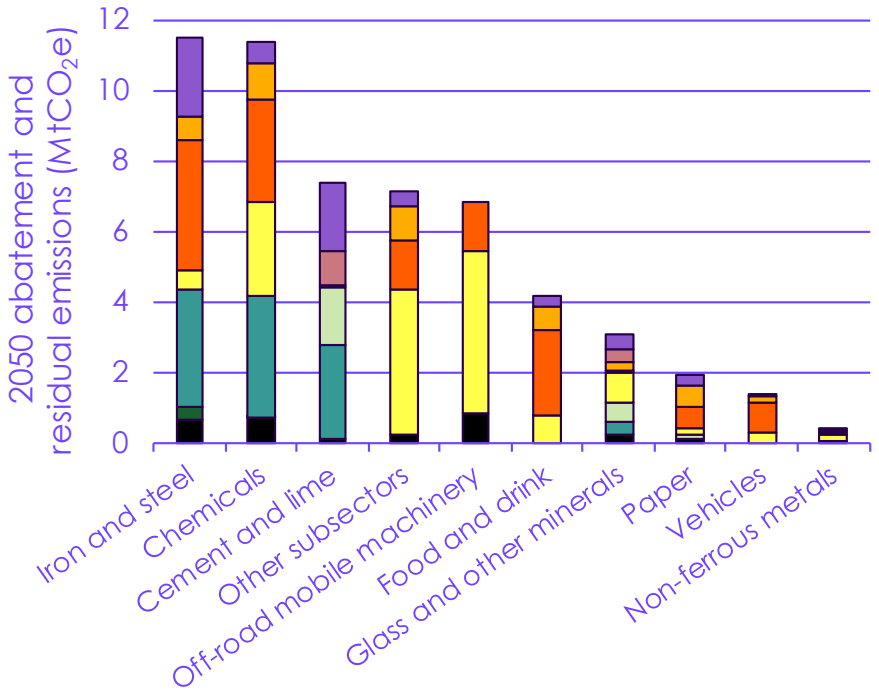

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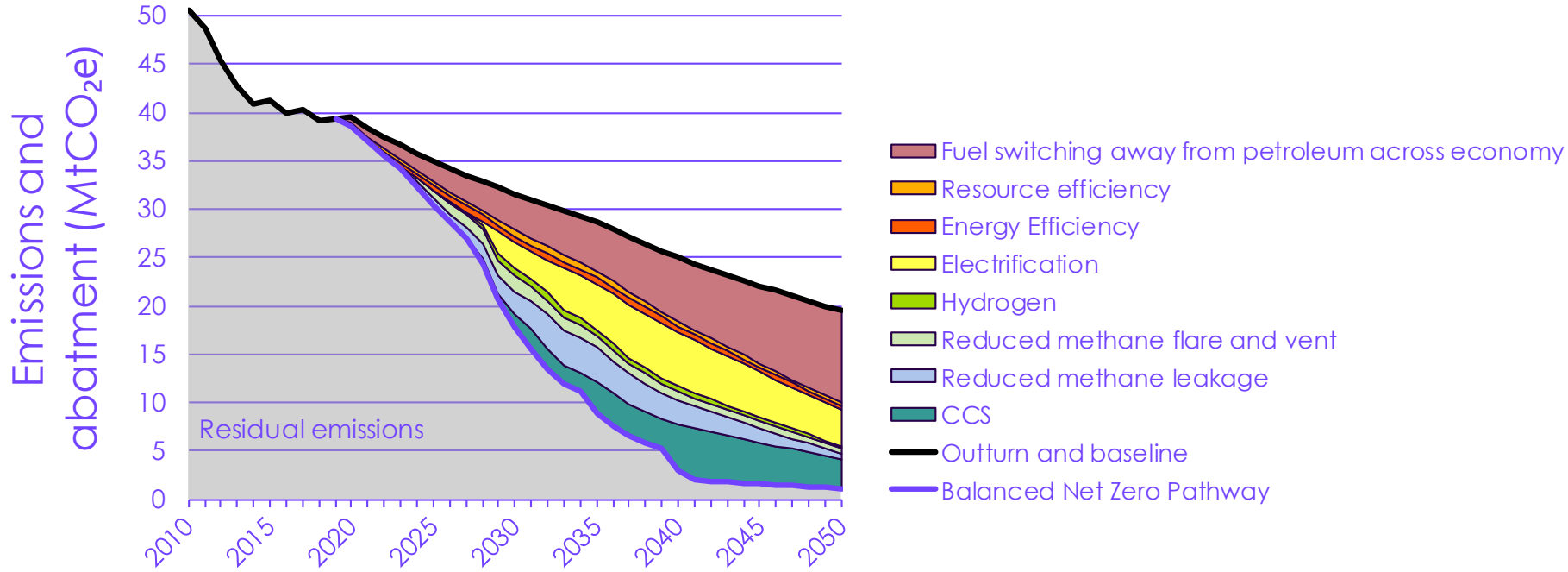
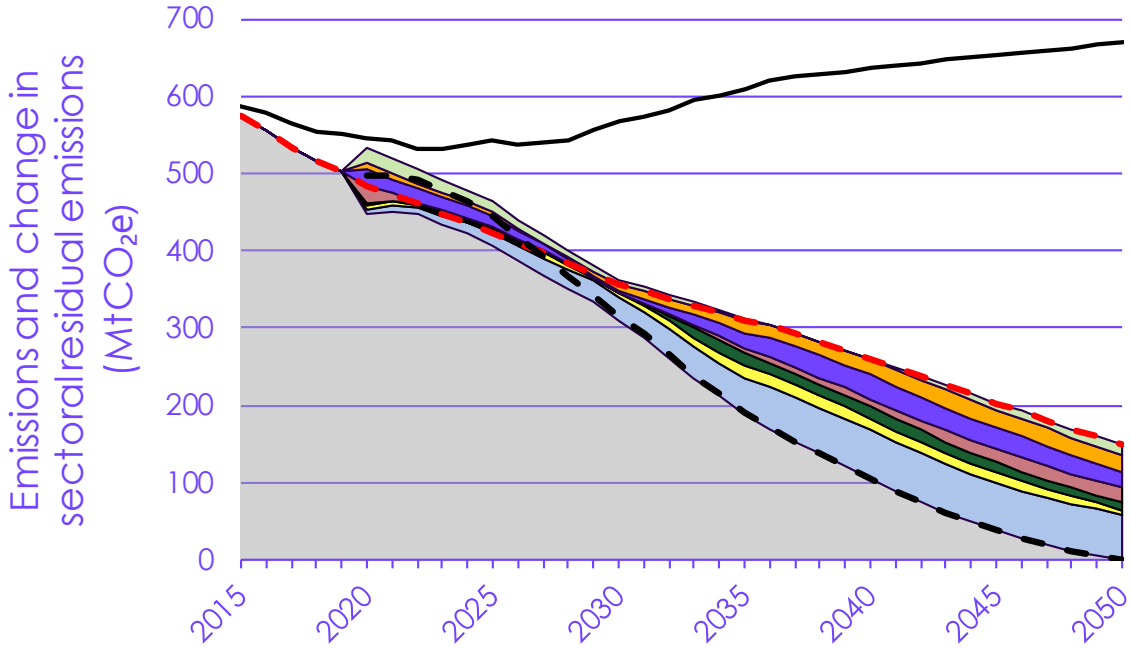
The Balanced Pathway for fossil fuel supply

Sources of abatement



Changes in emissions pathways between CCC's 5th and 6th Carbon Budget advice, by sector



- Agriculture & LULUCF
- Buildings
- Surface Transport
- Aviation & Shipping
- Removals
- Power, Waste and F-gases
- Industry
- CB5 Baseline
- CB5 Cost-Effective Path
- CB6 Balanced Net Zero Pathway

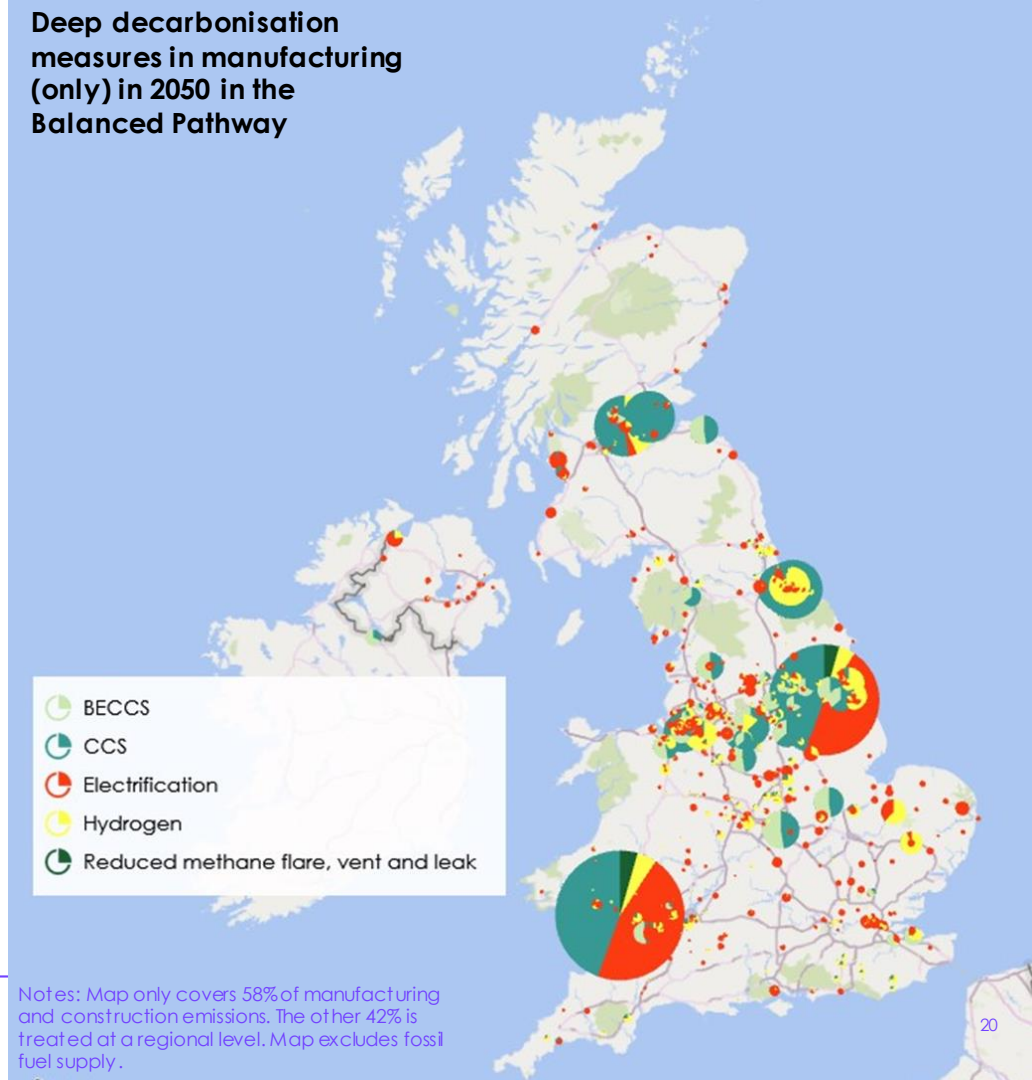
Notes: Changes in the approach to measuring emissions (the inclusion of emissions from peatland and changes to GWP values) account for increases in pathway emissions in some sectors in the 2020s, particularly agriculture and LULUCF. Underperformance in surface transport and buildings means pathway emissions in the 2020s have increased since CB5. CB5 emissions are shown on a territorial basis, rather than using the net carbon account.

The Balanced Net Zero Pathway

Geography, infrastructure and skills

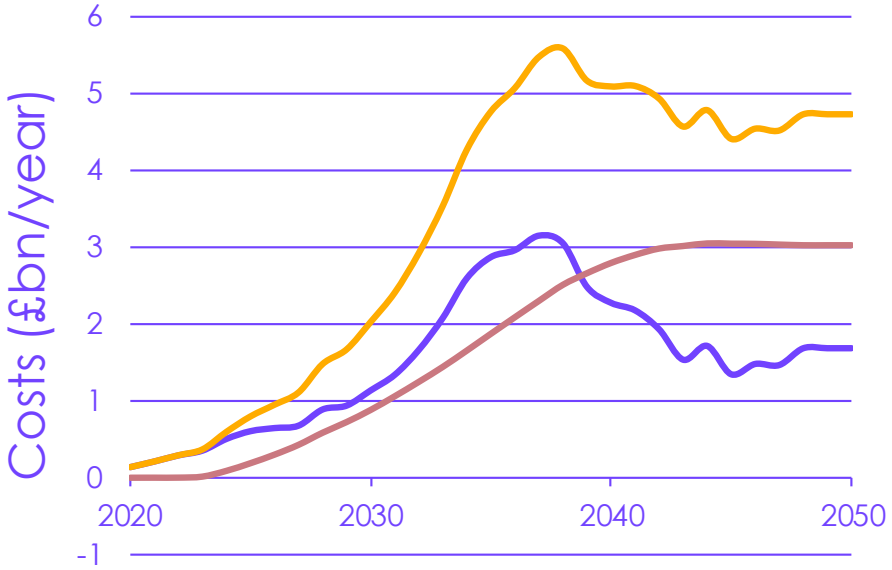
- Electrification has an advantage over hydrogen at dispersed sites, due to differences in electricity and hydrogen distribution options and availability.
- Infrastructures for CCS and hydrogen are deployed from 2025 in the pathway, starting near industrial clusters.
- Electricity network connection capacity is also increased around newly electrifying sites.
- Smaller and more dispersed sites tend to decarbonise later, due to costs, attitudes and infrastructure availability.
- More workers acquire skills to implement low-carbon measures, the supply of necessary technologies and equipment grows, and the availability of finance increases.

Deep decarbonisation measures in manufacturing (only) in 2050 in the Balanced Pathway



Notes: Map only covers 58% of manufacturing and construction emissions. The other 42% is treated at a regional level. Map excludes fossil fuel supply.

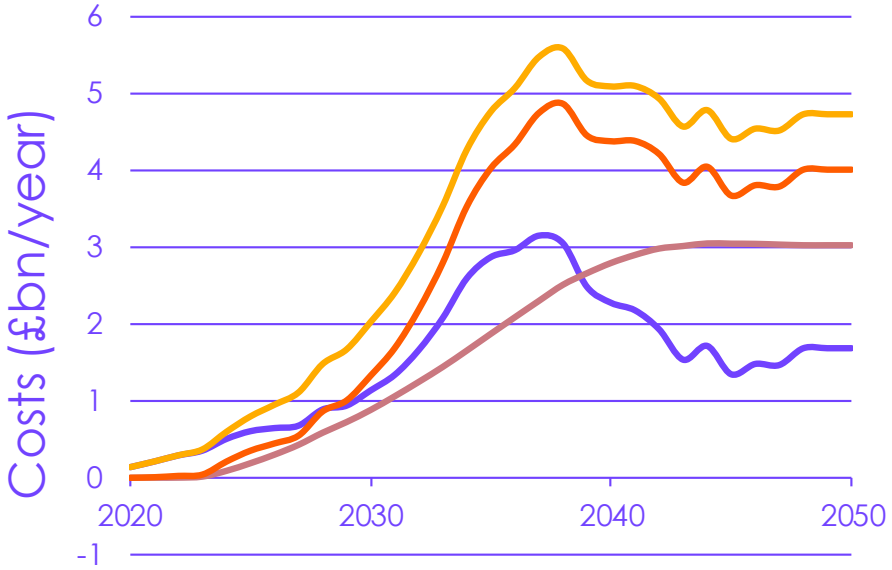
Costs of the Balanced Pathway



Notes: Assumes long-run variable electricity costs. CCS transport and storage costs seen as an operating expenditure. Data smoothed.

We estimate that the cost to the exchequer of enabling fuel switching and CCS in manufacturing and construction in the Balanced Pathway, in a way that protects subsectors at risk of carbon leakage, would be up to £2bn/year in 2030.

Costs of the Balanced Pathway



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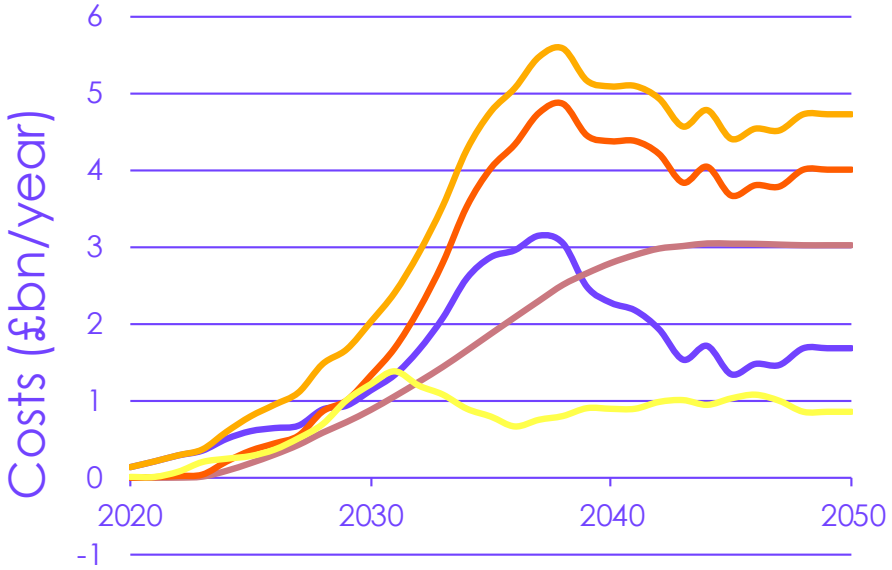

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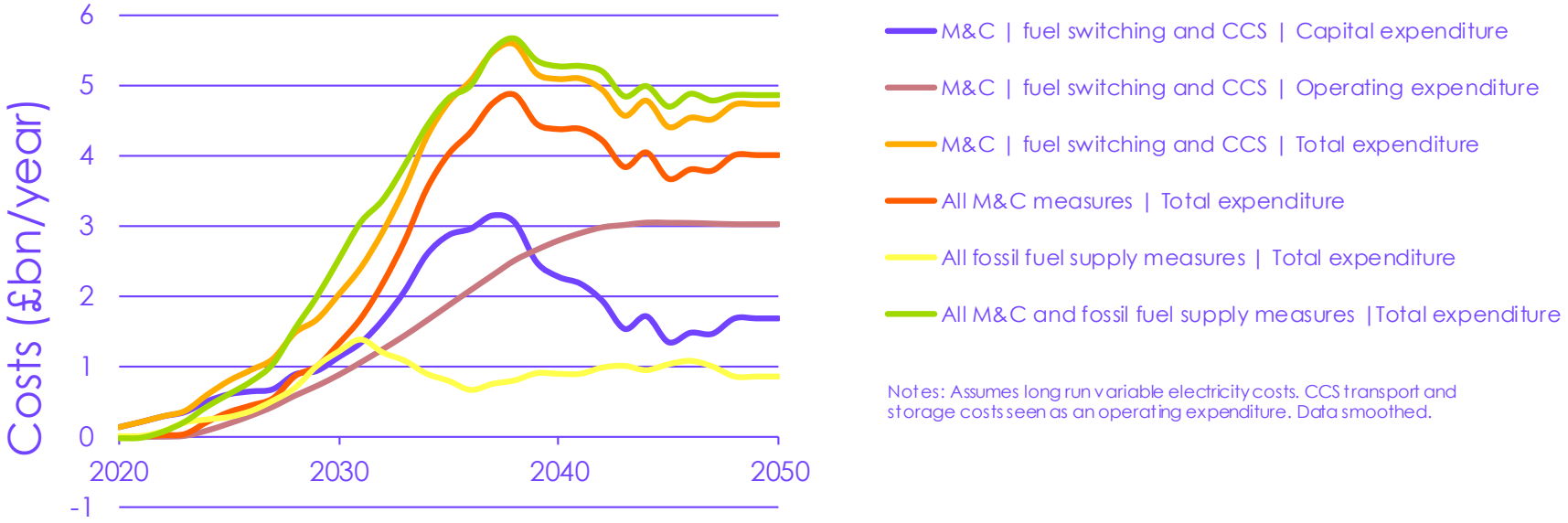

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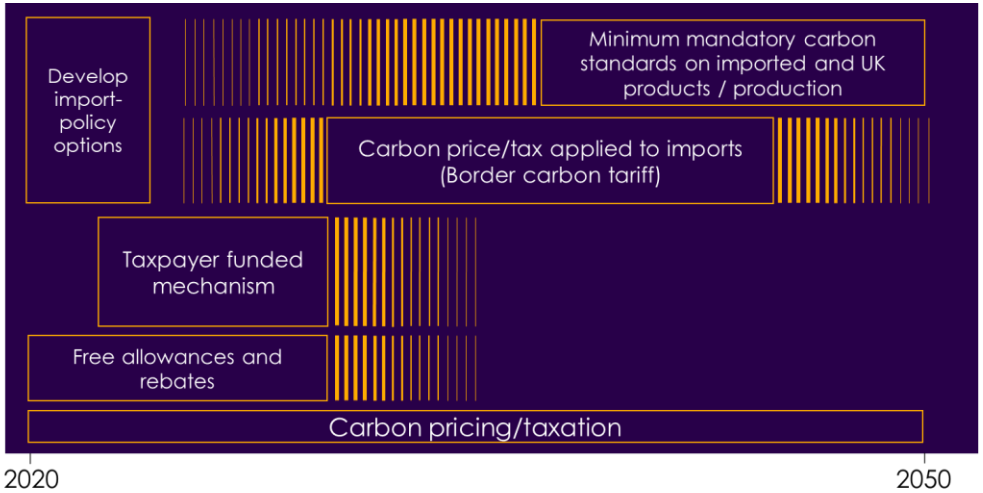
Policy recommendations

Key policy recommendations
Maintaining Competitiveness

The design of policies to reduce UK manufacturing emissions must ensure that it does not damage UK manufacturers' competitiveness and drive manufacturing overseas.

- In the near term, taxpayer funding should be used to support deep decarbonisation in manufacturing sectors at risk of carbon leakage.
- Work should begin immediately to develop the longer-term options of applying either border carbon tariffs or minimum standards to imports of selected emissions-intense products. This should include developing carbon intensity measurement standards, mandating these are disclosed and fostering international consensus around trade policies through the G7 and COP presidencies.



Indicative timing of policies to support deep decarbonisation in sectors at risk of carbon leakage

Key policy recommendations
Delivering key measures

Funding for fuel-switching and CCS

- Establish funding mechanism(s) to support operational and capital costs of both electrification and hydrogen-use in manufacturing, to be awarded from 2022.
- Finalise the Contract for Difference mechanism to support industrial CCS.
- Continue to support innovation and demonstration of fuel switching and CCS technologies.

Resource and Energy Efficiency

- Extend consumer product standards to cover how a product is made.
- Work towards introducing a mandatory minimum whole-life carbon standard for both buildings and infrastructure.

Key policy recommendations
Economic policies

Strengthen market mechanisms

- Create a clear incentive for non-traded manufacturing sectors to switch to lower-carbon energy sources by reforming energy and carbon pricing.
- Strengthen carbon prices and taxes on manufacturers.
- Reform electricity pricing to reflect the much lower costs of supplying low-carbon electricity in the mid-2020s and beyond.

Address manufacturers' low appetite for risk, either though loans or grants.

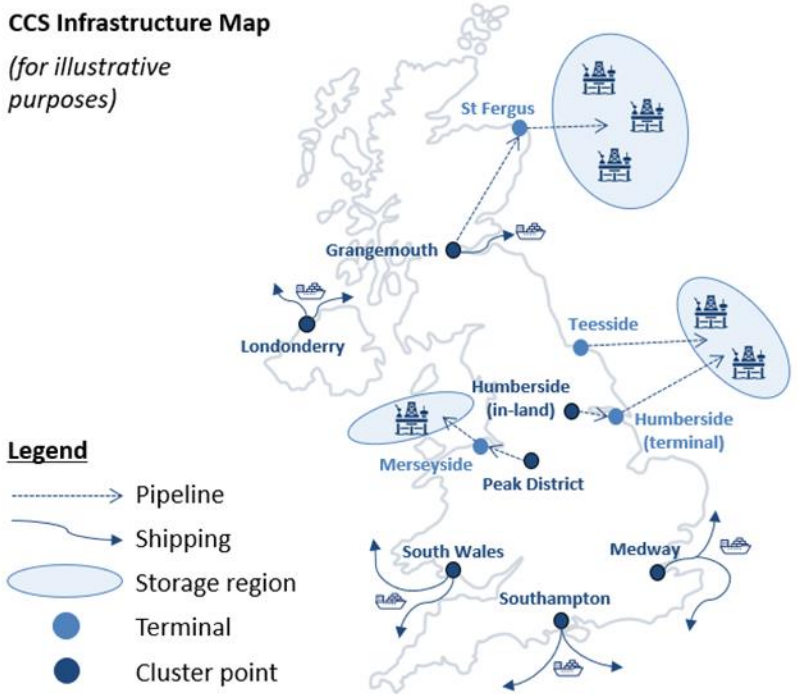
Key policy recommendations
Supporting policies

Infrastructure development

- Establish at least two CCS clusters in the mid-2020s, at least four by the late 2020s, and further clusters around 2030.
- Work with the minerals industries to develop a detailed joint plan for CO_2 transport from dispersed sites.
- Prepare to make decisions about whether initial areas of the gas transmission and distribution networks should be converted to hydrogen.
- Plan for a potential increase in large localised electricity network reinforcements for manufacturers.

Jobs and skills

- Design industrial decarbonisation policies to support and create jobs, especially in regions with reliance on industrial jobs. Prompt award of existing funding can help the recovery.
- Develop the capacity of skills and supply chains.



Source: Element Energy (2020) Deep-decarbonisation pathways for UK Industry, report for the Climate Change Committee

Key policy recommendations
Setting vision and ambition

Set out a comprehensive, ambitious vision for decarbonisation of manufacturing and construction.

- The Government's Industrial Decarbonisation Strategy should provide a clear vision of the long-term policy mechanisms for industrial decarbonisation, including how policy will maintain the competitiveness of UK manufacturing on the path to Net Zero.
- To indicate ambition, Government should set targets for ore-based steelmaking and cement production in the UK to reach near-zero emissions by 2035 and 2040, respectively. This is crucial to build momentum following the step-change in ambition necessitated by the Net Zero.
- Decarbonisation of off-road mobile machinery should not be omitted from the Government's set of plans and strategies.

Key policy recommendations
Decarbonising fossil fuel supply

Implementation of lower-cost measures

- Set a requirement that from 2021 any new plans for offshore oil and gas platforms and associated installations must use low-carbon energy for their operations. As a result, all new oil and gas platforms should have no direct emissions from operational energy use by 2027, at the latest.
- From 2025, flaring and venting should only be permitted when necessary for safety reasons.

Reducing UK and consumption emissions

- Develop a policy to reduce emissions from existing oil and gas platforms in line with our Balanced Pathway.
- Develop carbon-intensity (or broader) measurement standards for gas and oil, by working with industry and the international community
- Facilitate increased collaboration between the UK's offshore oil and gas and offshore wind sectors, exploring the potential for direct power connections to platforms.

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