15th December 2020

Unpacking the Sixth Carbon Budget – The transition for transport

Baroness Brown of Cambridge (CCC Deputy Chair)
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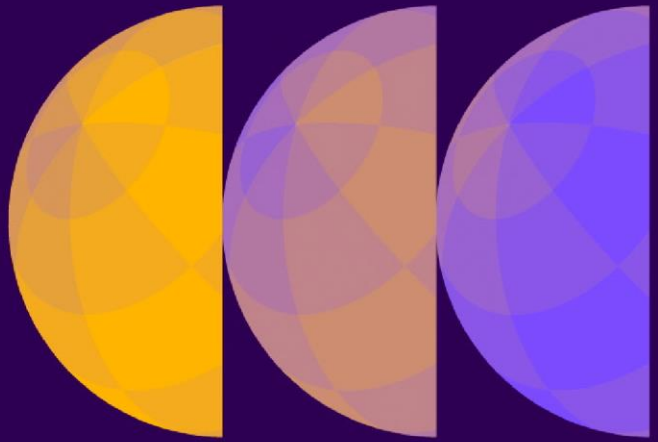


Climate
Change
Committee

Agenda

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

2. **Our recommended path**
   Recommendations for Sixth Carbon Budget, 2030 NDC – and associated requirements

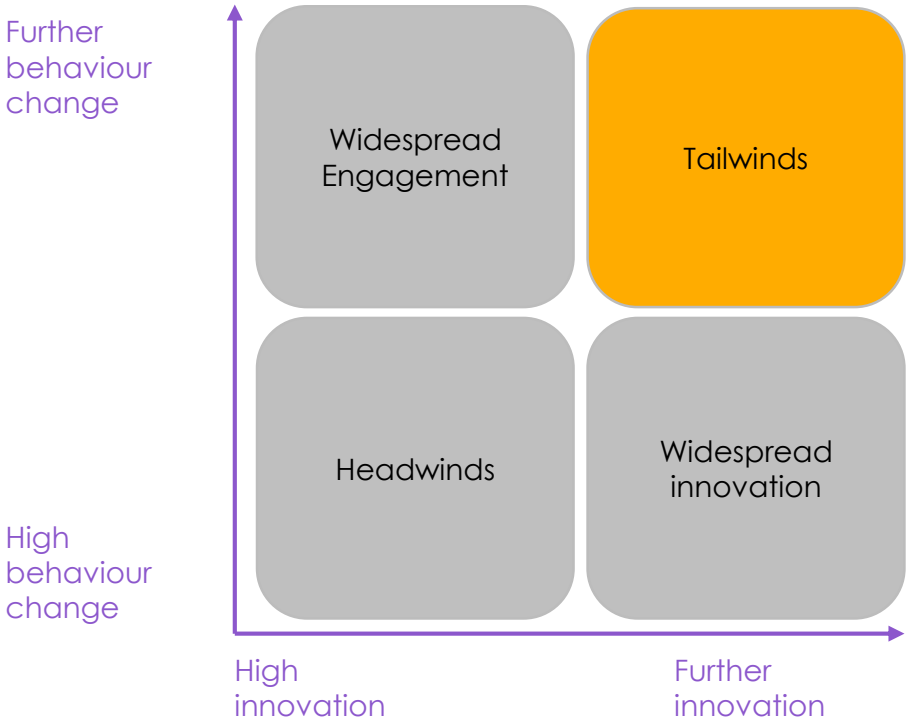
3. **Surface Transport path to Net Zero**
   Key elements of emissions reduction in surface transport

4. **Aviation and Shipping**
   Our recommended pathway and options to reduce emissions from these sectors

5. **Q&A**

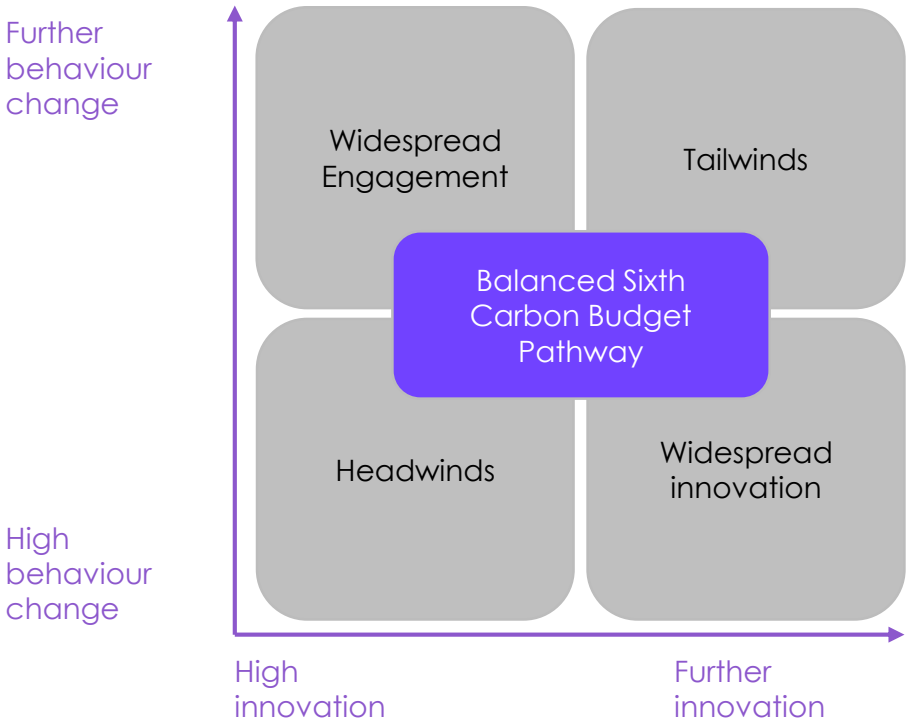
Our approach

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

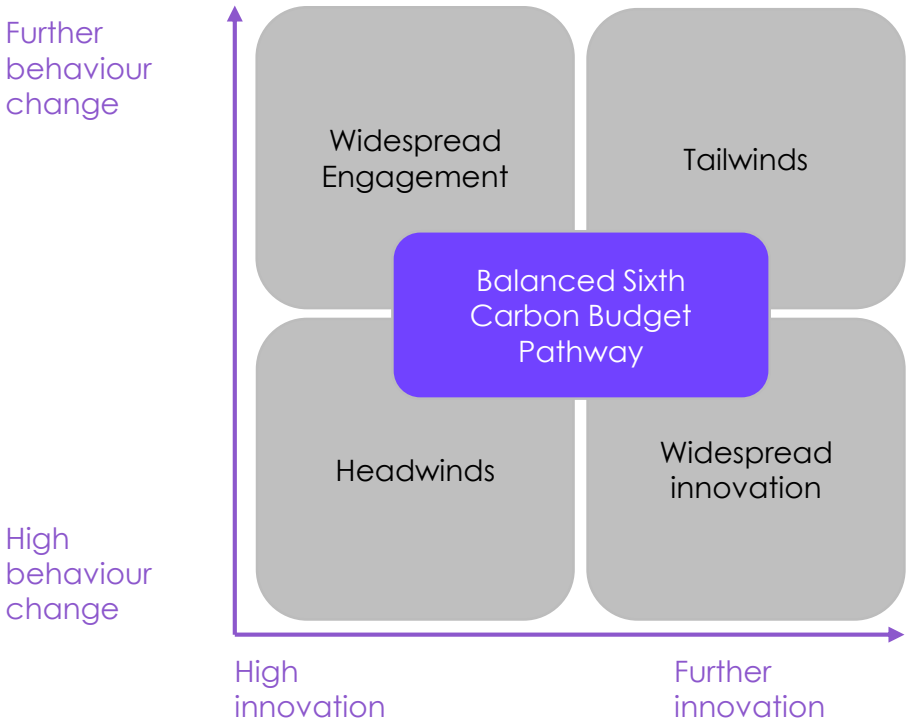


Our approach

A balanced pathway to keep options open



Our approach
Consistent with the Paris Agreement



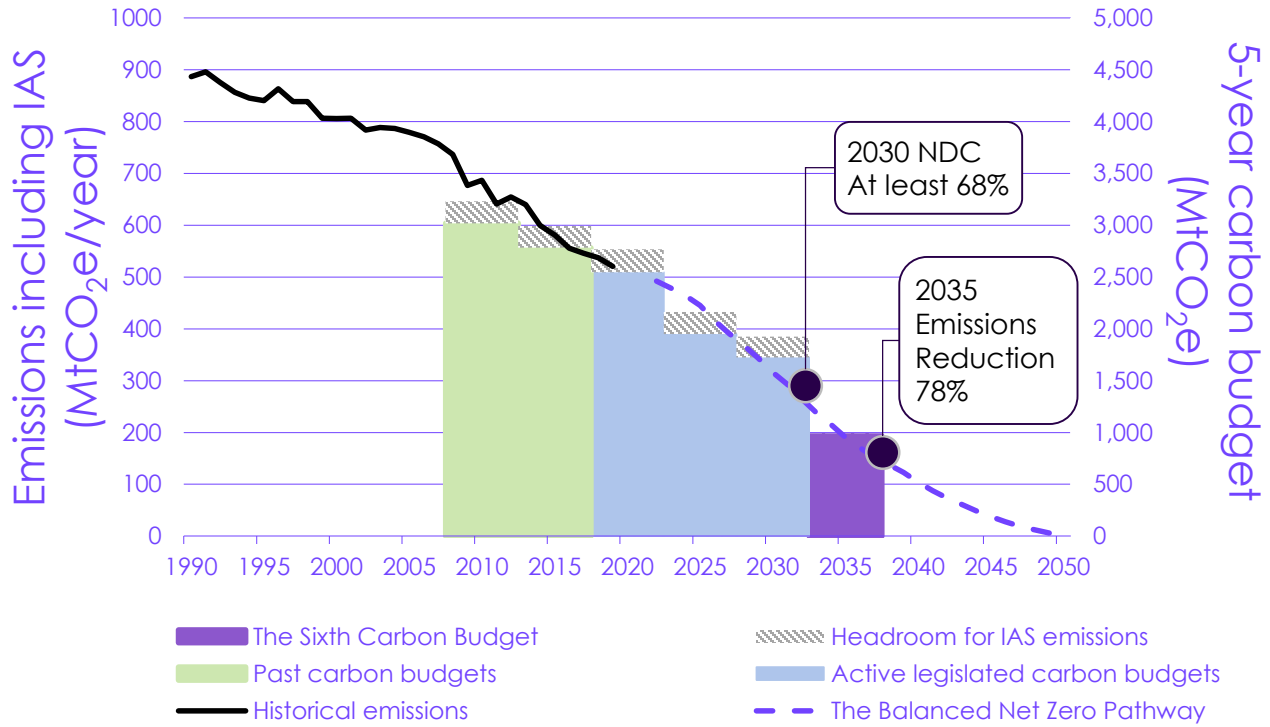
Climate science and international circumstances

- 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

Our recommended path

Our recommended path

The recommended Sixth Carbon Budget and 2030 NDC



Key recommendations
The Sixth Carbon Budget and 2030 NDC

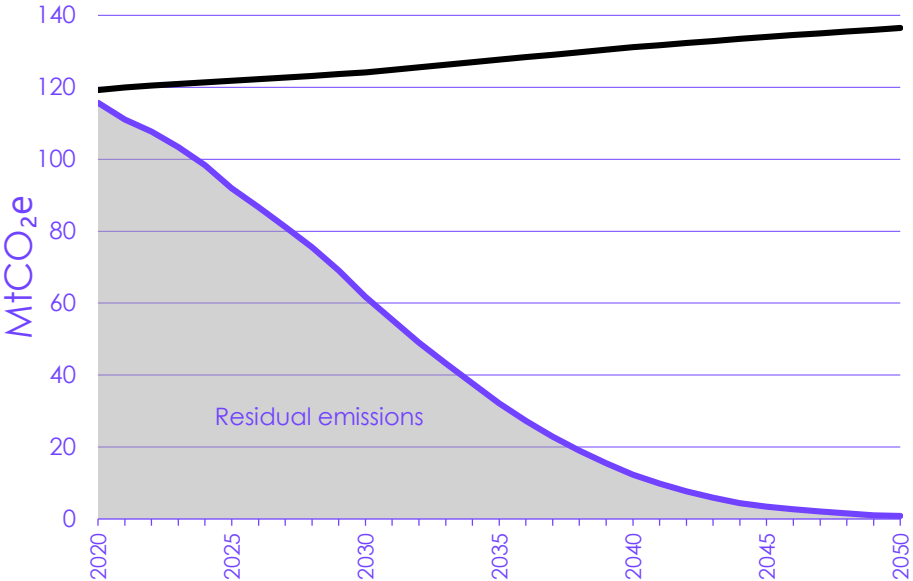
The Committee's key recommendations

- **Budget level.** The Sixth Carbon Budget should be set at 965 $MtCO_2e$, implying a 78% reduction from 1990 to 2035.
- **2030 NDC.** The UK should submit an NDC requiring *at least* a 68% reduction in territorial emissions from 1990 to 2030 (excluding emissions from international aviation and shipping, IAS, in line with UN convention), to be delivered through domestic action, with additional actions to reduce the UK's contribution to IAS emissions.
- **Budget scope.** The budget should cover all greenhouse gas emissions, including those from international aviation and shipping, and removals of CO_2 from the atmosphere.
- **Domestic action.** Performance against the budget should be judged based on actual UK emissions (net of removals), without recourse to international carbon units (often referred to as 'credits'). The Government could choose to use credits to go *beyond* the budget as a greater international contribution.
- **Net Zero Strategy.** The Government should legislate our recommended Sixth Carbon Budget as soon as possible and sets out its Net Zero plans and policies in the first half of 2021
- **Existing carbon budgets.** It is for the Government to decide whether the existing budgets should be amended to bring them in line with the Net Zero 2050 target, however, the Committee does not consider it necessary to reset these in law.

Surface transport in the CCC's Sixth Carbon Budget advice

The Balanced Pathway in Surface Transport

In the Balanced Pathway, surface transport emissions reduce by around 70% to 32 $MtCO_2e$ by 2035 and to around 1 $MtCO_2e$ by 2050



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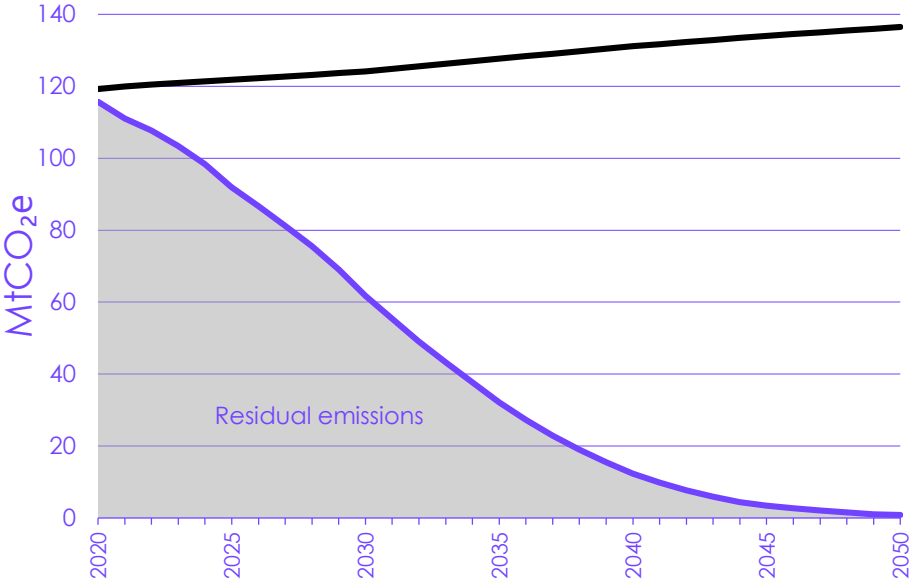
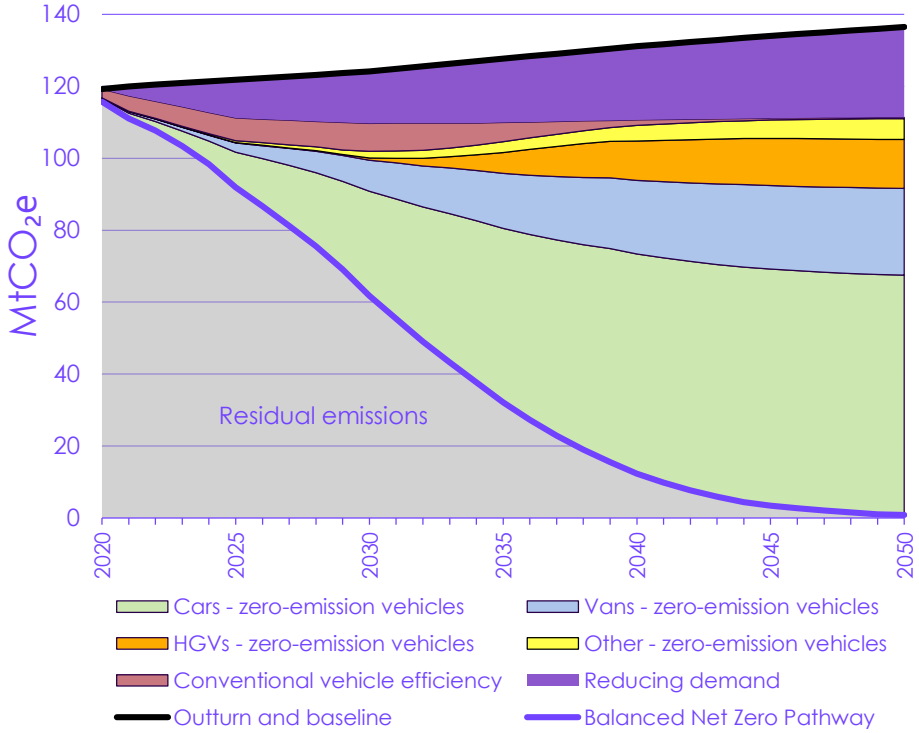
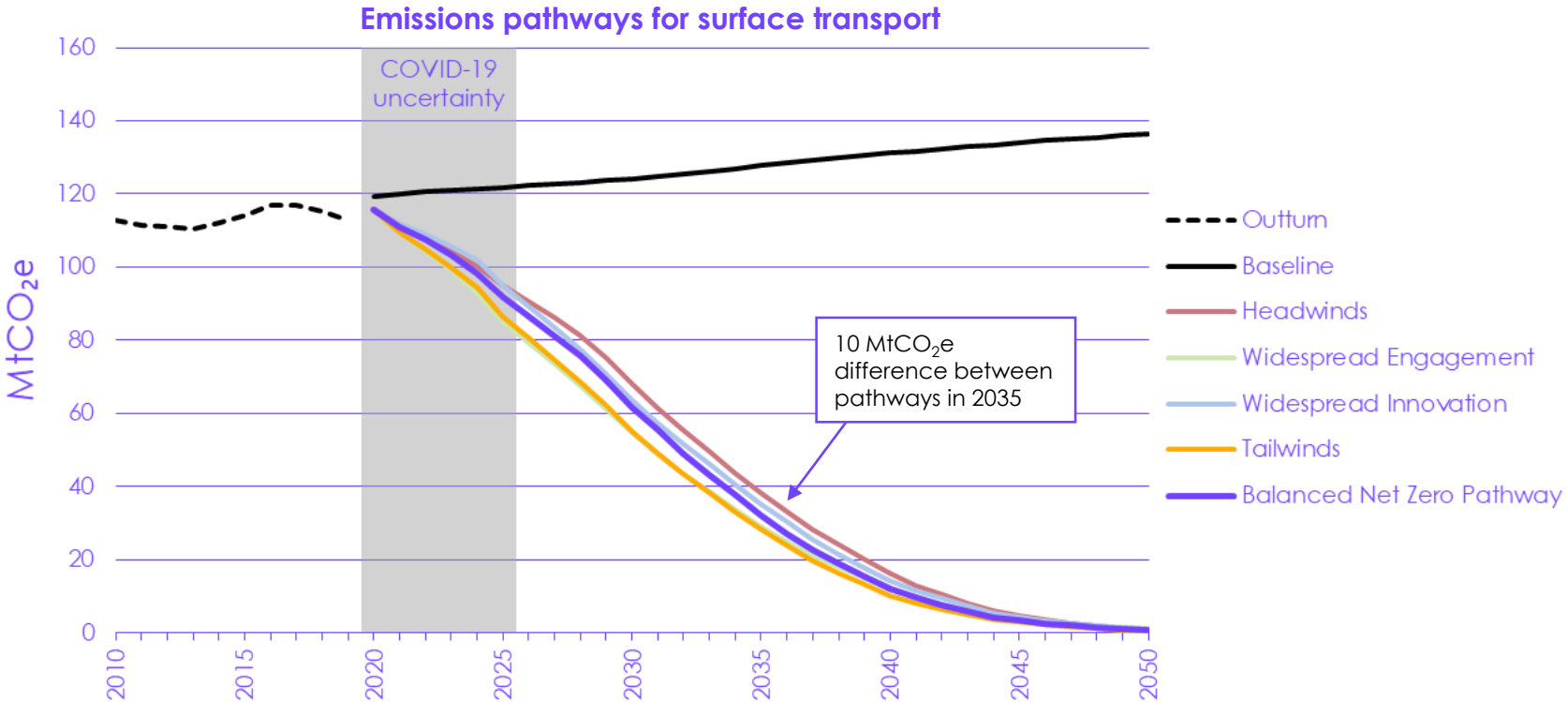




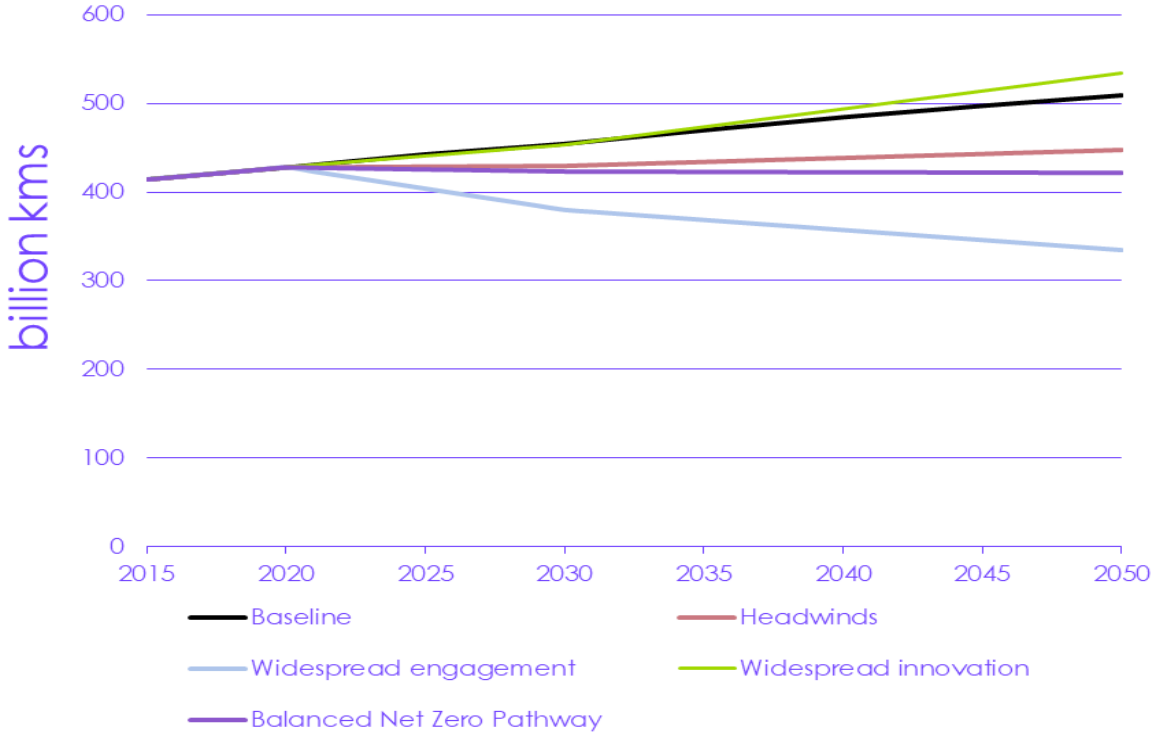
Emissions pathways for surface transport

The Balanced Net Zero pathway and our exploratory scenarios have a similar trajectory but get there in different ways



Car demand scenarios

Demand scenarios result in a relatively wide range of possible futures by 2050



The pathways are based on combining different levels of ambition for 3 drivers of travel:

- Societal and technology changes
- Car occupancy
- Modal shift to active and public transport

Rapid ramp-up is needed during the 2020s

Fully electric vehicles need to reach nearly 100% of new car/van sales by 2030

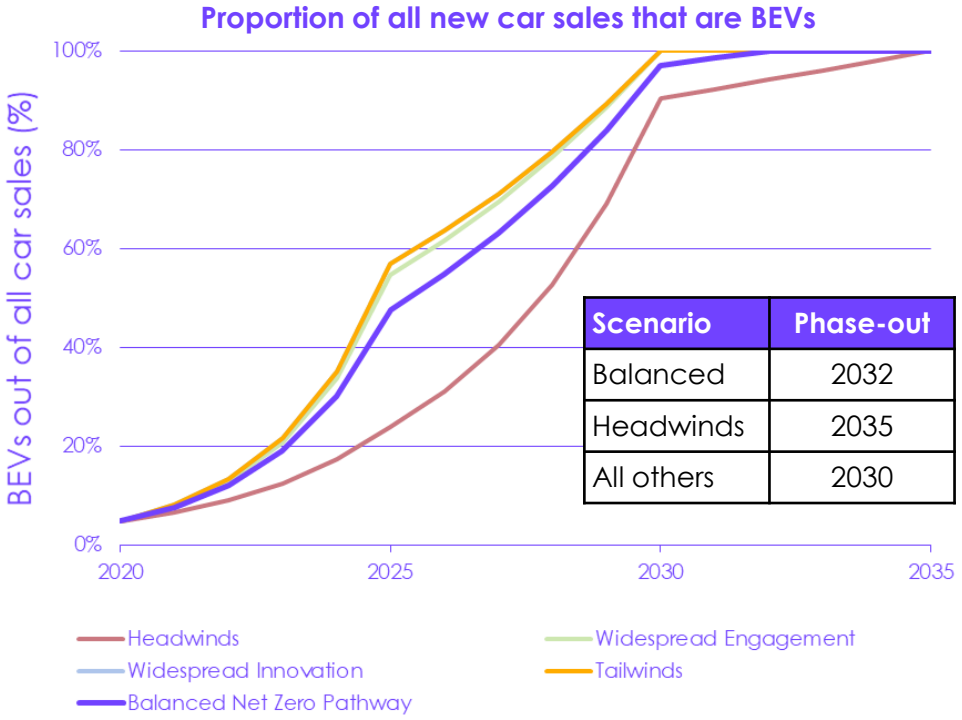
Announcement of 2030 phase-out date is welcome, but roll-out needs to focus on fully electric vehicles

To meet our Balanced Pathway, 97% of new sales should be battery-electric by 2030

- 90%+ in all scenarios
- BEVs make up 35% of the fleet by 2030, rising to 65% by 2035
- BEVs reach upfront cost-parity by 2030, with lifetime savings well before then

Current investment in charging infrastructure needs to continue to support this roll-out

- On-street for those without off-street parking
- Around town for top-up charging
- In inter-urban locations for longer journeys



Scenario	Phase-out
Balanced	2032
Headwinds	2035
All others	2030

The best solution for HGVs is currently uncertain
But now is the time to act, with trials + planning

Early 2020s – large-scale trials:

- Commercial demonstrations
- 50-150 vehicles per trial, lasting up to 5 years
- Collect and communicate data on costs, system performance/reliability, and commercial suitability

Early 2020s – planning:

- Consult on phase-out date for diesel
- Comprehensive plan for how phase-out can be delivered

2035 – our modelling assumes sufficient incentives to ensure total cost of ownership parity versus diesel

2040 (or earlier) – end of sales of new diesel HGVs

Simultaneously:

- Support schemes to reduce HGV/van use
- Set ambitious CO_2 emissions standards for HGVs

Electricity with ultra-rapid chargers

e.g. Tesla megachargers
Uncertainty over battery developments. Impact on electricity grid.

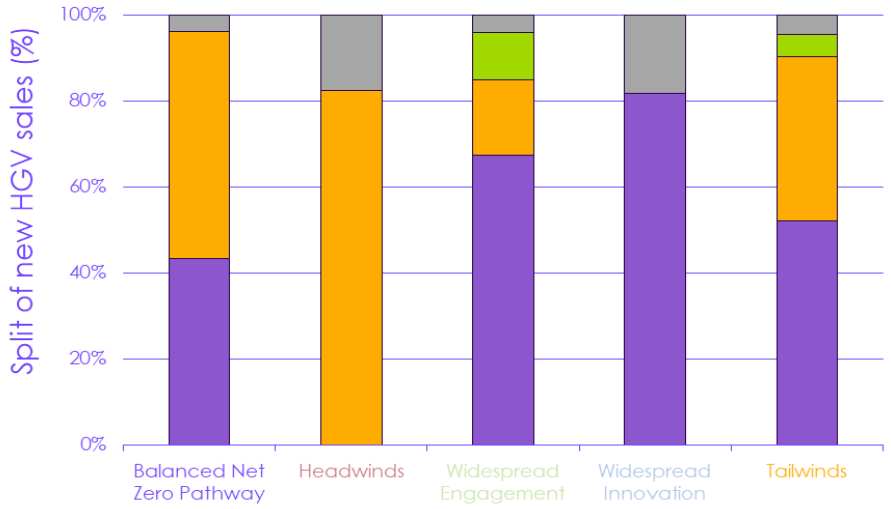
Hydrogen

e.g. Toyota
Producing hydrogen is more energy intensive than direct electrification.

Electricity with on-road recharging

e.g. Scania/Siemens
Costly and lengthy infrastructure roll-out required.

New HGV sales in 2035



Delivering the Balanced Pathway results in a cost saving

Operational savings outweigh investment costs from around 2030

Investment costs include:

- Public and private investment starting from now and rising to £12 billion per year in 2035
  - Purchase of vehicles
  - Infrastructure deployment

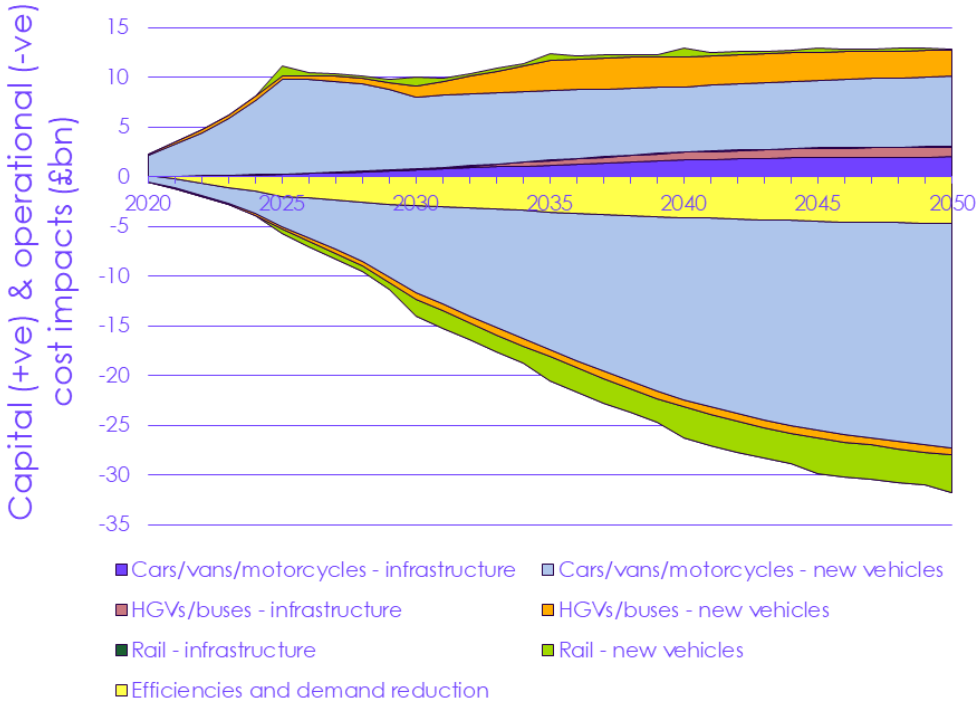
While savings arise from:

- Lower operating cost of EVs compared to conventional vehicles
  - Greater efficiency means BEVs are cost-saving to society (i.e. excluding taxes and duties) from 2025
  - Fuel cost savings of around £11 per week for a private owner
  - Maintenance costs are lower, saving up to £170 per year
- Efficiency (particularly in HGVs) and demand reduction

Overall:

- Investment is offset by lower operational expenditure
  - Annual cost saving to the economy of £8 billion in 2035, versus a counterfactual without action on emissions

Additional capital expenditure and operational cost savings in the Balanced Pathway

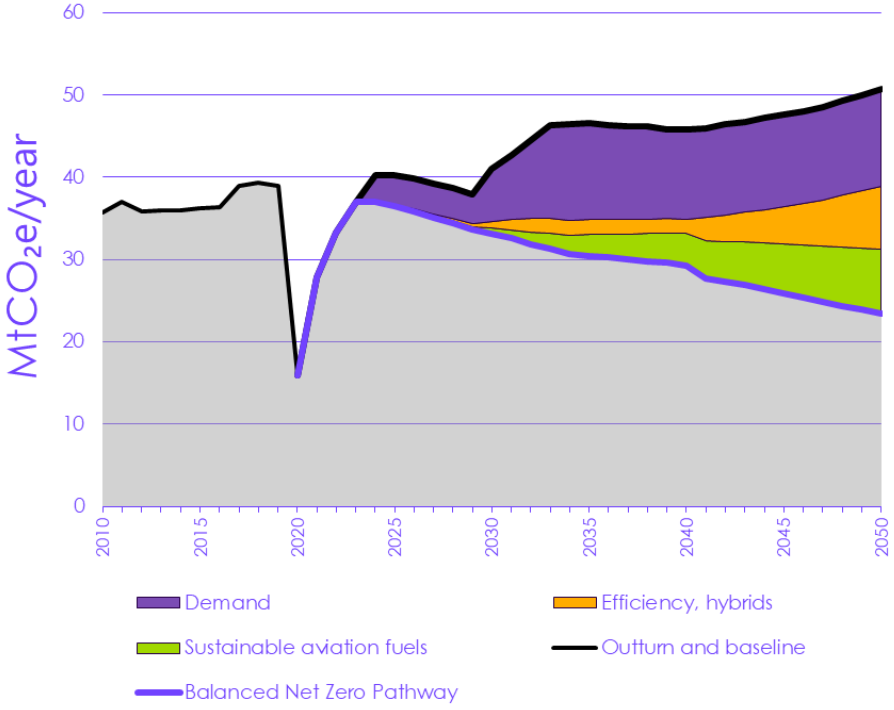


Aviation and shipping in the CCC's Sixth Carbon Budget advice

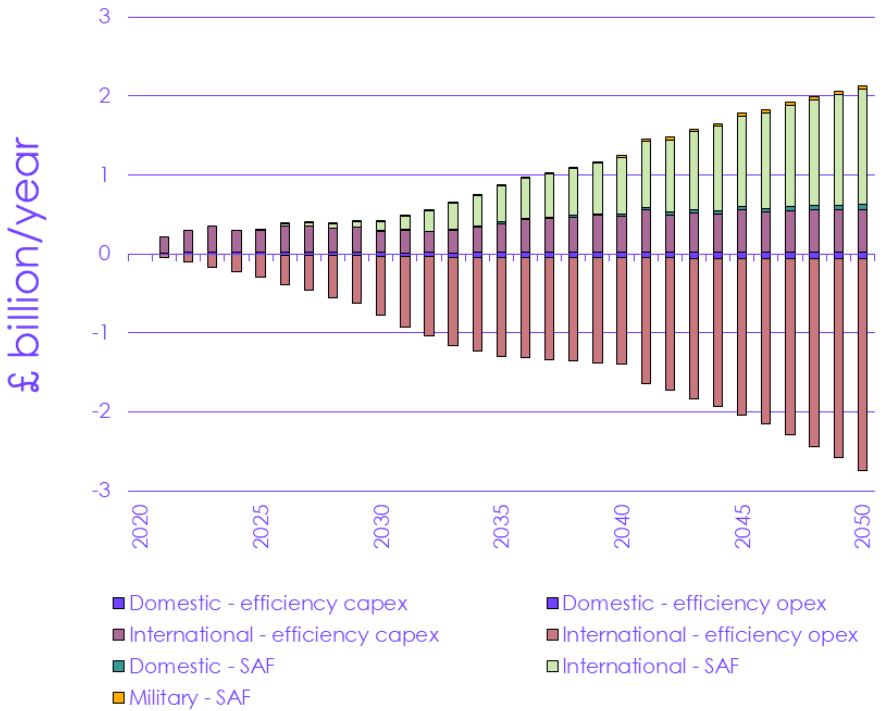
Aviation abatement is cost saving

After recovery from COVID-19, aviation emissions decline to 23 $MtCO_2e$ by 2050 in the Balanced Pathway. Efficiency savings outweigh added capital and sustainable aviation fuel costs

Emission savings in our Balanced Pathway

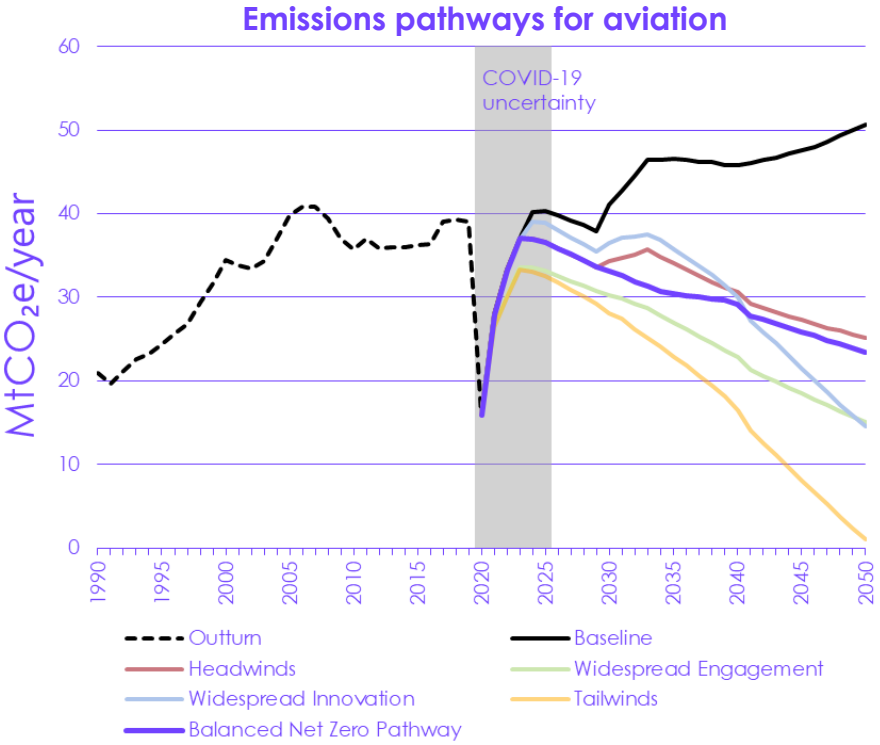


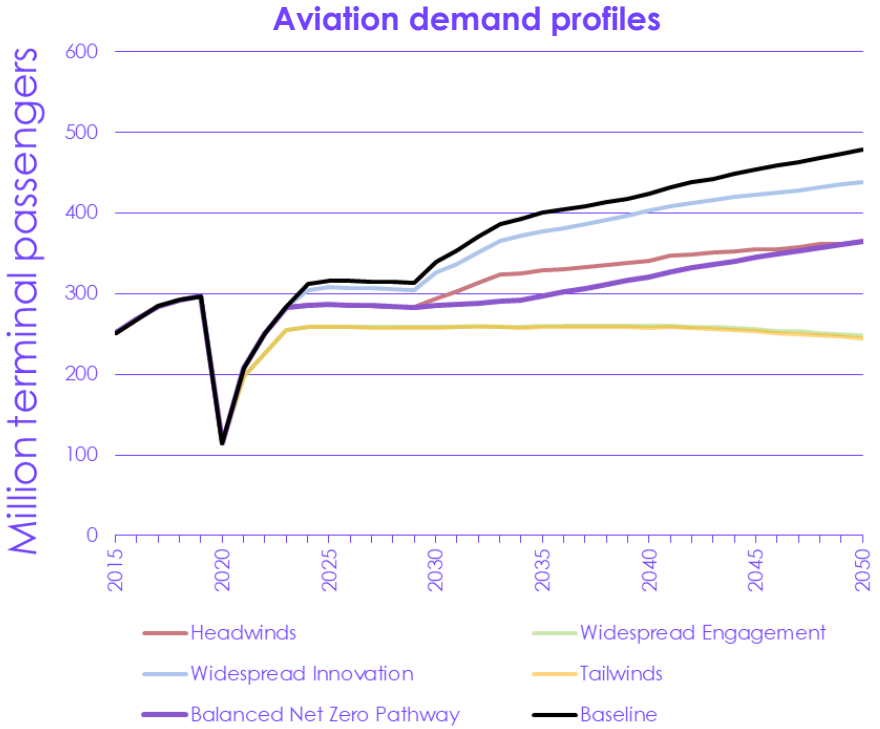
Capital and operating costs for aviation



Aviation emissions are strongly determined by future demand

Demand grows by 25% to 2050 (from 2018) in the Balanced Pathway, but back-ended without net airport expansion. Our other scenarios explore -15% to +50% demand growth

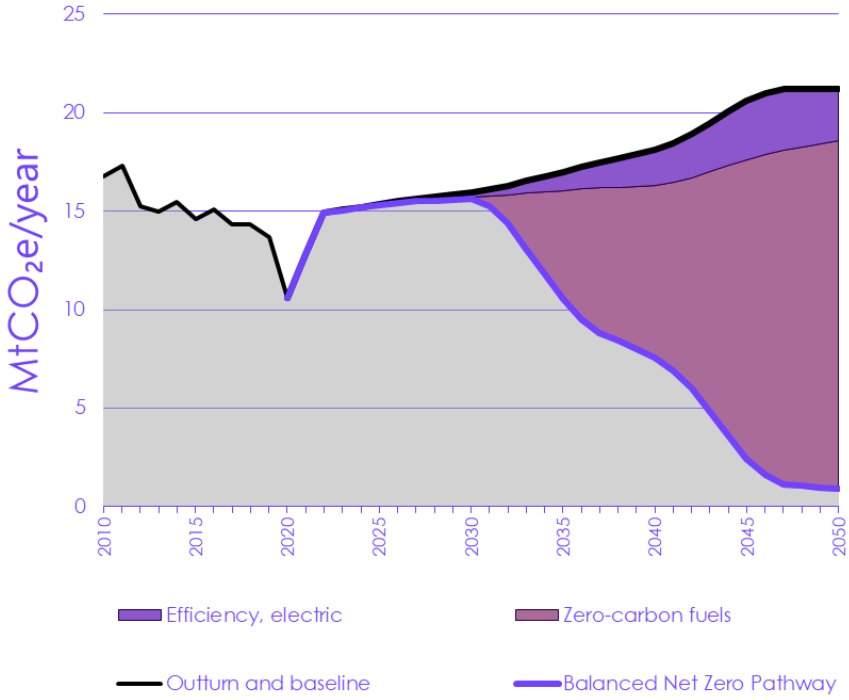




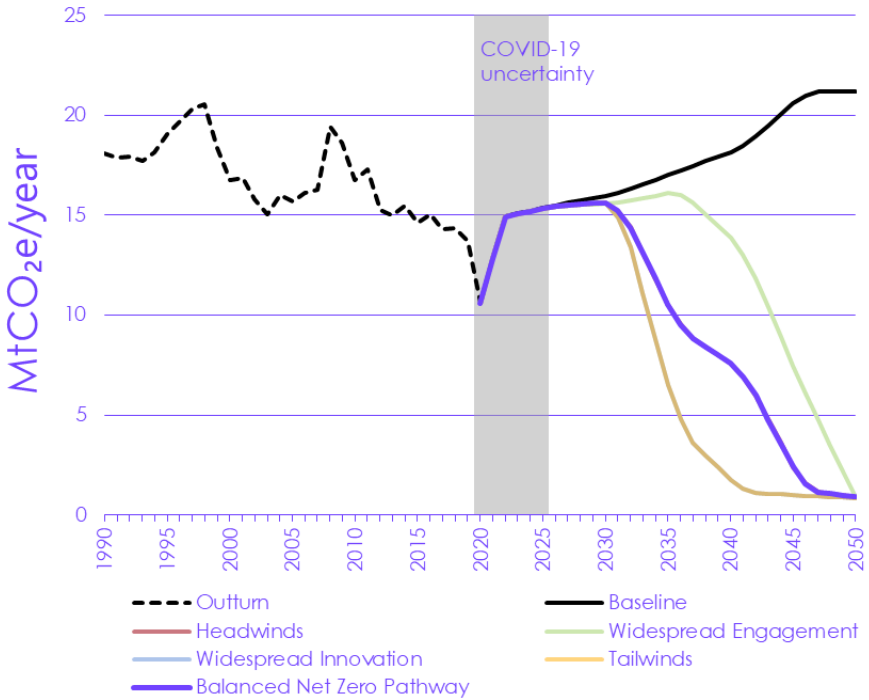
Shipping emissions abatement is dominated by zero-carbon fuels

Shipping emissions reduce to 11 $MtCO_2e$ by 2035, and to almost zero by 2050 in the Balanced Pathway, with uptake of zero-carbon ammonia

Emission savings in our Balanced Pathway

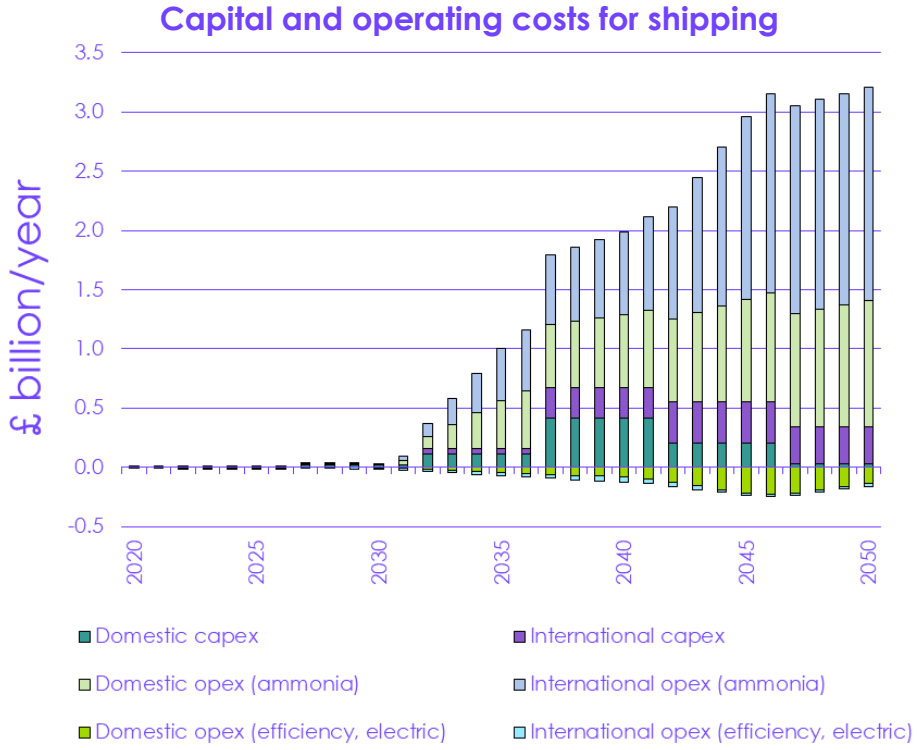


Emissions pathways for shipping



Shipping decarbonisation is relatively expensive, due to higher fuel costs

The Balanced Pathway has rapid deployment of zero-carbon fuels from 2030, with domestic shipping decarbonising quicker than international shipping



Recommended inclusion of IAS emissions within Carbon Budgets

IAS inclusion:

- IAS emissions should be included in carbon budgets as early as possible, and certainly formally within the scope of the Sixth Carbon Budget and 2050 target.
- Alongside this, the UK should push for suitably strong international targets and global policy mechanisms to deliver reductions in IAS emissions.
- Allowing 'headroom' for IAS emissions is not deemed to be sustainable, as progress to date has not been sufficient, and time to 2050 is limited. Emissions could be considerably higher from the 2030s without sufficient action.

NDC:

- UK's 2030 NDC can be communicated without IAS, as per UN convention and to maximise impact for COP26, but commitments to tackle IAS emissions will be required. We recommend setting Net Zero 2050 goals with trajectories to assess progress (particularly important for aviation and airport expansion decisions).

Non-CO_2 effects:

- We recommend a minimum goal that there should be no additional aviation non-CO_2 warming beyond 2050.
- Further research is required to reduce scientific uncertainties and test mitigation options, but action on non-CO_2 effects should not result in higher CO_2 emissions.

Contact us

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