

Is Net Zero achievable?

Is Net Zero enough?

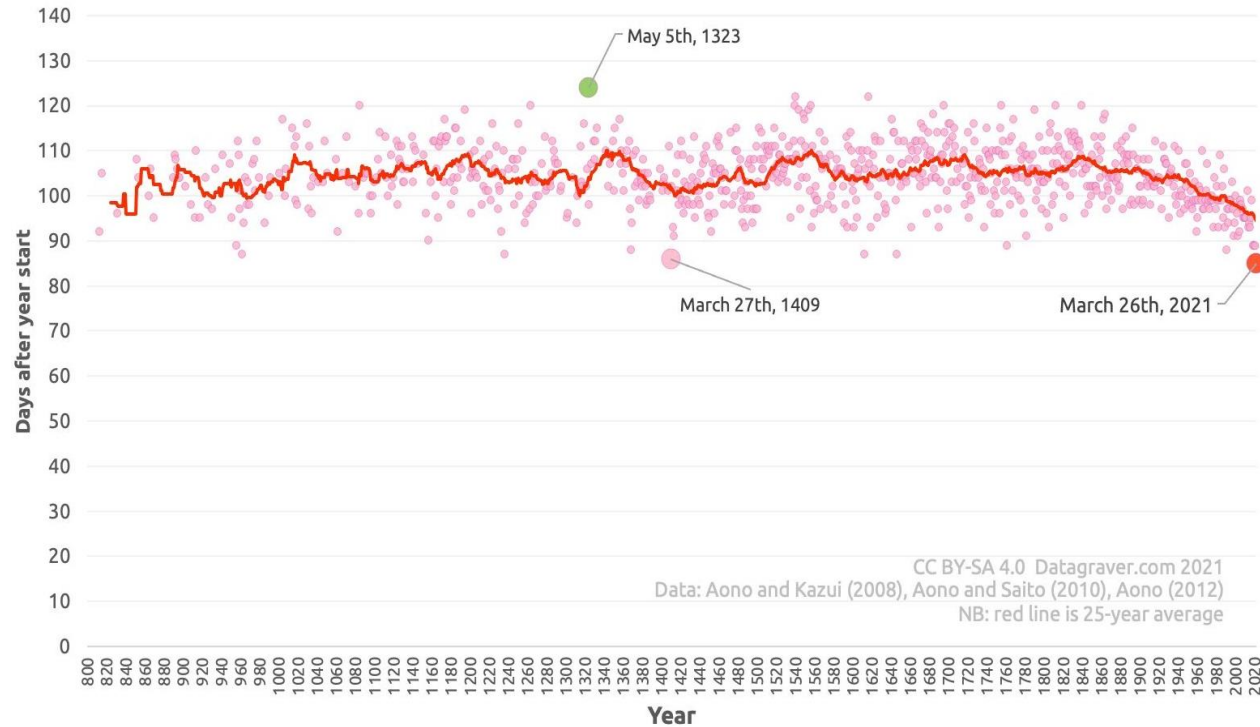
Julia King, Baroness Brown of Cambridge FREng FRS
Chair, Adaptation Committee, UK Climate Change Committee

Foundation Future Leaders Conference 22nd November 2021

The climate is changing

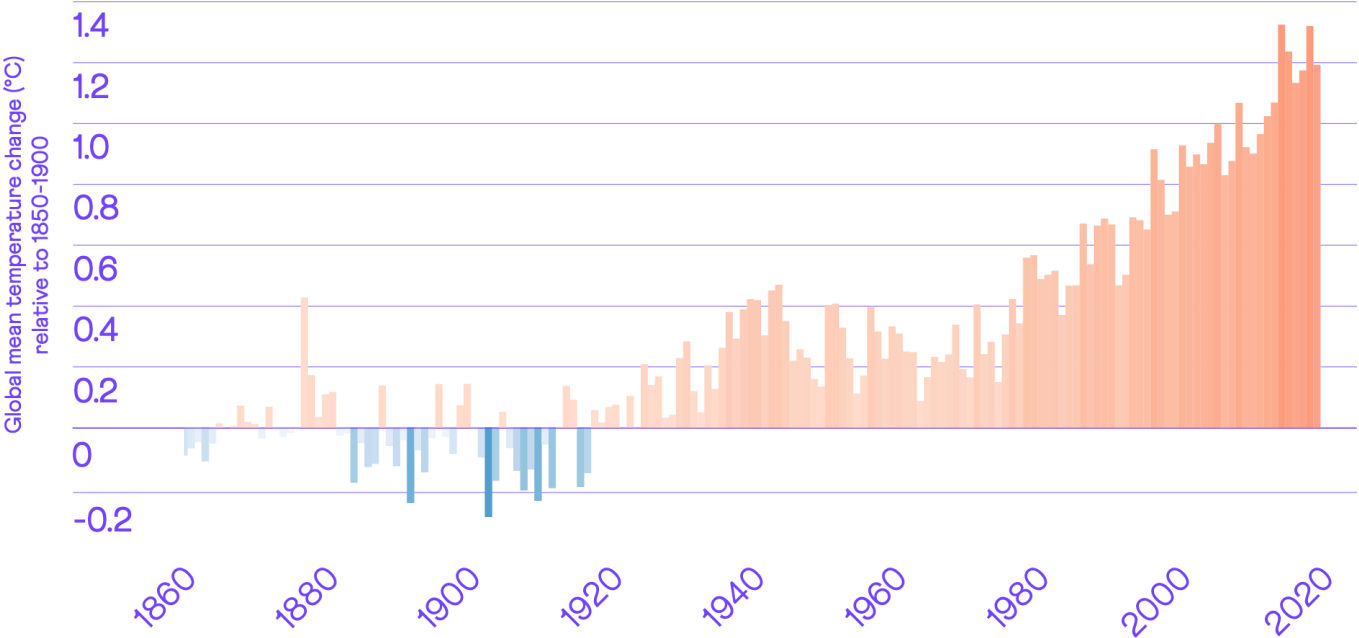
A wide variety of indicators

Full-flowering cherry blossom day, Kyoto



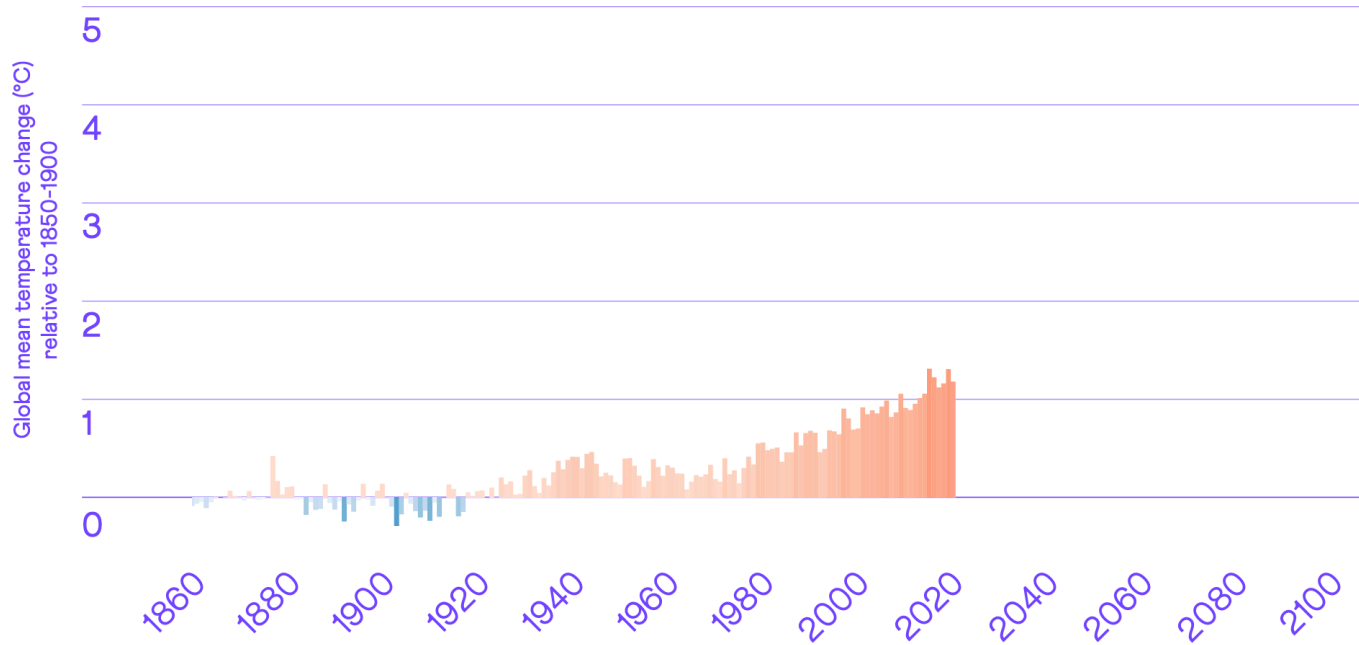
Our changing climate

Global temperature changes since 1860



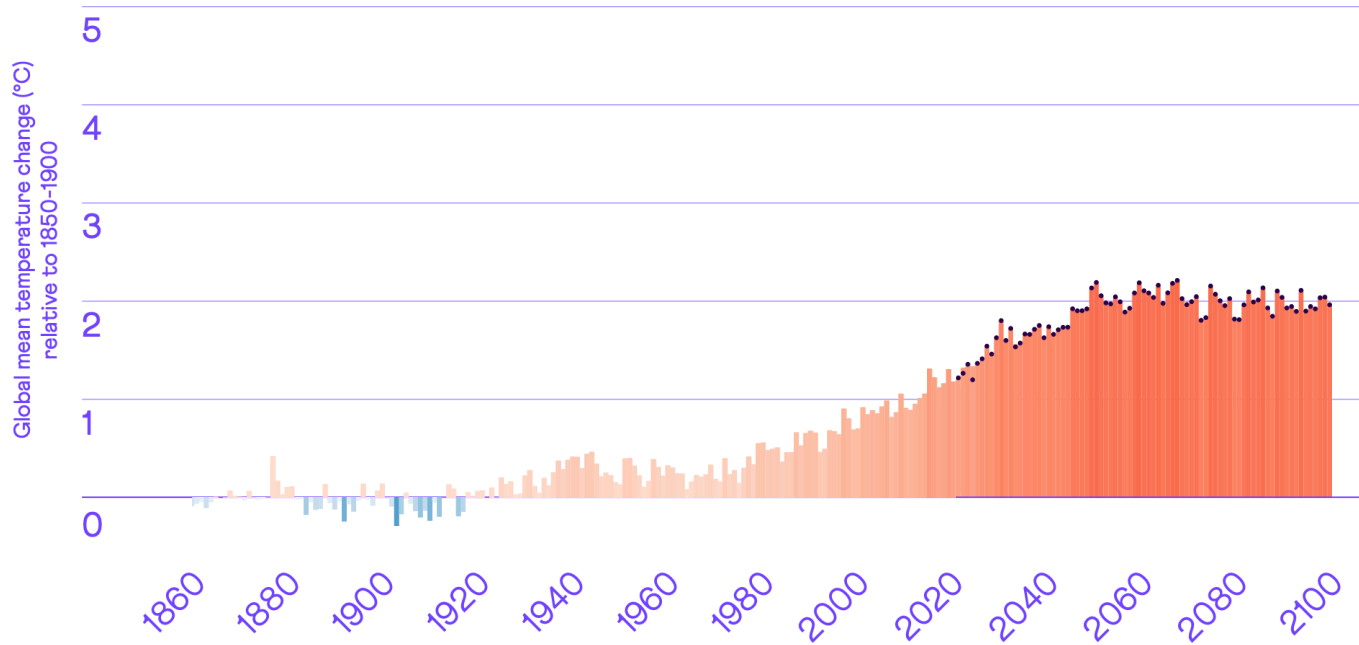
Our changing climate

Global temperature changes since 1860



Our changing climate

Global temperature changes since 1860



Example climate future
with global warming
limited to 2°C by 2100

The world today

2021 is sending us a message

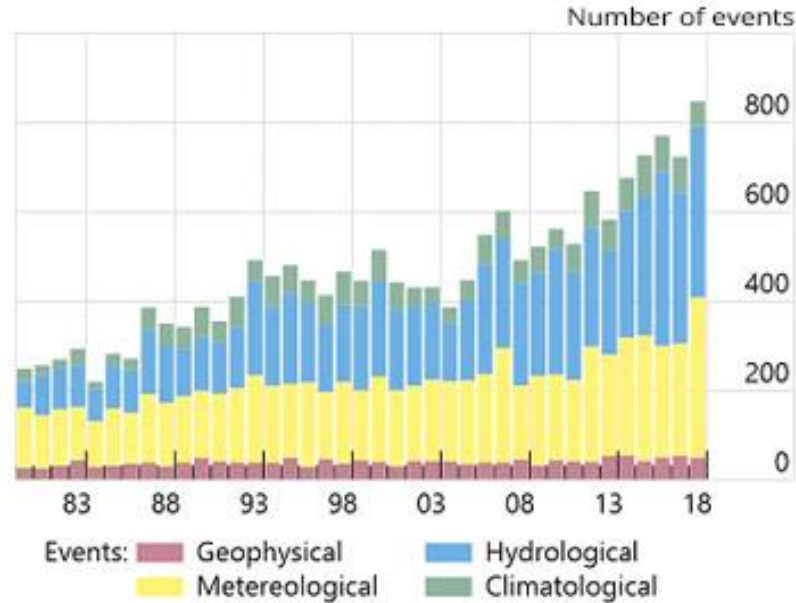
- Flooding in Europe, China, Kenya, London, New York
- 50°C temperatures in North America
- Wildfires in Greece, Turkey, California, Oregon...
- Drought in Argentina, Brazil, Madagascar, California, India
- ...



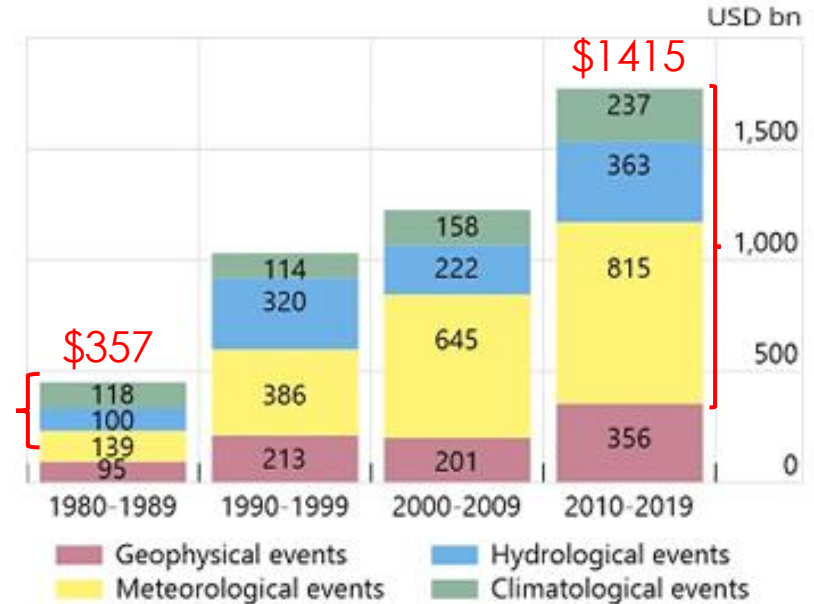
Impact of climate risks on the global economy

The cost of damage is increasing: we are not adapting fast enough

Number of natural loss events



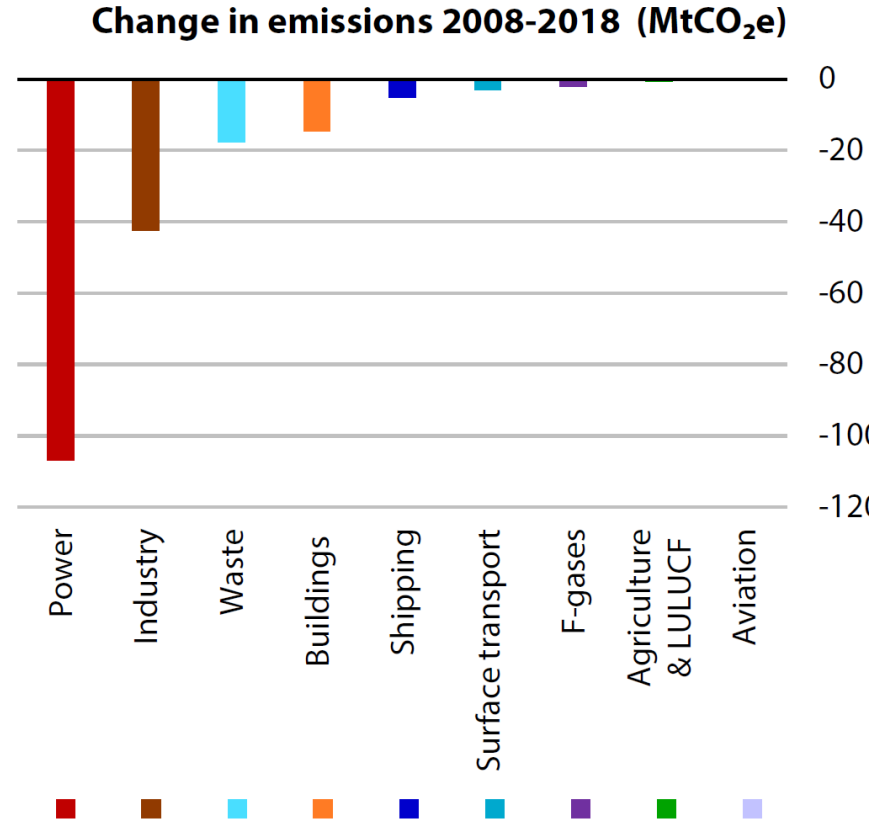
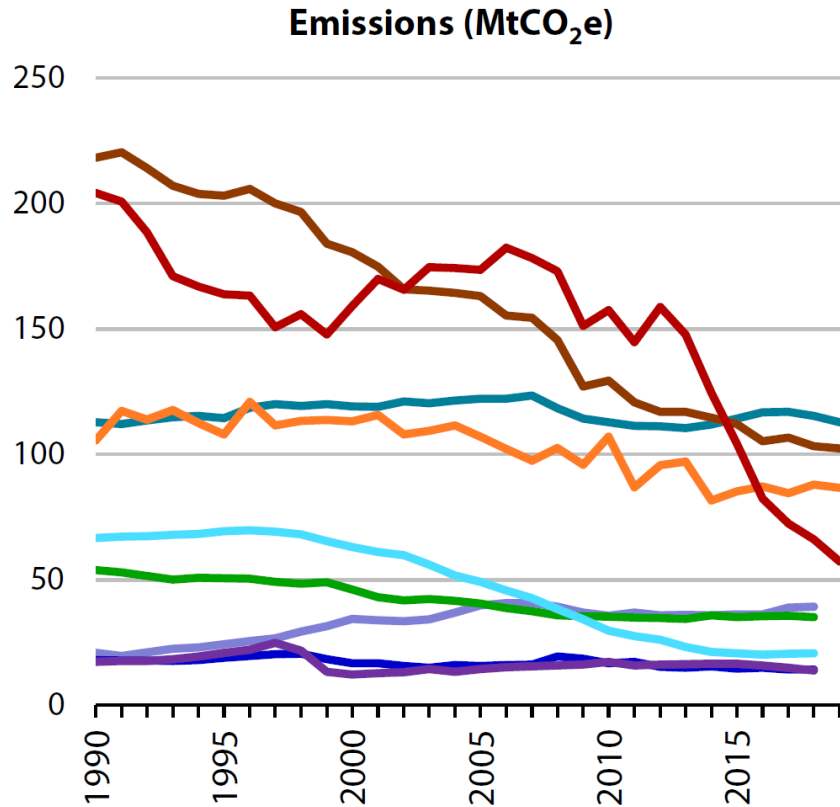
Estimated global economic loss from natural catastrophe events



The UK's path to Net Zero

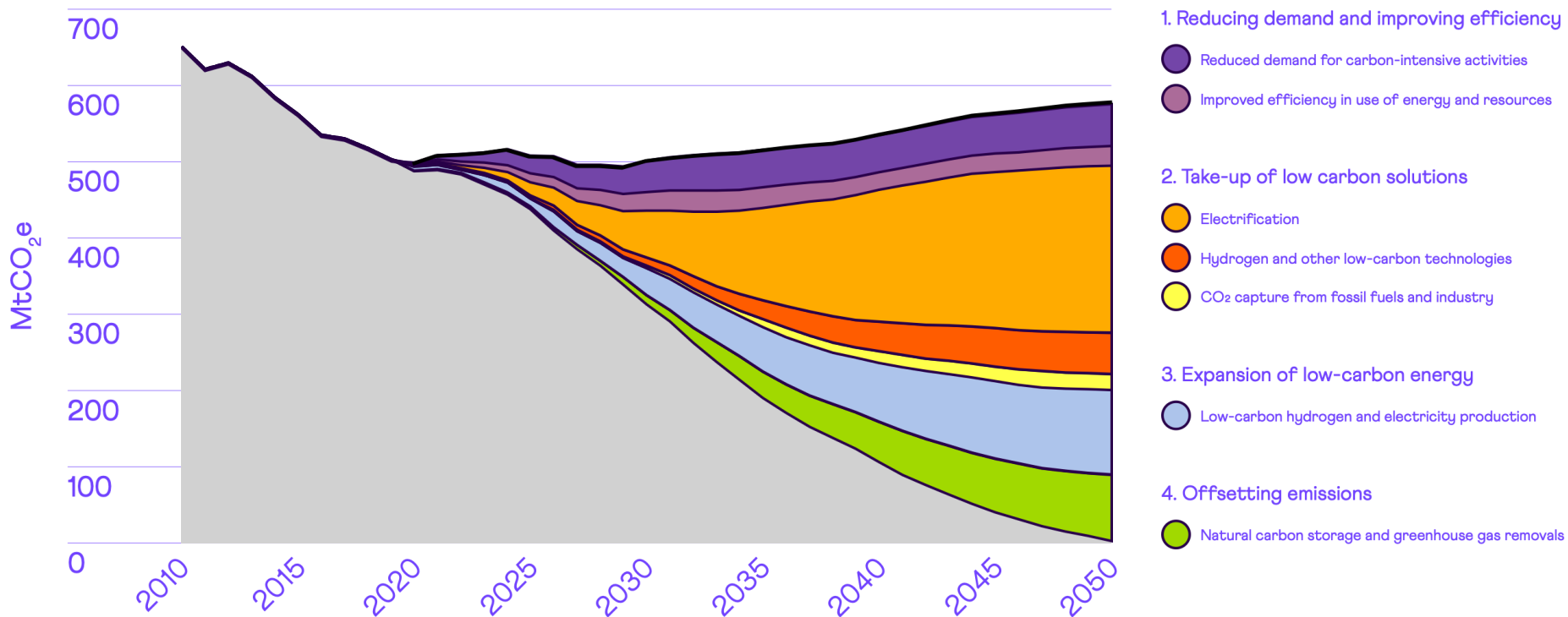
The starting point

UK sectoral emissions 2019



Emissions abatement

Actions across four key areas

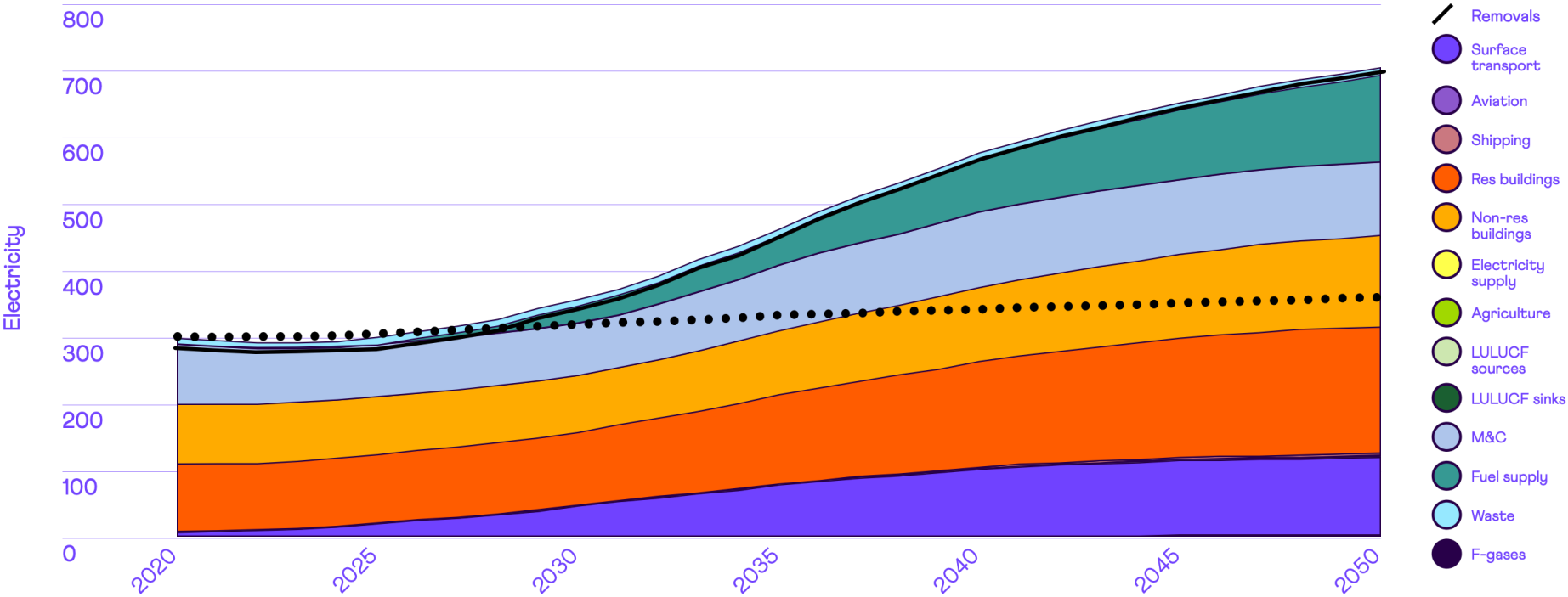


Major changes in fuel use

Changes in energy demand

Electricity (TWh)

Source:
CCC Analysis



Our energy use today:*

2000TWh: 300TWh electricity + 1700TWh oil+gas
15% electric

Our energy use in 2050:

1000TWh: 700TWh electricity + 300TWh oil+gas
70% electric

including 200TWh hydrogen from electricity and gas

The scale of the challenge

Delivering Net Zero

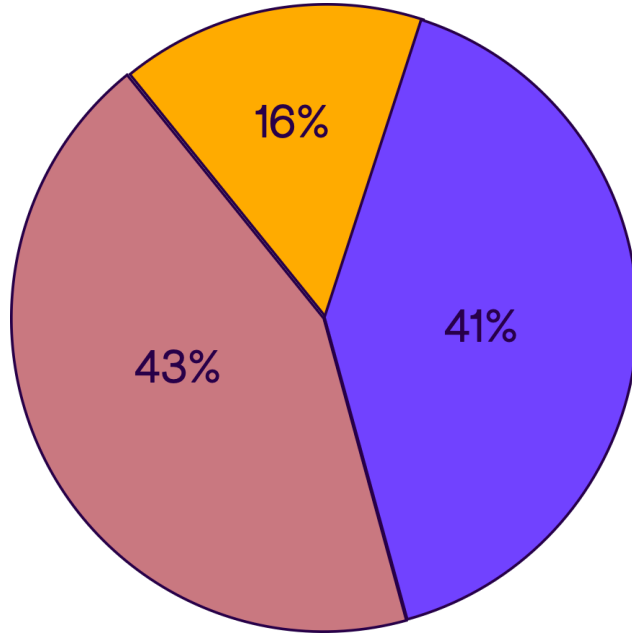
In the next 30 years...

- Electricity system more than doubles in size
- Offshore wind 10 GW to around 100GW
- Transformation of the grid: scale, flexibility, storage, resilience
- Hydrogen production 27TWh to over 220TWh
- Carbon Capture and Storage CCS 0 to 180 Mt CO₂
- 29 million existing buildings installed with low carbon heat
- Zero carbon cars 100,000 to 35 million
- 25,000 to over 500,000 public charging points
- Afforestation 10,000 to up to 50,000 hectares pa
- Woodland and forest 14 to 18% of UK area
- Major changes in agriculture
- Major changes to diet: beef, lamb and dairy consumption down 20-50%

It's getting tougher

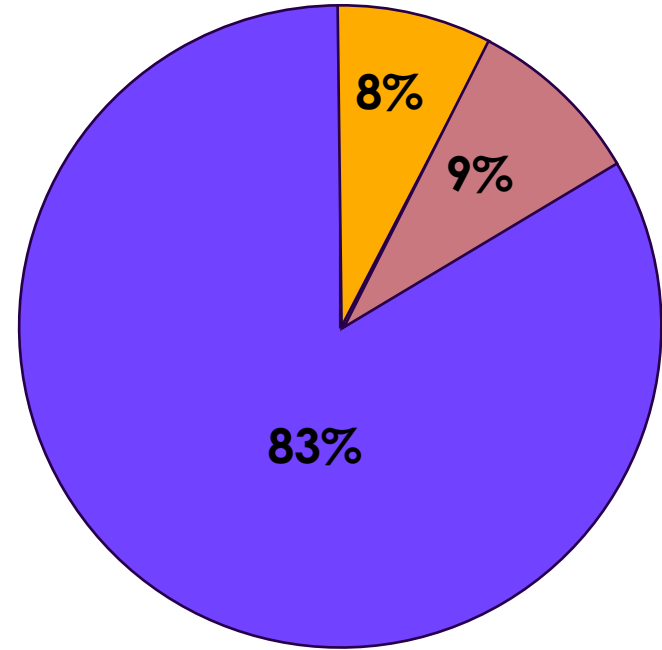
Behavioural change: more engagement needed

2020 to 2050



- Low-carbon technologies or fuels, not societal/behavioural changes
- Measures with a combination of low-carbon technologies and societal/behaviour changes
- Largely societal or behaviour changes

2008 to 2019*

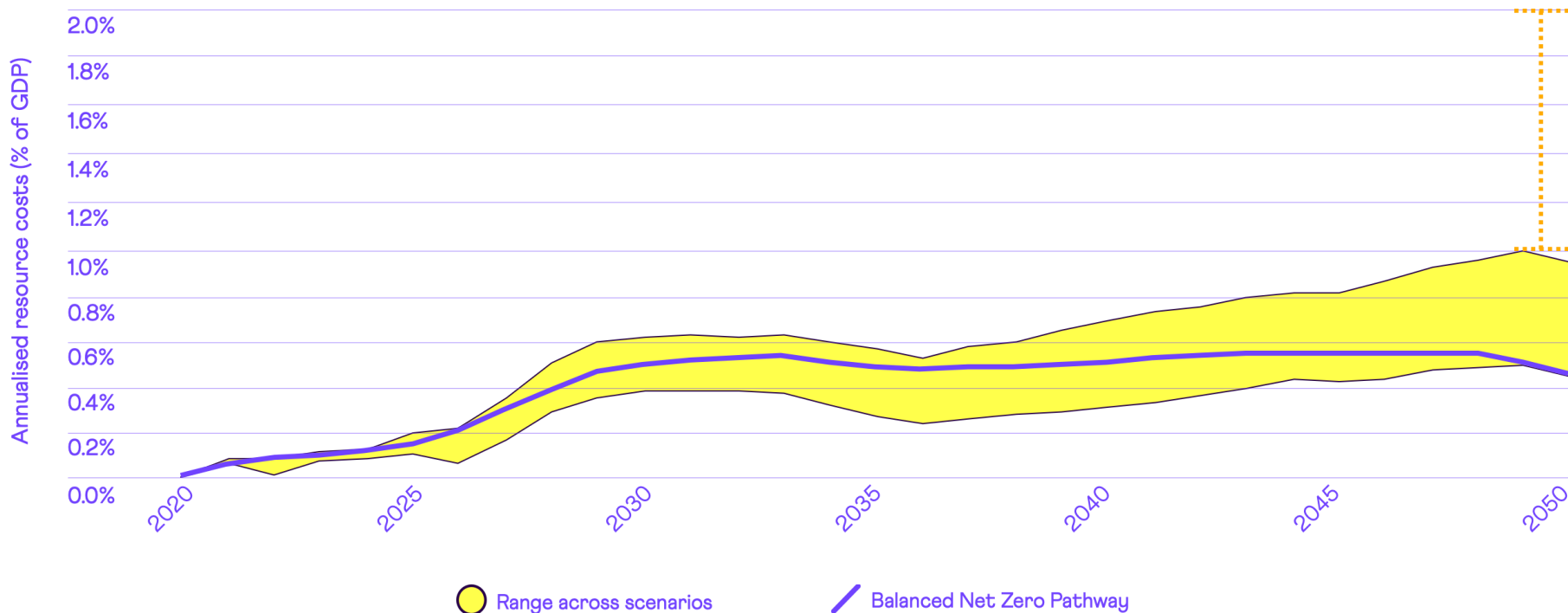


Source: CCC Analysis

* Author's estimates

It's getting cheaper

Modelling suggests potential additional GDP growth of 2%



Source: CCC analysis.

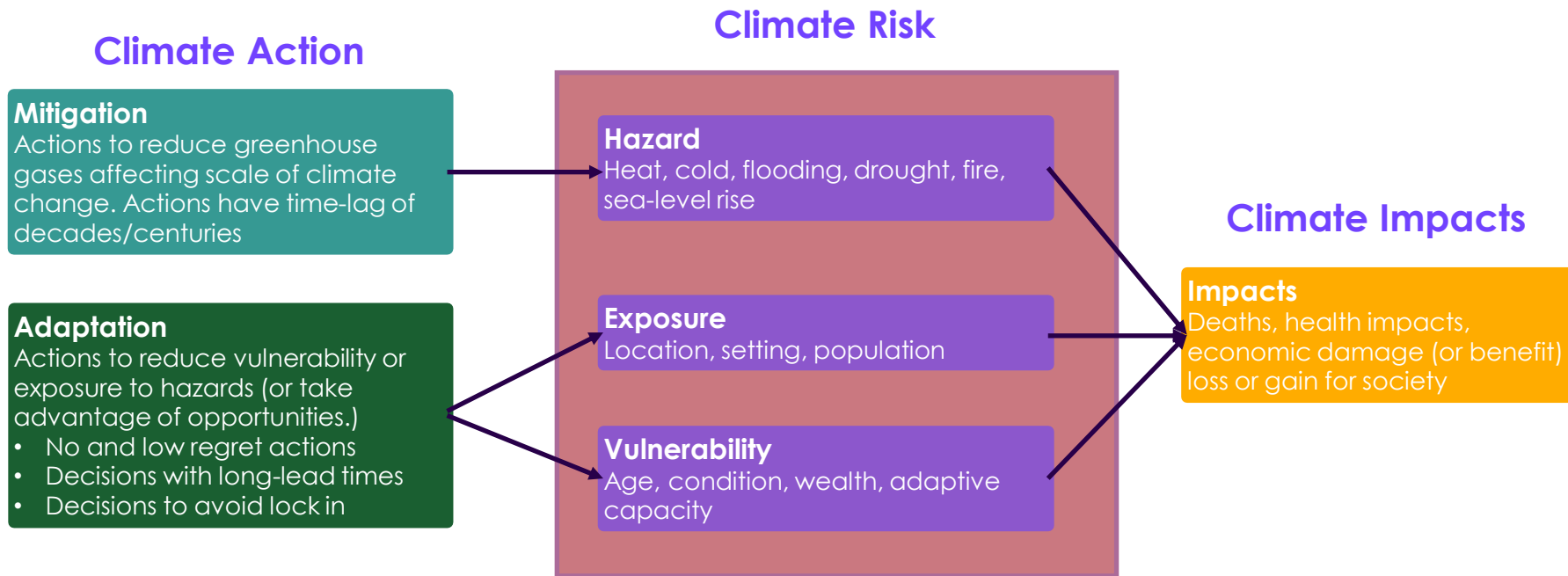
But Net Zero is not enough...



Tesla charging station Sindlesham December 2019

Reducing emissions is not enough to reduce climate impacts

Mitigation and adaptation

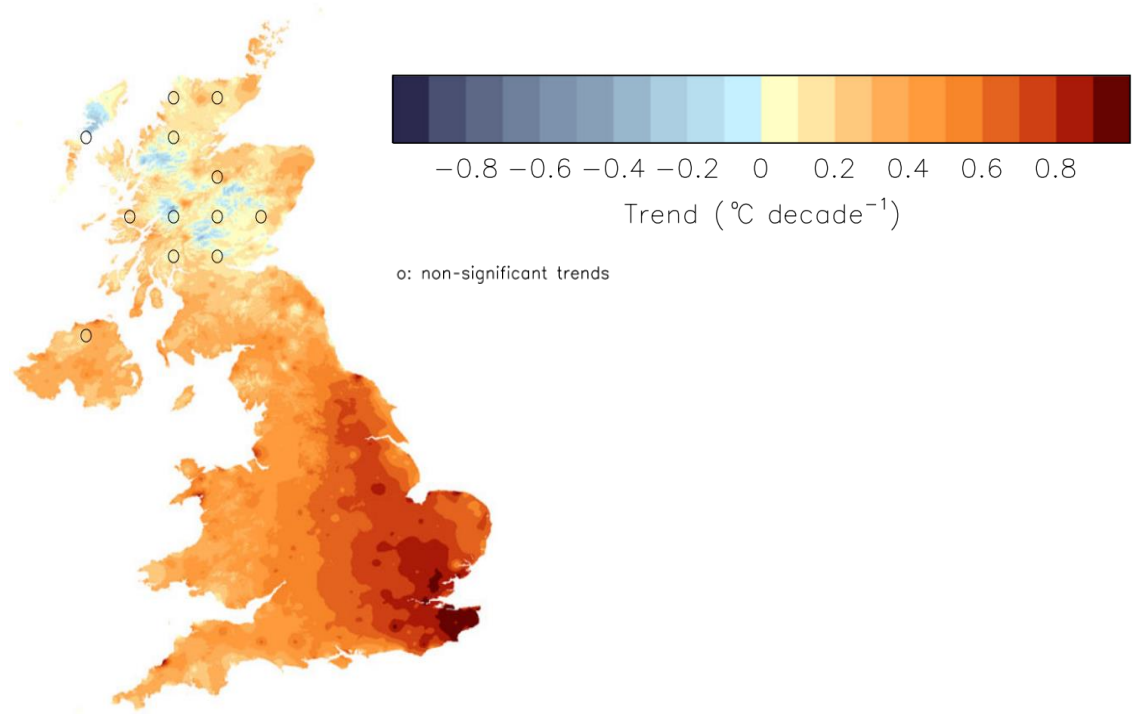


Recent UK experience

Hottest 10 years.....

- 2018 heatwave summer typical by 2050
- Record UK temperature in Cambridge 38.7° July 2019
- 40°C temperatures by 2050

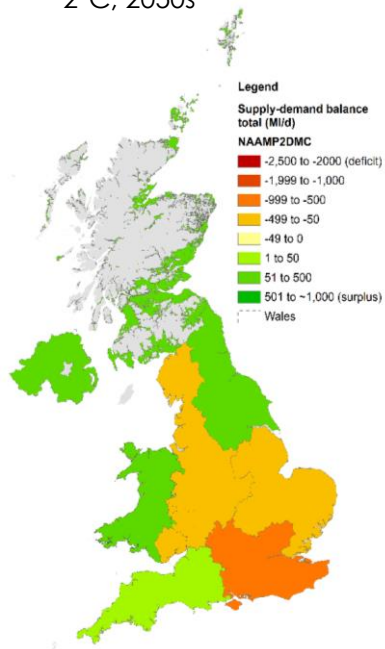
Rate of increase in hottest daytime temperatures (1960 to 2019)



Growing water shortages

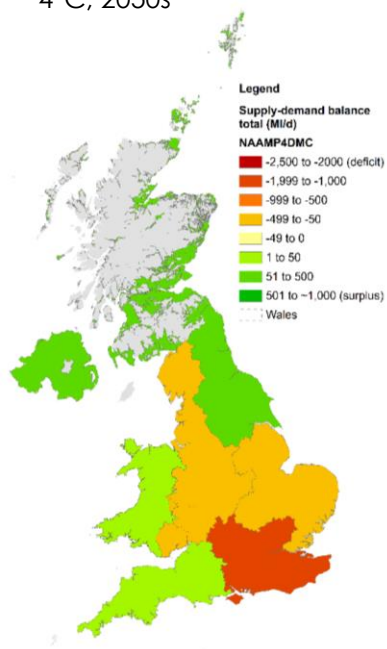
UK water deficits on 2° and 4° warming pathways

2°C, 2050s



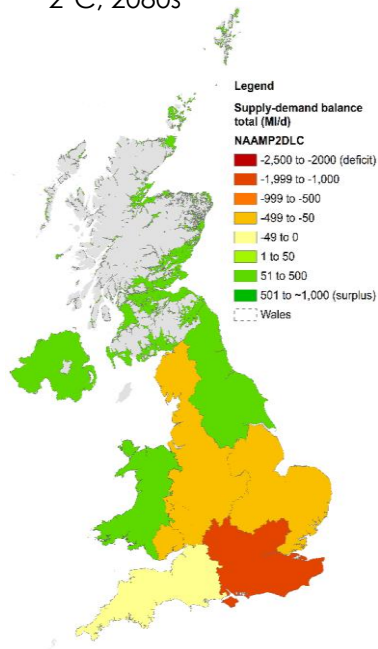
-650 MI/d

4°C, 2050s



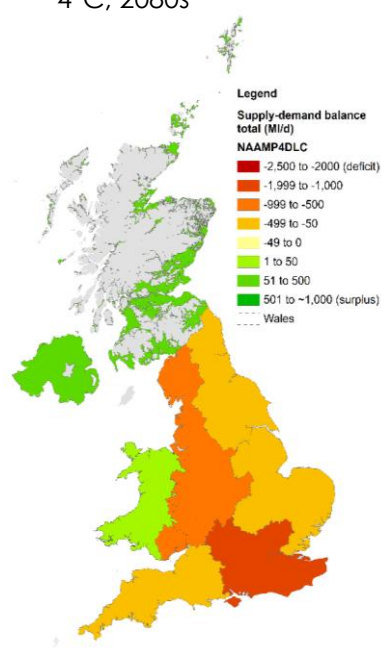
-920 MI/d

2°C, 2080s



-1,200 MI/d

4°C, 2080s

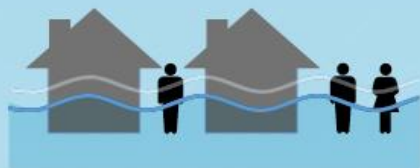


-2,900 MI/d

Homes at significant flood risk

7 of the UK's ten **wettest years** since 1998, 2014 and 2016 two wettest on record

Current



1.8 million people in the UK are living in areas at significant risk of flooding.

2050s



The number of people at risk is projected to rise to **2.6 million** in a 2°C global warming scenario.



Maybury Hill 2016

'Germany's forests are sick' – German Agriculture Minister Feb 2021

Already with us too...

- German Forest Report 2020
- Climate change damage from:
 - Increased winter rainfall
 - Summer drought and heat
 - Bark beetle
- Affecting almost all trees:
 - 79% of spruce
 - 80% of pines
 - 80% of oaks
 - 89% of beeches
- €1.5bn funding for clearing and replanting



The UK's changing climate

Further climate change is inevitable

	Observed change to date	Inevitable change by mid-century	2°C by 2100C	4°C by 2100
Average annual UK temperature	~1.2°C above pre-industrial levels	~0.6°C from present	~0.7°C from present by mid-2080s	~3.0°C from present by mid-2080s
'Hot summer' occurrence	10 – 25% chance of a '2018 summer'	50% chance each year	50% chance each year	90% chance each year
Average summer rainfall	No significant long-term trend	-11% (to -24%)	-15% (to -28%)	-29% (-53%)
Average winter rainfall	No significant long-term trend	+5 % (+16%)	+6% (+18%)	+18% (+41%)
Heavy rainfall	No significant long-term trend	10% from present	20% from present	50% to 70% from present
Sea level rise	~16cm since 1900	3 - 37 cm from present by 2060	5 - 67cm from present	27 - 112cm from present

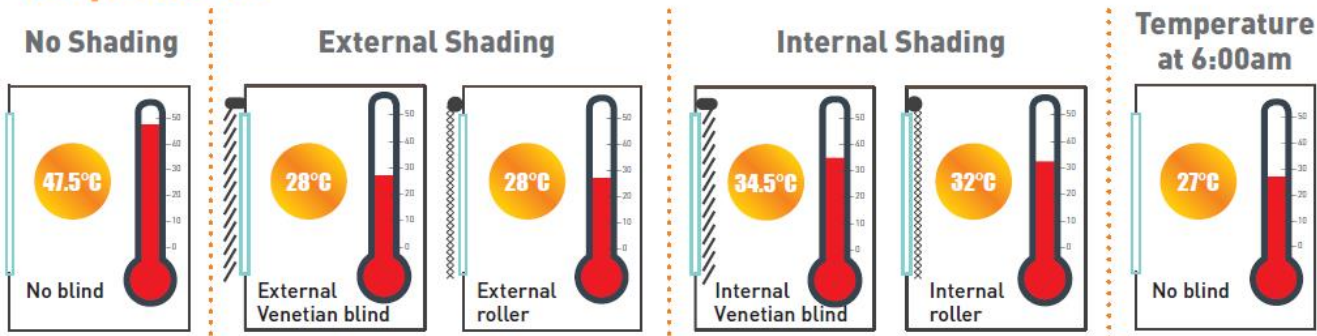
Adapt our buildings: avoid uninhabitable homes

Indoor temperatures in the unshaded flat of 47.5°C in September 2018



London office building converted to apartments. Fitted with new double glazing with a U-value of 1.1

Temperatures



Plant the right tree in the right place

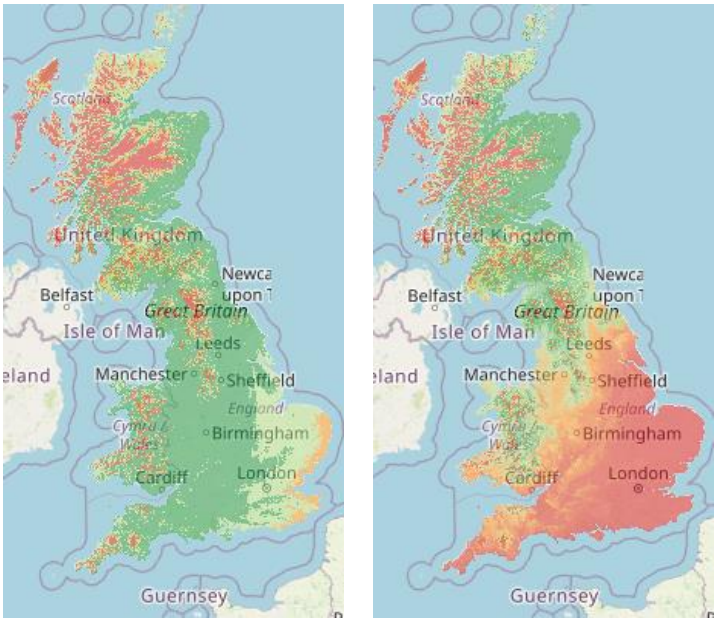
South and East of England unsuitable for beech and Sitka spruce by 2050

Beech

Sitka Spruce

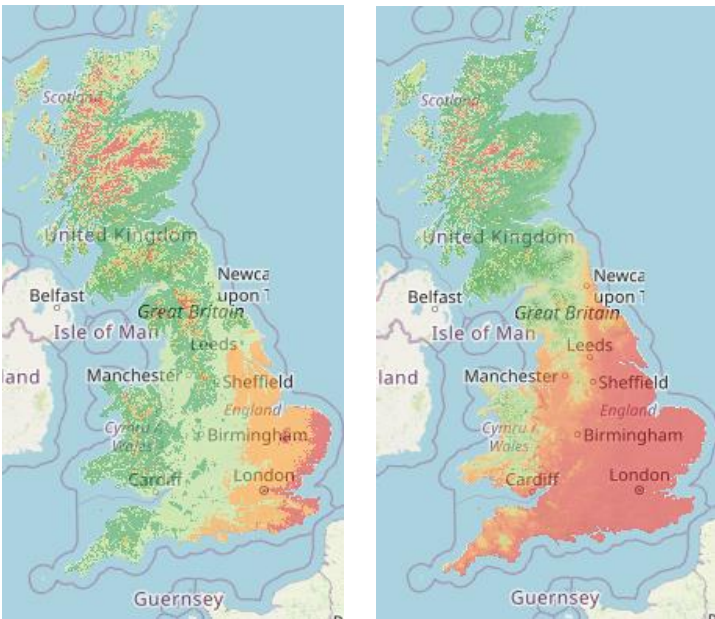
Present day

2050



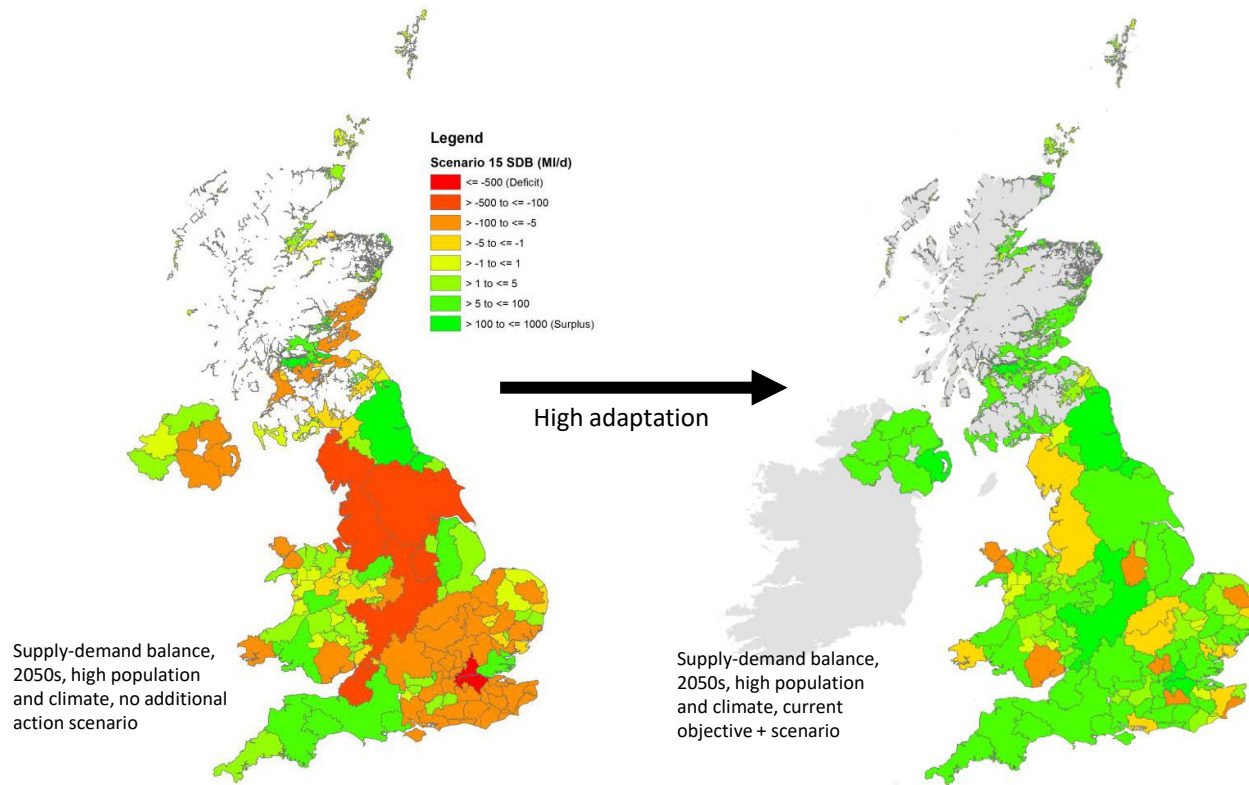
Present day

2050



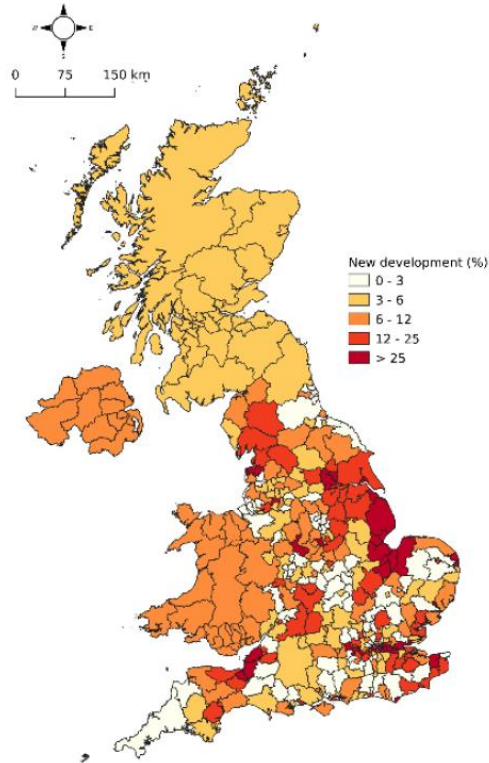
Reduce our water use: 2050 benefits

Address leaks and consumption from 140 to 90l per person per day



Avoid lock-in

Proportion of new development in the floodplain: past 5-10 years

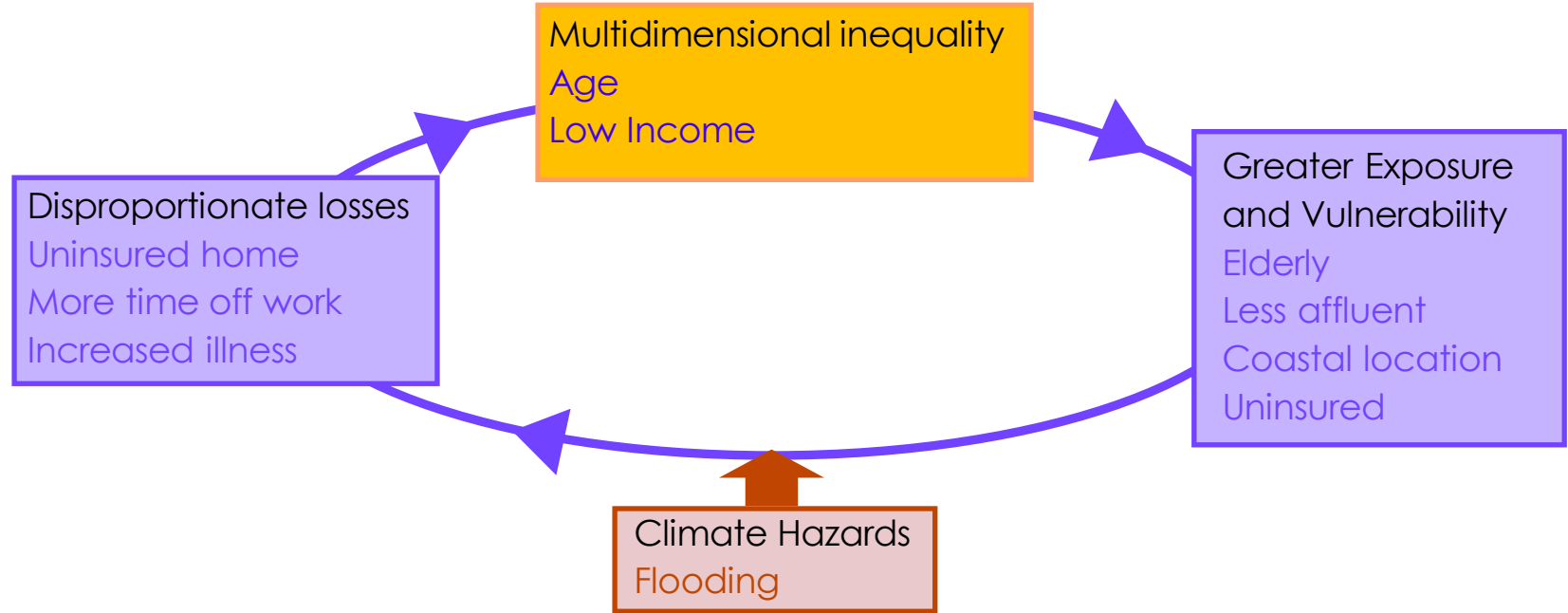


Note: values for Scotland are estimated by Scottish Government. In the absence of data for Wales and Northern Ireland, the UK average is assumed

Note: in some local authority areas (e.g. Hull) there is very little suitable land area that does not sit on the floodplain

Address inequalities

The disadvantaged are disproportionately affected by climate change: coastal communities



2007 floods: lowest income groups 8x more likely to report mental health problems than highest

Integrate Net Zero and Adaptation into policy

Opportunities are being missed to integrate adaptation into relevant policies

Relevant announcements without adaptation

- 1 UK's updated Nationally Determined Contribution (2020)
- 2 UK Treasury cost review of transitioning to a green economy (2020)
- 3 Green Homes Grant (2020)
- 4 Future Homes Standard Consultation (2020)
- 5 UK Climate Assemblies (2019-2020)

Relevant announcements with adaptation mentioned but not integrated

- 6 Net Zero Strategy (2021)
- 7 25-Year Environment Plan (2018)
- 8 Ten-point plan for a green industrial revolution (2019-20)
- 9 Environmental Land Management Scheme for England (2020)
- 10 Infrastructure Strategy (2020)
- 11 Planning White Paper (2020)
- 12 Heat and Buildings Strategy (2021)

Relevant announcements with adaptation integrated

- 13 Flood and Coastal Erosion Risk Management Strategy (2020)
- 14 Taskforce on Climate-Related Financial Disclosure Reporting Requirements (2020)
- 15 Green Book Supplementary Guidance on Climate Change (2020)
- 16 UKRI Strategic Priorities Fund (2018)

Pledges to plans... to ACTION

Greta Thunberg

"This needs Cathedral Thinking.
We can build the foundations without
knowing exactly how we will complete
the roof"

