BODDINGTON
PARISH COUNCIL

Energy efficiency: Meeting the Climate Emergency and the Energy Bill Crisis

3rd September
Boddington Village Hall

10.15 Welcome – Host: Olivia Davies, Boddington Sustainability Group

Boddington Sustainability Group

RSA

LCWN

CA-WN

You

10:45 Main Speakers – Host: Mark Thompson, Boddington Sustainability Group

The Climate Challenge and Opportunity, Mark Thompson, Boddington Sustainability Group

Tips and Tricks to optimise your system, Jo Alsop, The Heating Hub

Heat Pump Installations – Kimbo, Heating Academy

Hybrid Heat Pumps - Stephen Kelly, Oya Energy

Thermal Imaging Camera - Chris Colles, Boddington Sustainability Group

Q&A

11:55 Refreshments

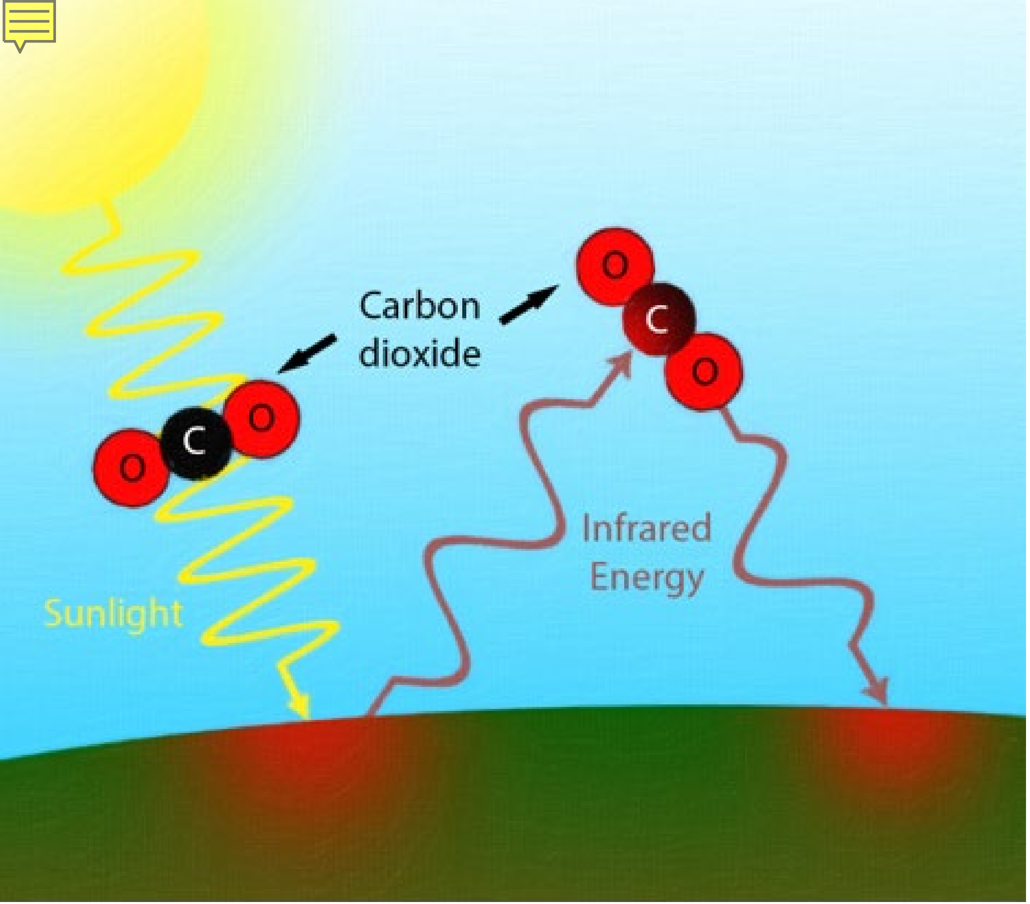
13:00 Wrap Up

The Climate Challenge and Opportunity

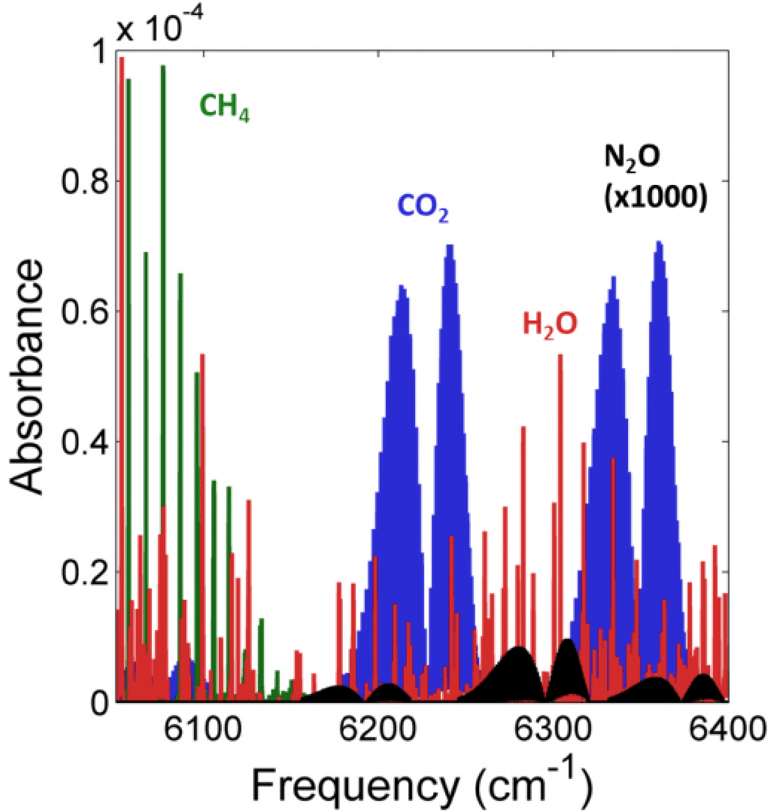
Dr Mark Thompson CPhys

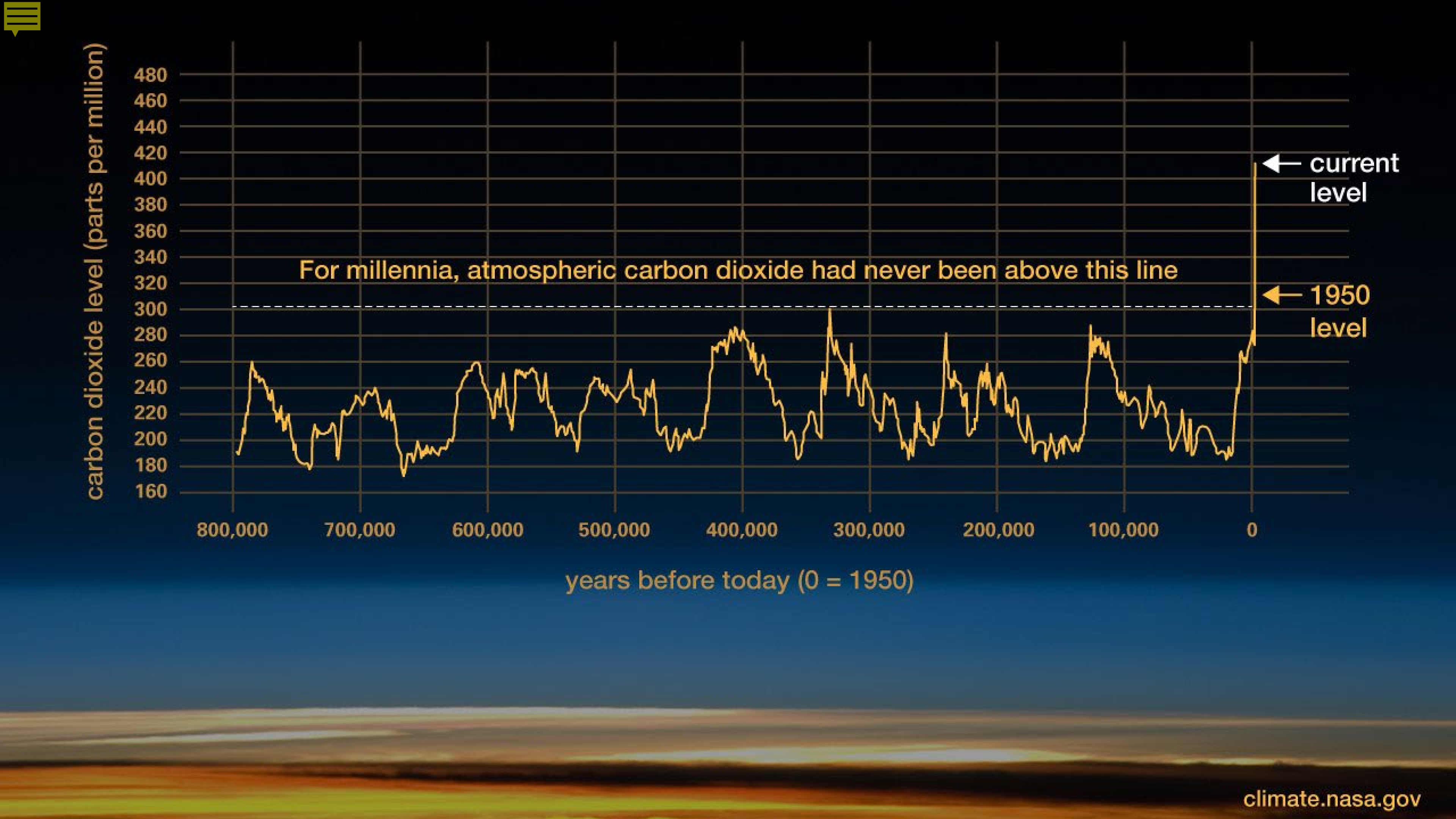
3rd September 2022

*Climate change refers to **long-term shifts in temperatures and weather patterns**. These shifts may be natural, such as through variations in the solar cycle. But since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas.*

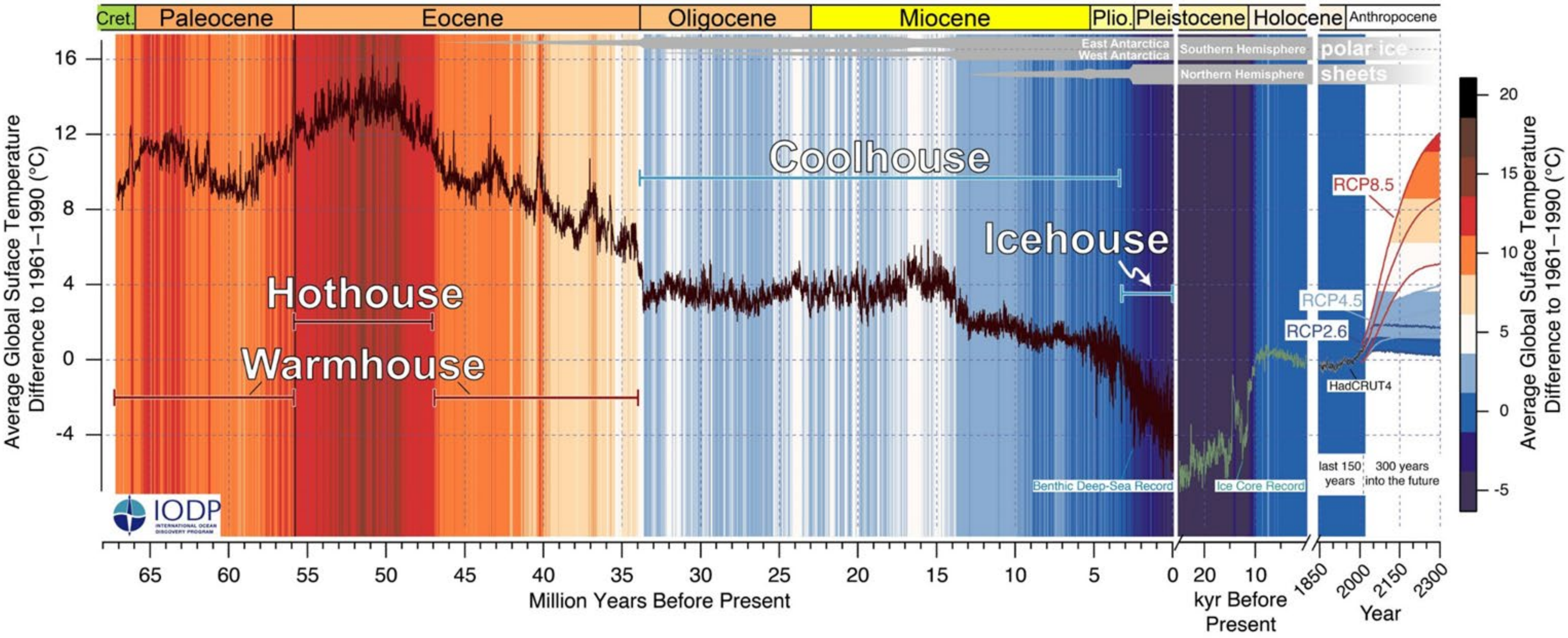


CARBON DIOXIDE DOES NOT INTERACT WITH VISIBLE LIGHT, BUT ABSORBS AND REEMITS INFRARED ENERGY.





carbon dioxide level (parts per million)
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
For millennia, atmospheric carbon dioxide had never been above this line
current level
1950 level
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
years before today (0 = 1950)
climate.nasa.gov



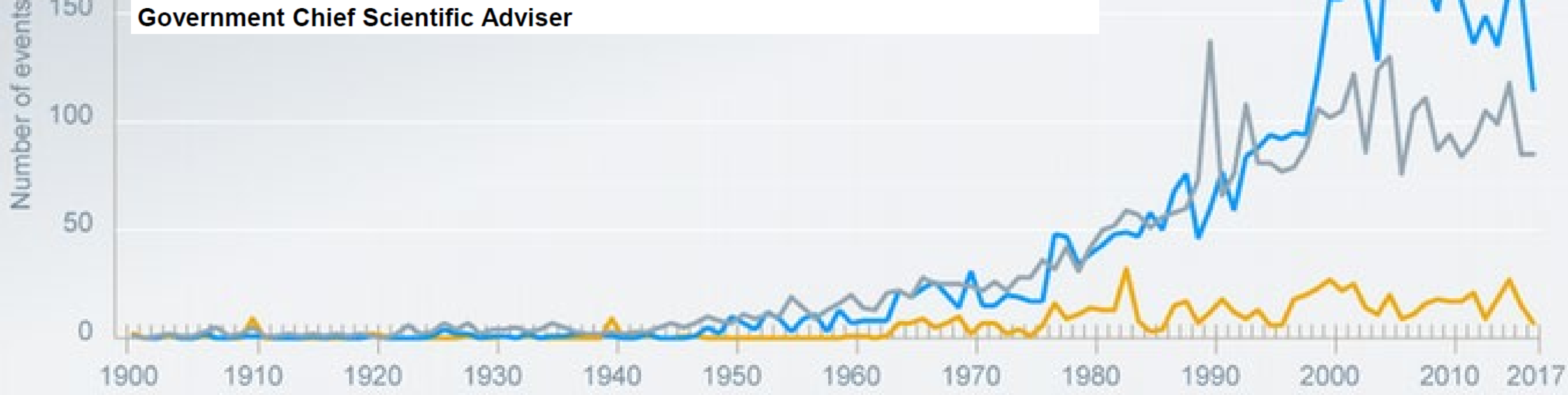
Science, Sept 2020

Extreme weather on the rise

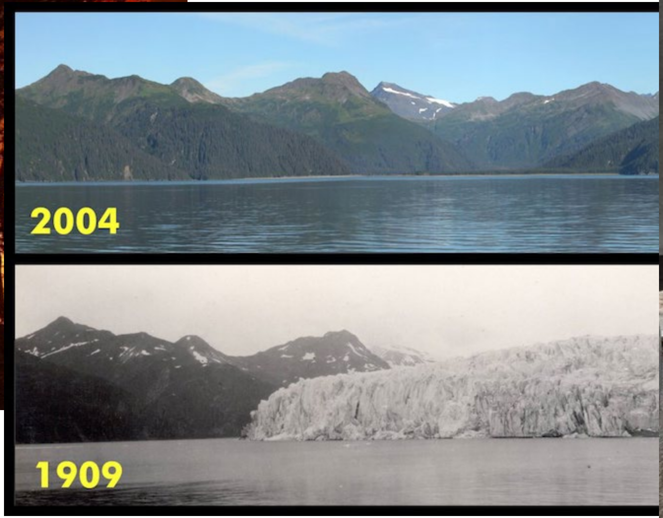
"And for those who might think it's happening 'over there', the UK will not escape these impacts. Extreme weather events such as flooding, drought and heatwaves, will be more common, more expensive and more challenging to manage unless we all take action now."

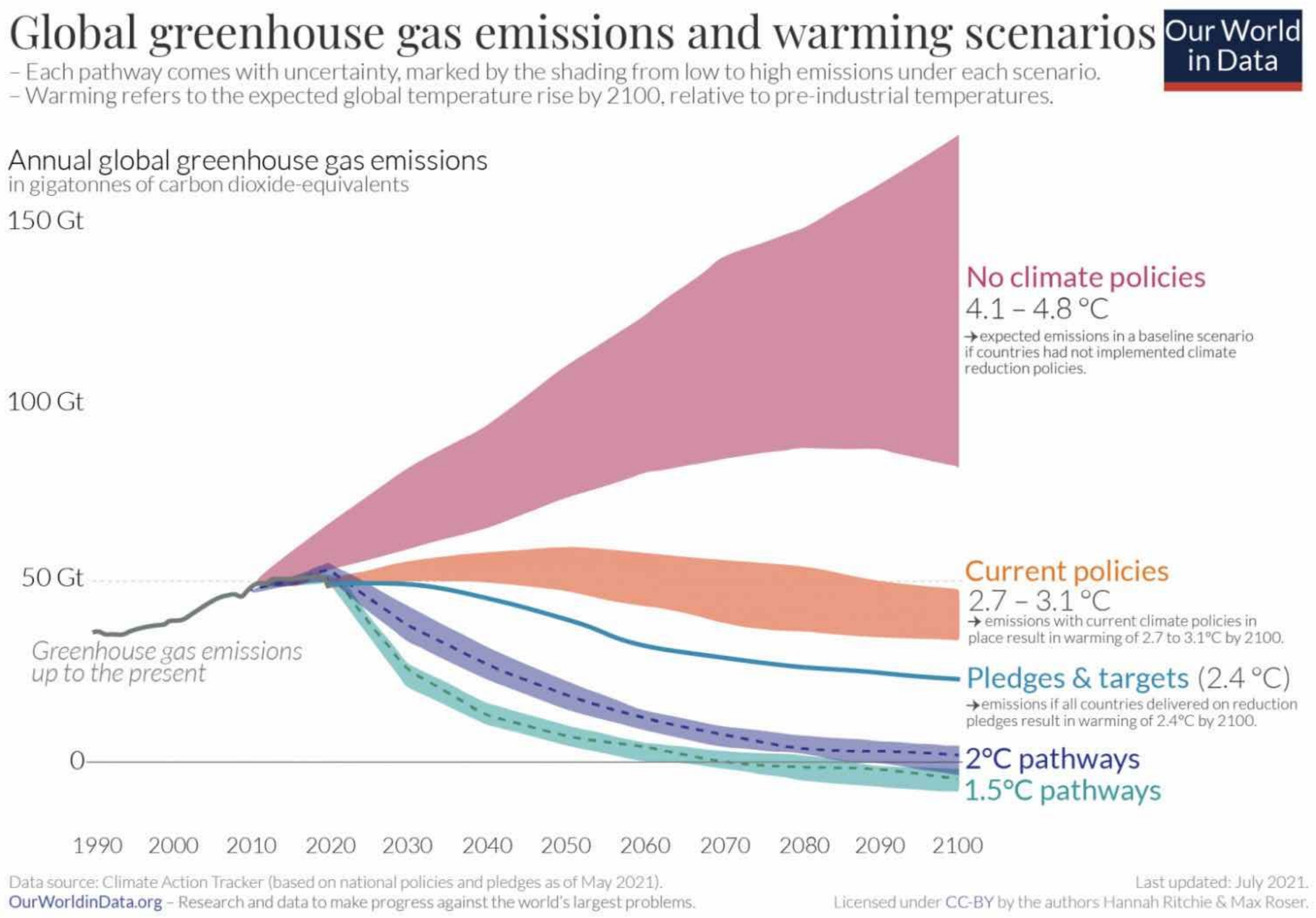
Sir Patrick Vallance

Government Chief Scientific Adviser



Source: The Emergency Events Database (EM-DAT) | www.emdat.be


2004
1909


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
50 Gt
0
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
Greenhouse gas emissions up to the present
1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100
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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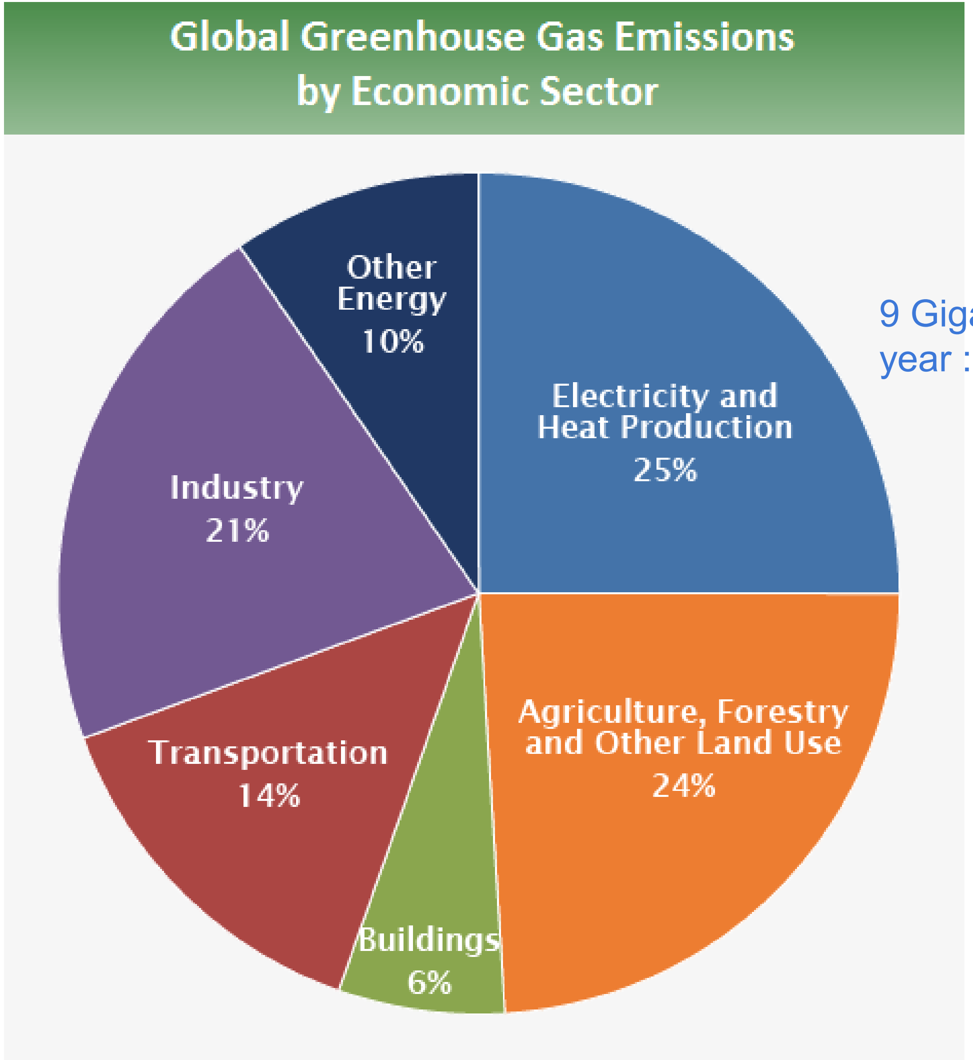
36 Giga Tonnes per year

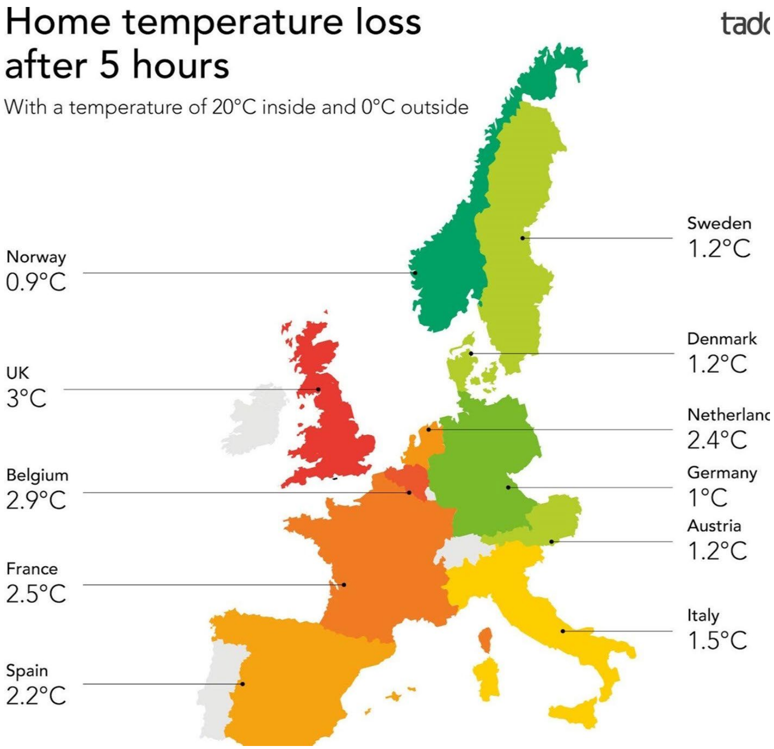
Average CO2e footprint in the UK is approx 20 tonnes per household per annum. 30 CO2e tonnes for Boddington.

for Boddington’s 290 households, this equates to 9,000 tonnes of CO2e emissions.



9 Giga Tonnes per year : Global

Home Energy - The Challenge

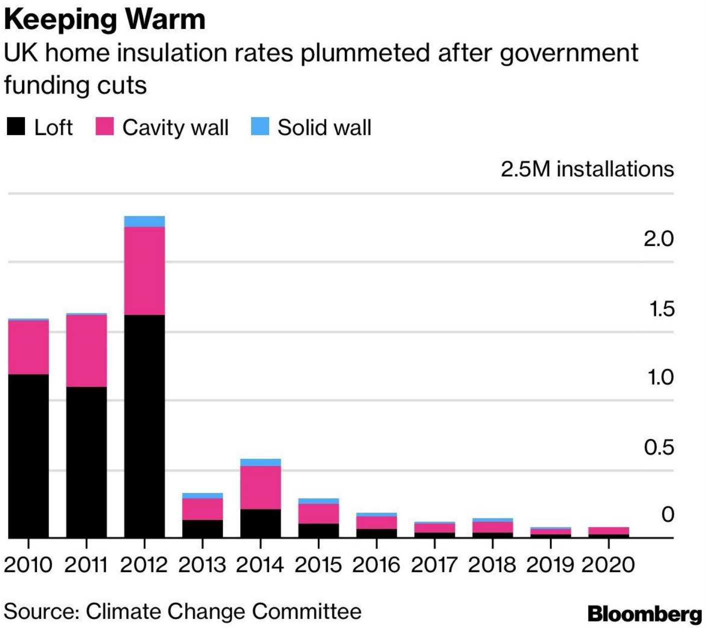


UK produces around 420 million tonnes of CO_2 emissions per year.

Emissions need to fall by about a quarter by 2030 from 1990 levels to meet the carbon budget

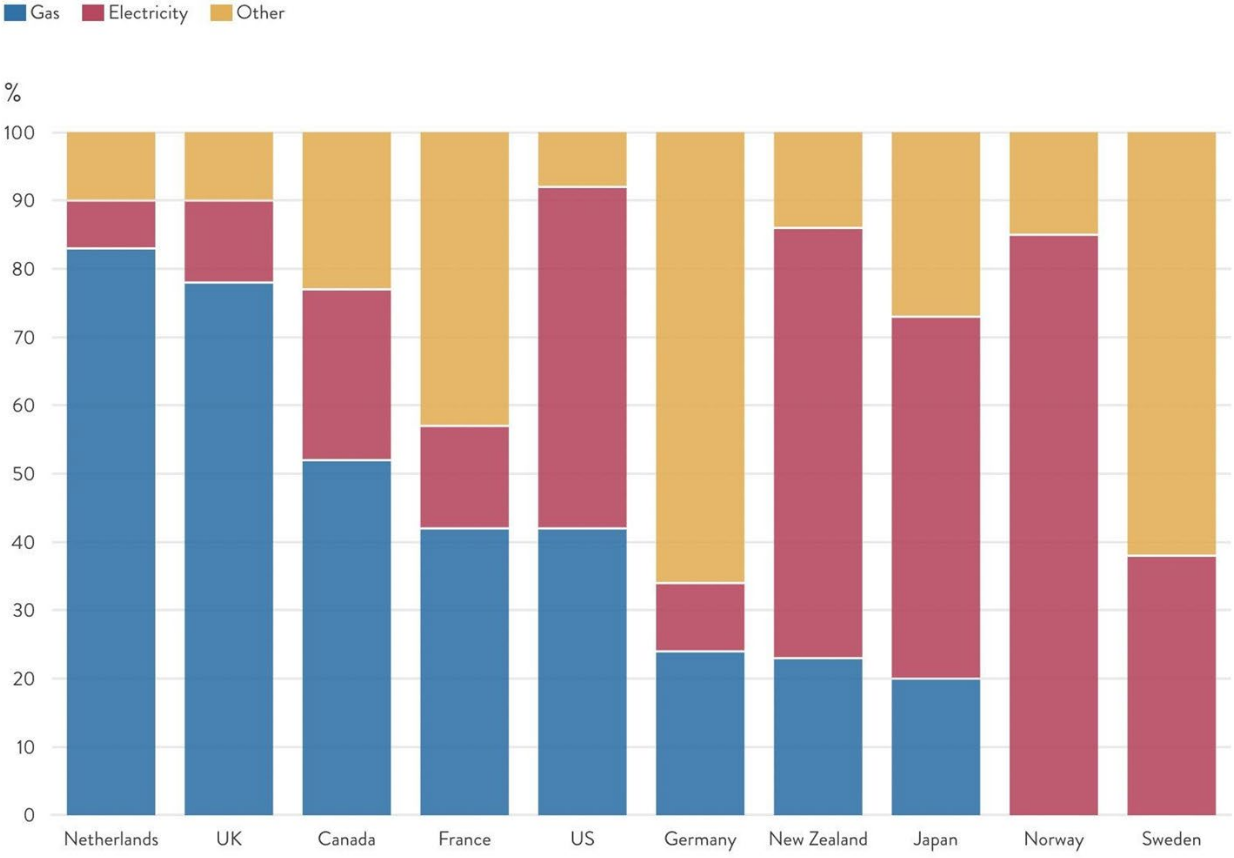
68 million tonnes (15%) comes directly from its 29 million homes - largely from boilers burning gas/oil for hot water and space heating.

Average UK household of 2.4 people uses 15,000 kwh of energy per year heating and powering their home - 8kwh elec / 33kwh heating per day.



Decarbonising the way homes are heated – meaning more efficient homes and the electrification of most heating systems. Cost estimated £200 billion over the next 30 years.

Figure 1 – UK households are highly dependent on gas



Source: /www.gov.uk/government/publications/international-comparisons-of-heating-cooling-and-heat-decarbonisation-policies

UK highly dependent on gas

Gas storage decommissioned - although *Rough Storage* now being brought back on line

Problem is GRID pricing mechanism prices all energy at highest marginal cost, which is gas (9 x cost of wind).

Solutions:

- CFDs
- Smart meter 4 demand management
- Battery storage

Home Energy - The Opportunity

What we can do….

Insulation and Draft Proofing

- 1% of UK homes have zero loft insulation and 31% have below standard levels (<125mm) of loft insulation. Applied to Boddington, that suggests around 90 of the 290 houses in the parish could benefit from increased loft insulation.
- If current EPC band D rated homes were retrofitted to achieve band C performance, households would save £511 a year under the proposed 2022 energy price cap. It is estimated that close to two-thirds of homes need no more than £1,000 spent on retrofitting energy efficiency measures.
- A thermal imaging camera can help identify where to target efforts.

Boiler Optimisation

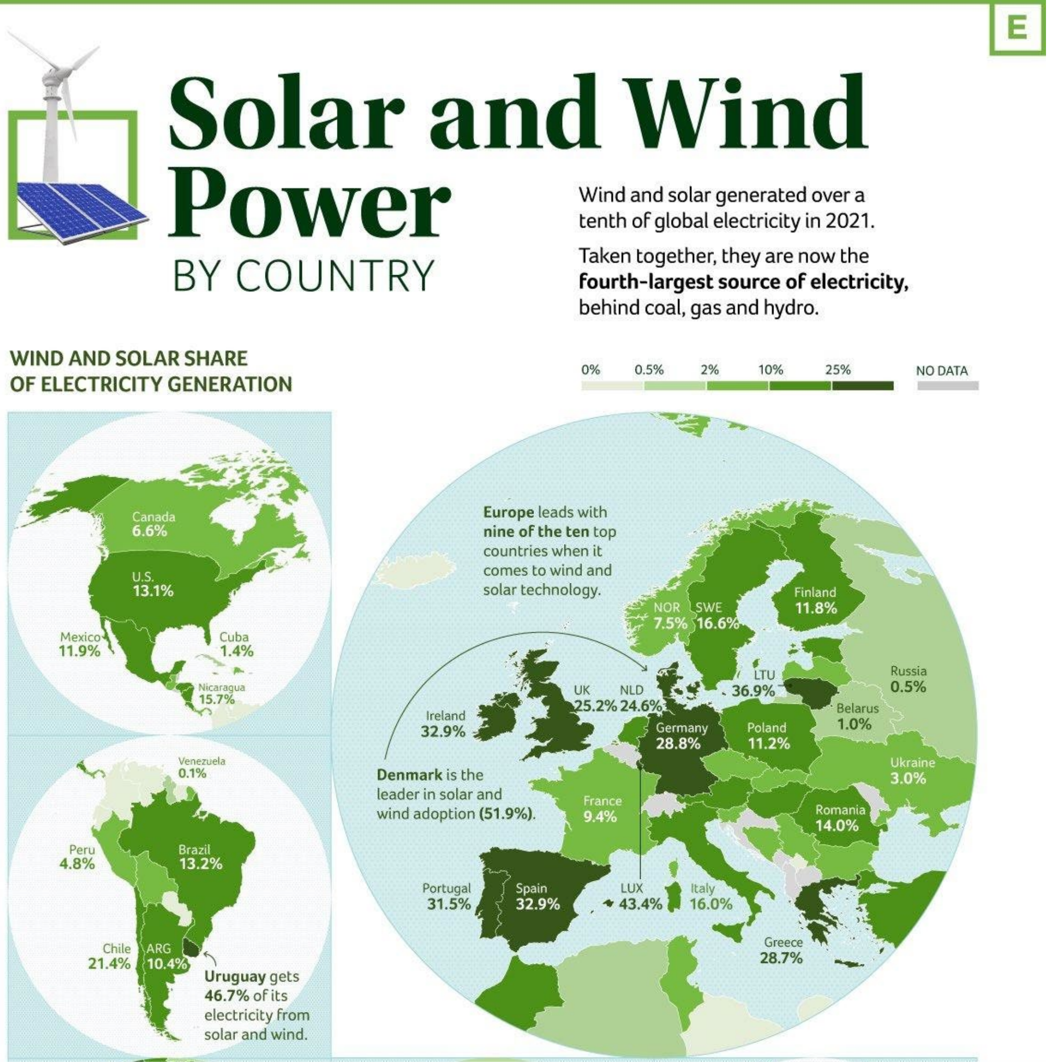
- Optimise what you have … listen to Jo!

Electrify Heating - Switch from oil and gas to use of Heat Pumps

- ASHP around £10k to install. BEIS funding 90,000 5k grants.
- 50k installed to-date - target 600k by 2028
- Reduces gas use by 85% even with current UK electricity energy mix

Decarbonise electricity - Transition of UK Electrical Grid to Renewable

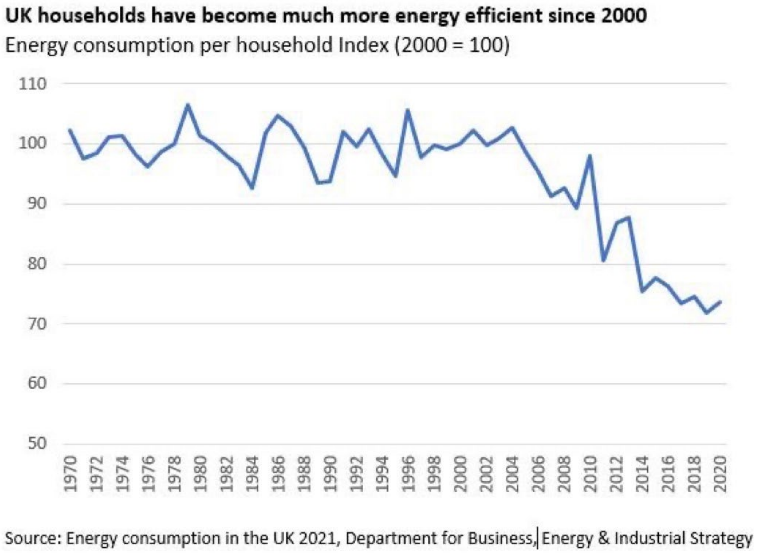
- Wind: UK has 11k turbines with installed capacity 25GW (14GW onshore : 11GW offshore). 86GW in pipeline.
- Solar: UK 14GW capacity : 3000 installs of solar at home per week / 600MW installed this year already
- Gov target of 2035 for renewable grid; 50GW wind and 70GW solar by 2050.
- About £5k for an install - payback can be just a few years with new prices.



To date in 2022…

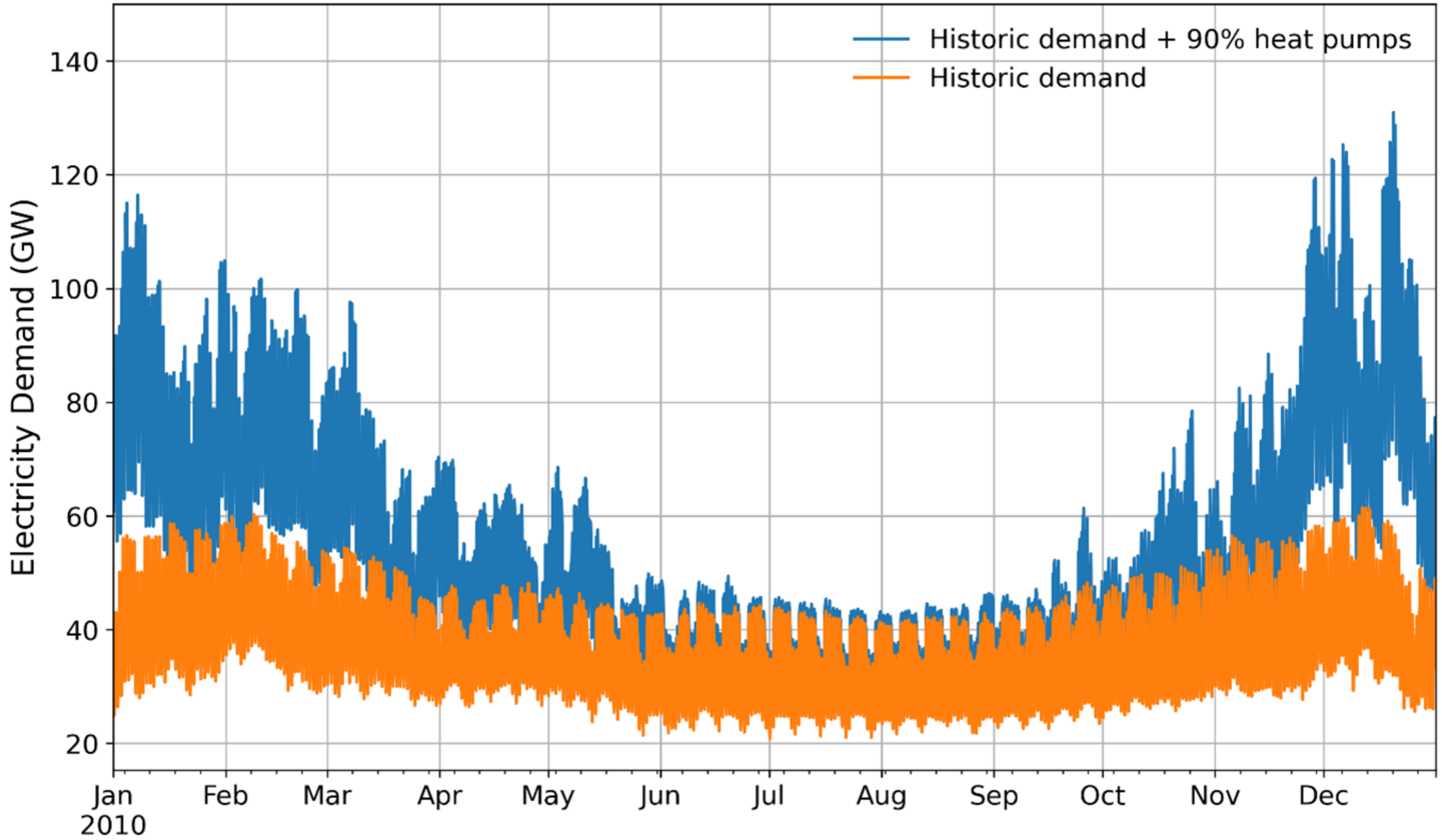
Wind has generated 50TWh of electricity
Avoiding need for 100TW of gas which would have cost more than £7 billion

Currently gas costing 9 times cost of wind.




The End

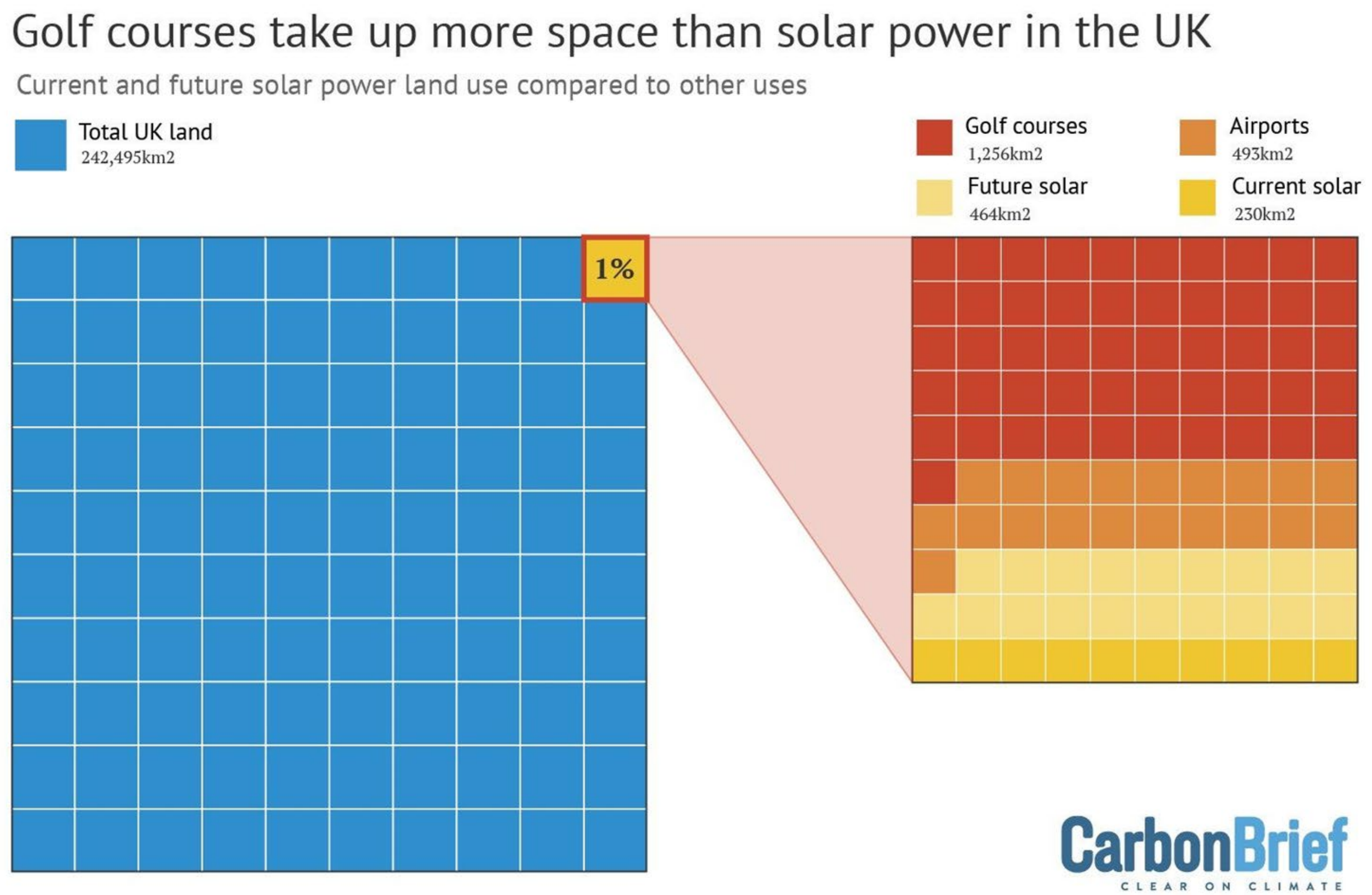
Other useful slides



Historic demand + 90% heat pumps
Historic demand
Electricity Demand (GW)
140
120
100
80
60
40
20
Jan
2010
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Net Zero Strategy key policies

- By 2035 the UK will be powered entirely by clean electricity, subject to security of supply.
- An ambition that by 2035, no new gas boilers will be sold.
- A 2030 commitment to end the sale of new petrol and diesel cars, and 2035 commitment that all new cars must be fully zero emissions capable.
- A zero emission vehicle mandate setting targets for a percentage of manufacturers' new car and van sales to be zero emission each year from 2024.
- Restore at least 35,000 ha of peatlands in England by 2025, through the Nature for Climate Fund.
- Deliver at least £1.5 billion of funding to support net zero innovation projects.
- Reform the skills system so that training providers, employers and learners are incentivised and equipped to play their part in delivering the transition to net zero.
- Publish an annual progress update against a set of key indicators for achieving our climate goals.


Golf courses take up more space than solar power in the UK
Current and future solar power land use compared to other uses
Total UK land
242,495km2
Golf courses
1,256km2
Airports
493km2
Future solar
464km2
Current solar
230km2
1%
CarbonBrief
CLEAR ON CLIMATE

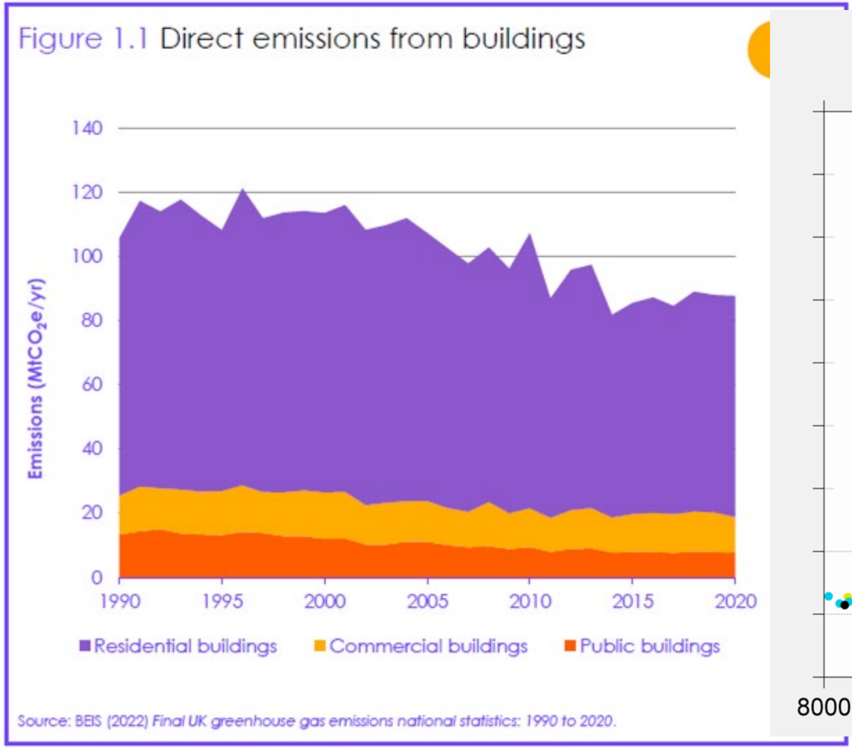
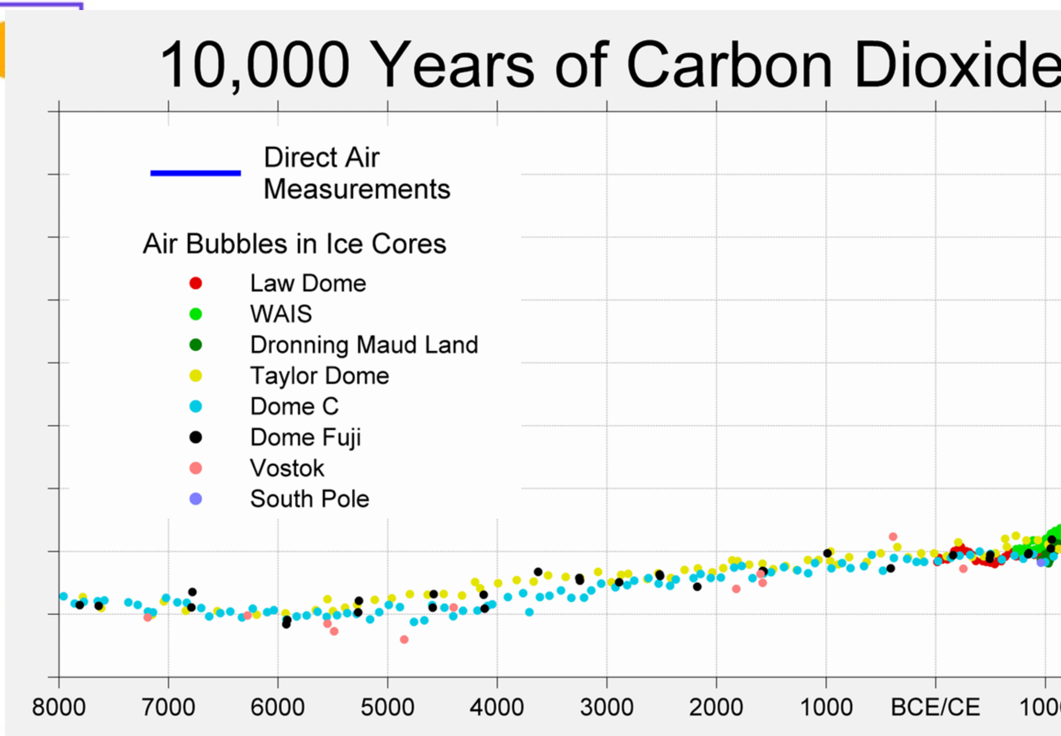
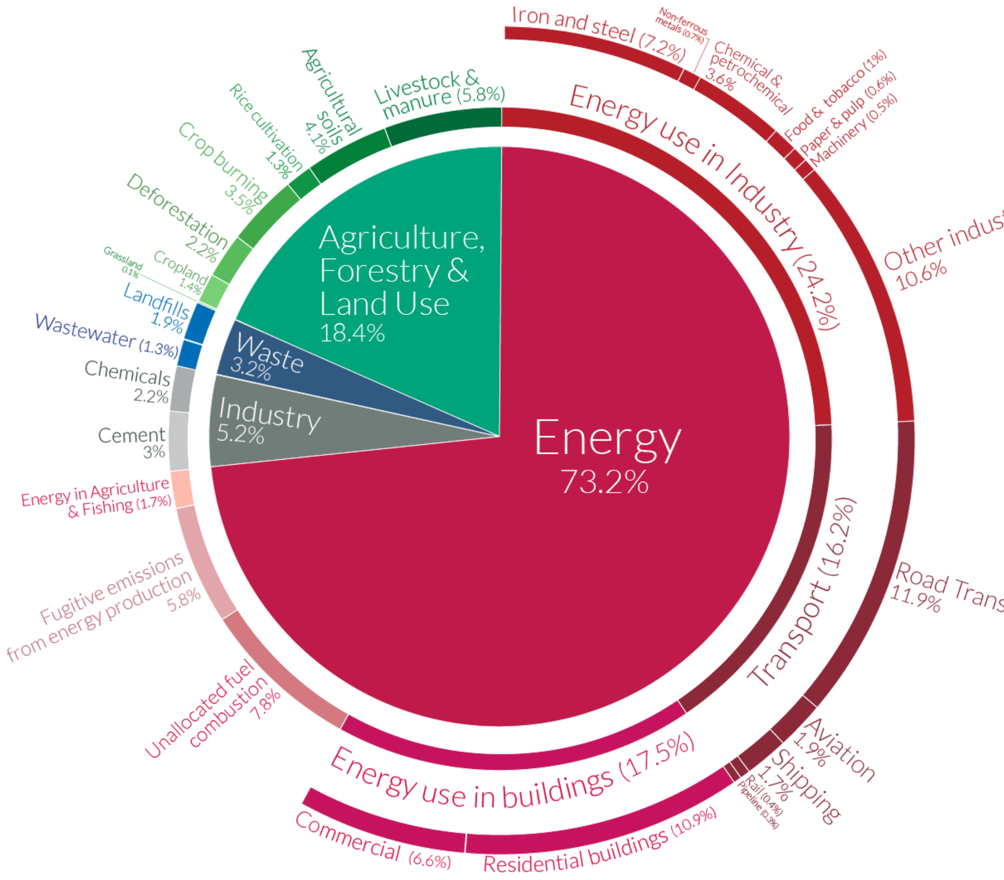


Figure 1.1 Direct emissions from buildings
140
120
100
80
60
40
20
0
Emissions (MtCO2e/yr)
1990
1995
2000
2005
2010
2015
2020
Residential buildings
Commercial buildings
Public buildings
Source: BEIS (2022) Final UK greenhouse gas emissions national statistics: 1990 to 2020.


10,000 Years of Carbon Dioxide
Direct Air Measurements
Air Bubbles in Ice Cores
Law Dome
WAIS
Dronning Maud Land
Taylor Dome
Dome C
Dome Fuji
Vostok
South Pole
8000
7000
6000
5000
4000
3000
2000
1000
BCE/CE

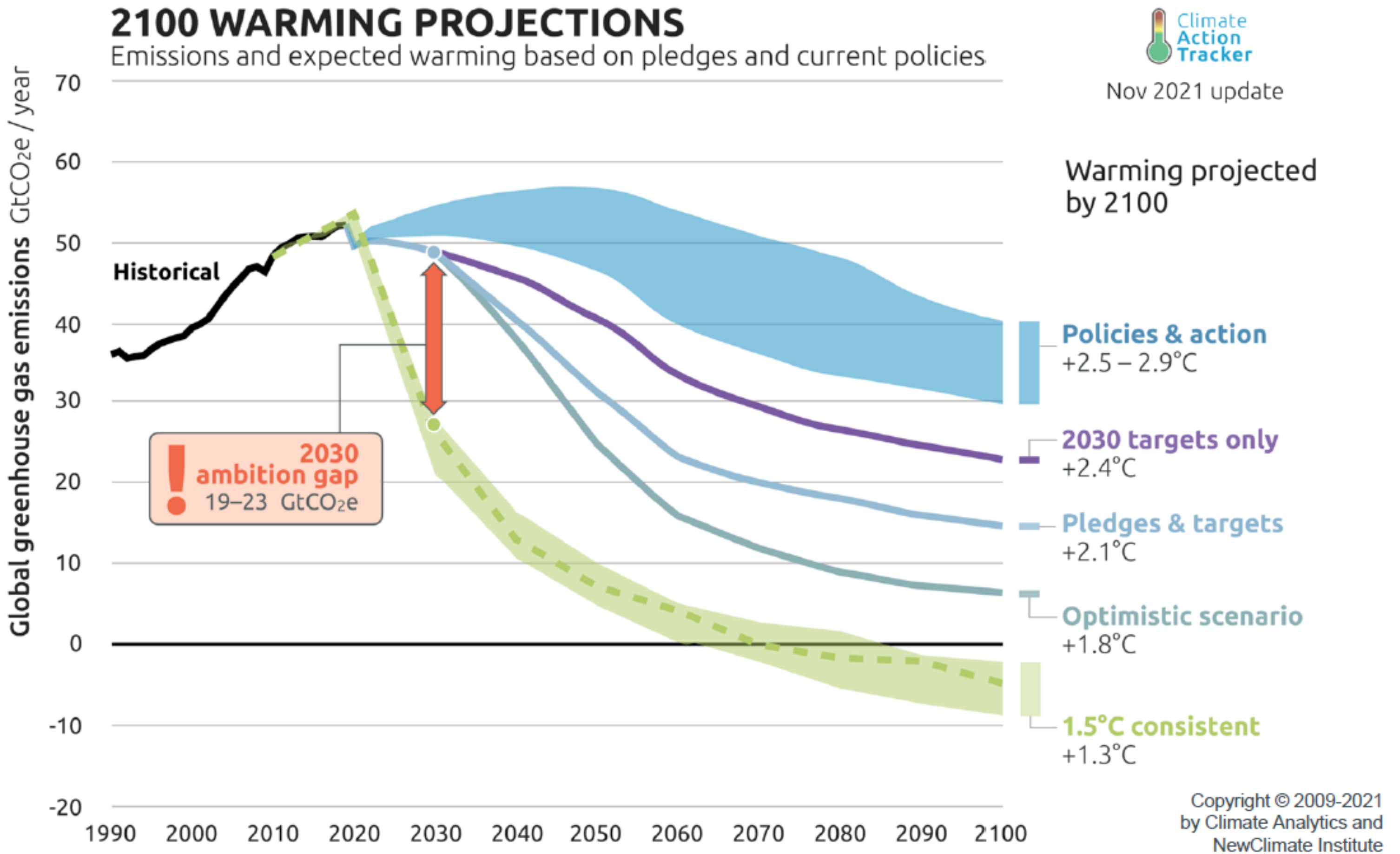
Global greenhouse gas emissions by sector

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.

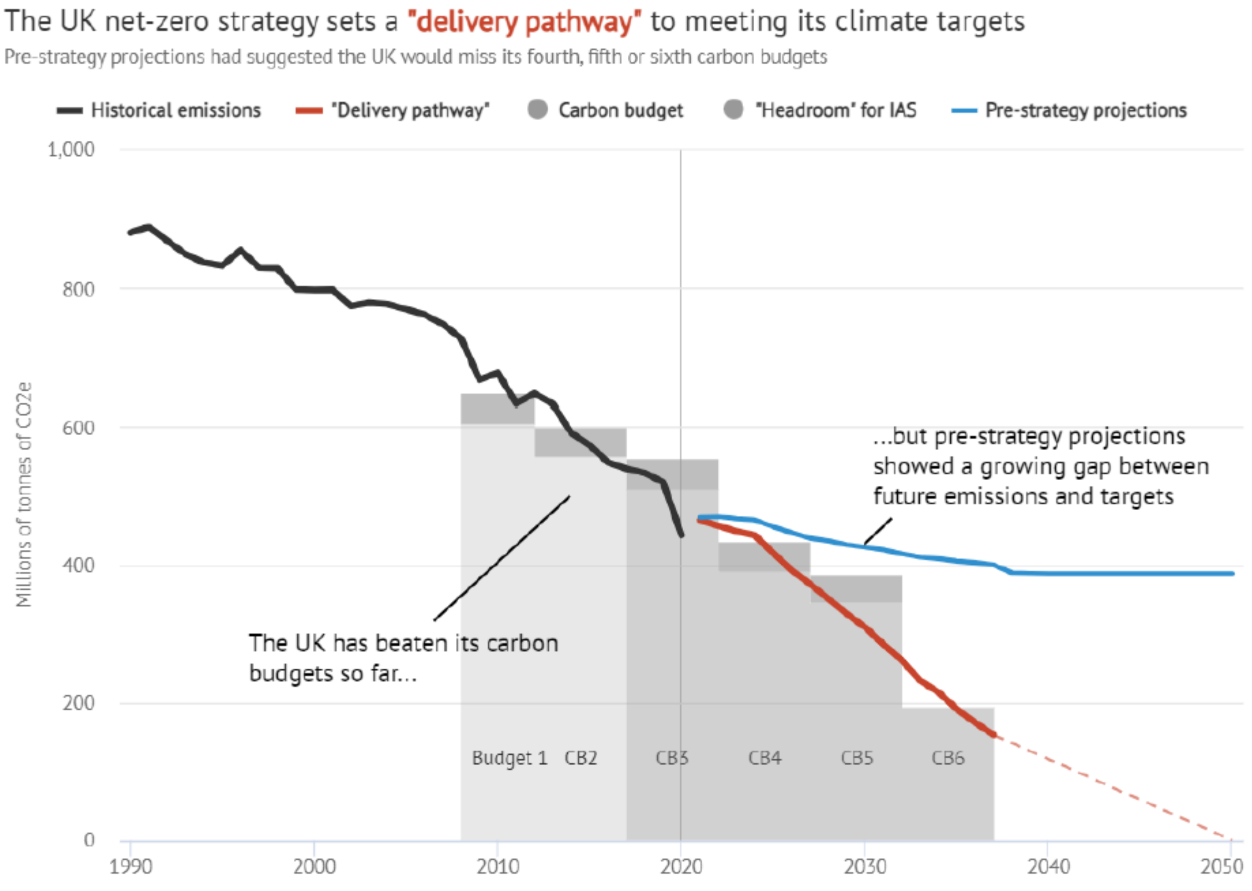


OurWorldinData.org – Research and data to make progress against the world's largest problems.
Source: Climate Watch, the World Resources Institute (2020).

Emissions trajectories

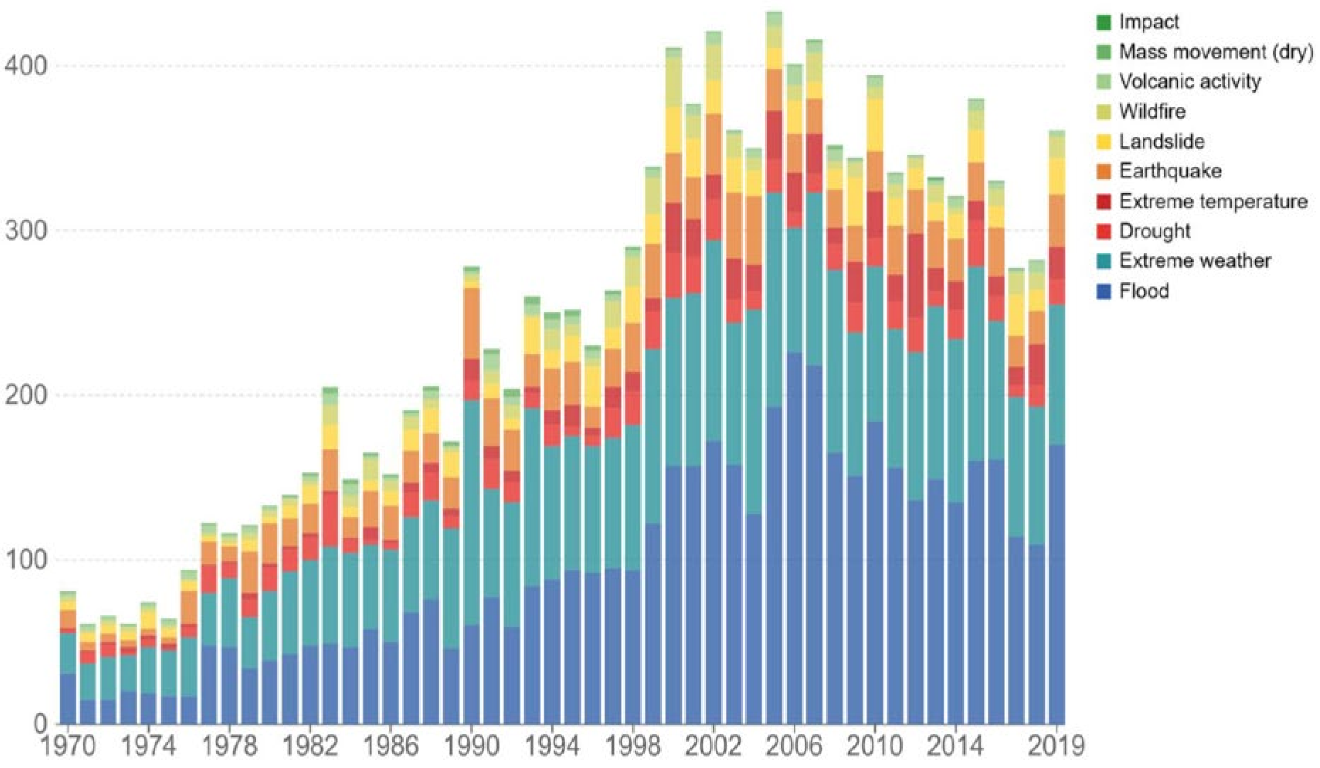


Current UK progress

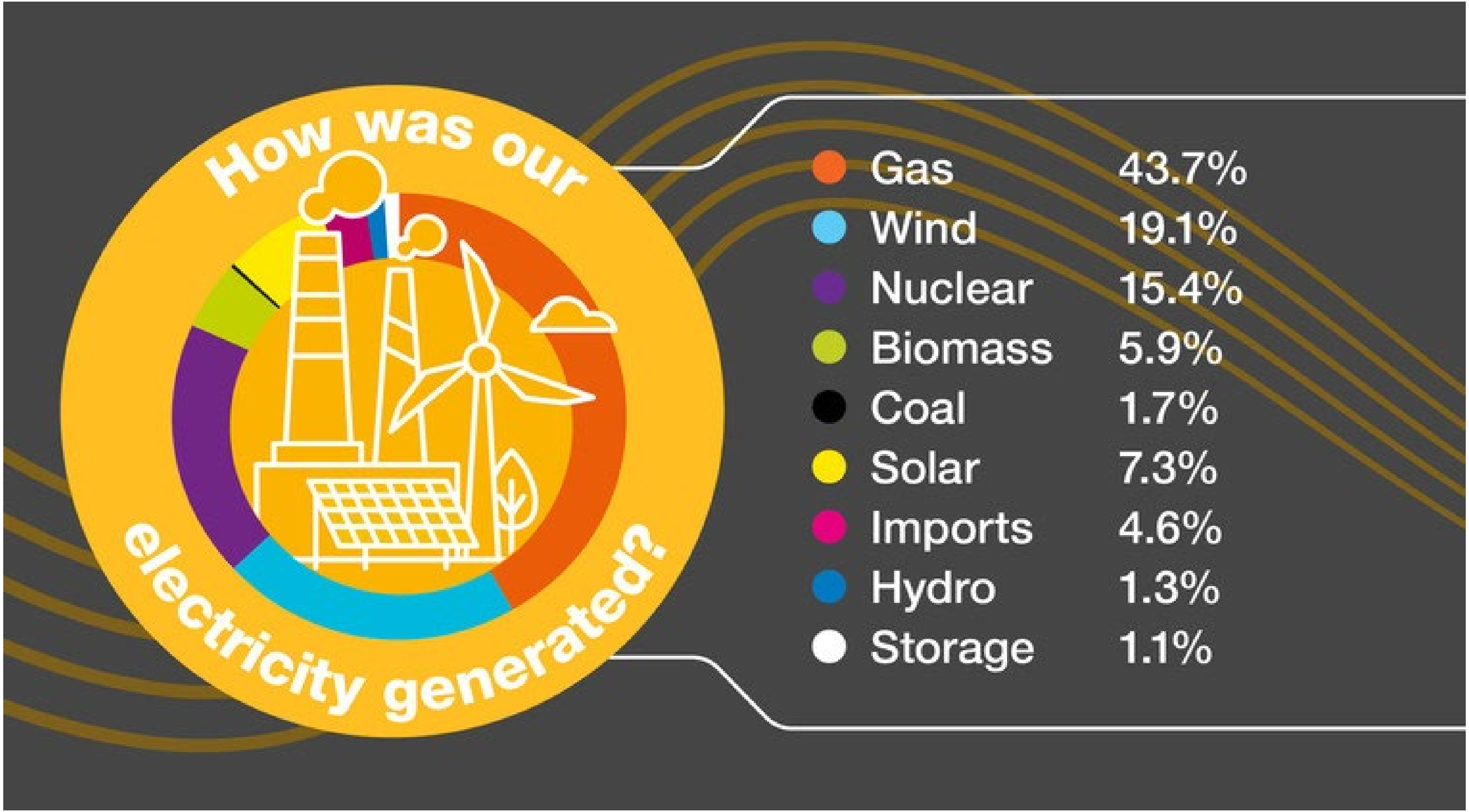


Global reported natural disasters by type, 1970 to 2019

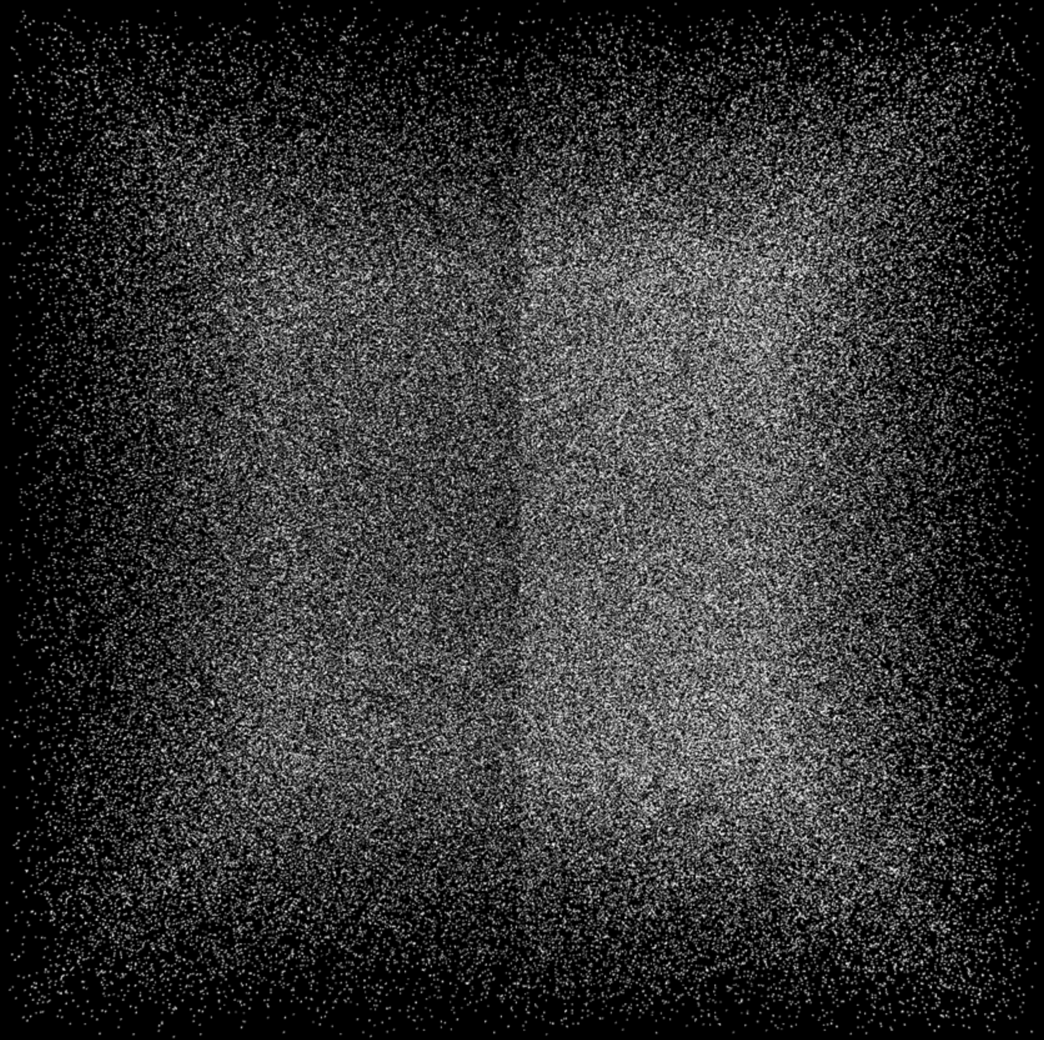
The annual reported number of natural disasters, categorised by type. This includes both weather and non-weather related disasters.



Source: EMDAT (2020): OFDA/CRED International Disaster Database, Université catholique de Louvain – Brussels – Belgium
OurWorldInData.org/natural-disasters • CC BY


How was our electricity generated?
Gas 43.7%
Wind 19.1%
Nuclear 15.4%
Biomass 5.9%
Coal 1.7%
Solar 7.3%
Imports 4.6%
Hydro 1.3%
Storage 1.1%

280ppm
0.028%



415ppm
0.042%

@KevPluck
PixelMoversAndMakers.com

$1m^3$ with 1mm particles