
Planning for a Resilient Future
LIVERY
CLIMATE ACTION
GROUP
22nd October 2024 - Merchant Taylors' Hall EC2R 8JB

LIVERY CLIMATE ACTION GROUP

IOP Institute of Physics

POLLINATING LONDON TOGETHER

The Institution of Environmental Sciences

Programme

12:30	Light lunch, poster displays and stands: Learned Societies: IOP, PLT, IoES Schools: Hugh Myddelton and Simon Langton, City of London school for girls
13:30	Conference opens with Alderman Alison Gowman
13:35	Keynote speaker: Alderman Professor Michael Mainelli
13:50	Allan Barton will pose challenges to panels
14:04	Panel 1: Water (Prof Carolyn Roberts, Tim Munday, Dr David Lloyd Owen)
14:35	Panel 2: Energy (Prof Averil MacDonald, Ashutosh Shastri, Jon Clark)
15:05	Panel 3: Bio-diversity (Dr Heather Barrett-Mold, Ben Bishop, Dr Cristina Banks-Leite)
15:35	Tea and cake

15:35 Tea and cake, plus:
Learned societies displays
Additional school displays: St Saviour's and St Olave's, Walsall Academy
16:05 Walsall academy will discuss their project as featured on the BBC
16:30 Panel 4: Skills (Alex Hughes, Simon Sadinsky, Faiza Khan)
17:05 Keynote speaker: Dr Thom Waite, UK Deputy Chief Medical Officer on health and climate change
17:25 Dr Emma Howard-Boyd - key points from the London Climate Resilience Review
17:45 Toasts, champagne and canapes (and more networking opportunities)
19:30 Close

Alderman Canon Alison Gowman CBE DCL (Hon) MstJ JP

Social media:

X: @liverycag
LinkedIn: Livery Climate Action Group
#LCAG #LCAGConference2024

Scan code for LCAG conference website and scroll down for programme

Alderman Professor
Michael Mainelli,
FCCA FCSI(Hon) FBCS
Lord Mayor of the City
of London 2023-24

LIVERY CLIMATE ACTION GROUP

Allan Barton

The Worshipful Company of
Water Conservators

LIVERY CLIMATE ACTION GROUP

Setting the scene

Why are we in the state we are?

How did WE get to today

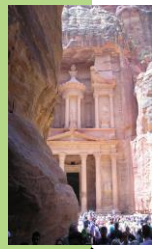
LIVERY CLIMATE ACTION GROUP

Our World in Data

The size of the world population over the long-run

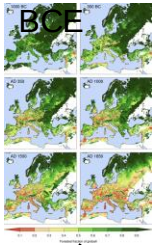
7600 BCE

4000 BCE



4000 BCE

1000 BCE



10000 BCE

2,000,000 BCE

The UN demographers expect the world population to peak at 10.4 billion in 2086 and to decline thereafter.

The pink line shows the projection by the UN Population Division.

The purple line shows the size of the world population over the last 12,000 years.

10 billion are projected for the year 2058

9 billion are projected for the year 2036

8 billion in 2023

7 billion in 2011

6 billion in 1999

5 billion in 1987

4 billion in 1974

3 billion in 1960

2 billion in 1928

1.65 billion in 1900

990 million in 1800

600 million in 1700

In the mid 14th century the Black Death pandemic killed between a quarter and half of all people in Europe.

In 10,000 BCE the world population was around 4 million

The average growth rate from 10,000 BCE to 1700 was just 0.04% per year

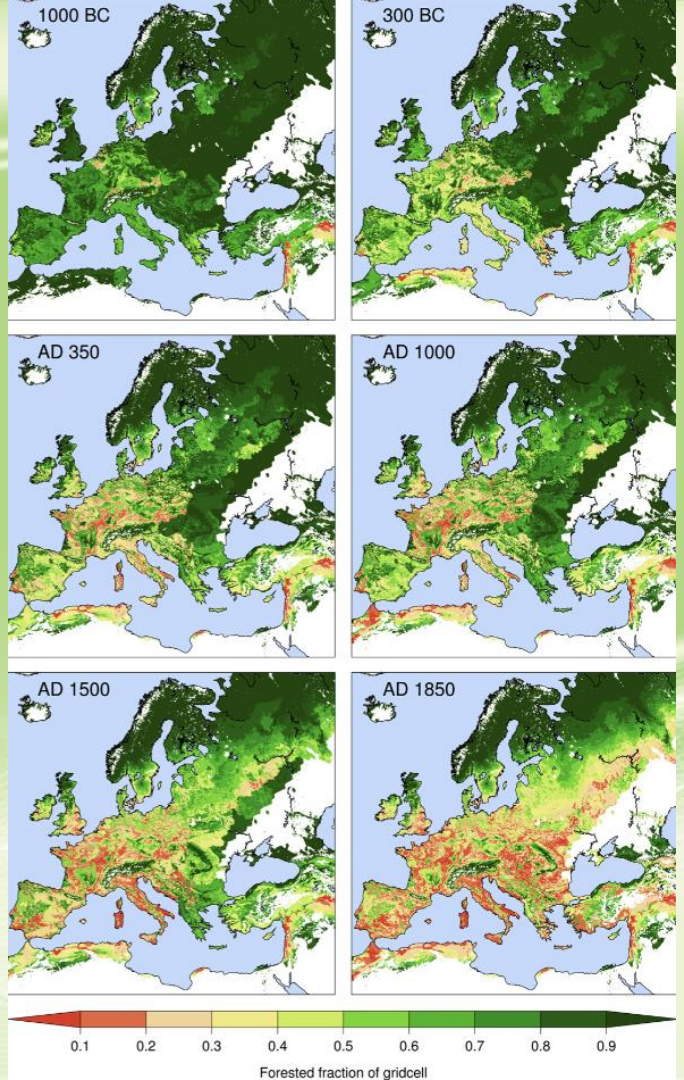
In the year 0 the world population was around 190 million

10,000 BCE 8,000 BCE 6,000 BCE 4,000 BCE 2,000 BCE 0 2000

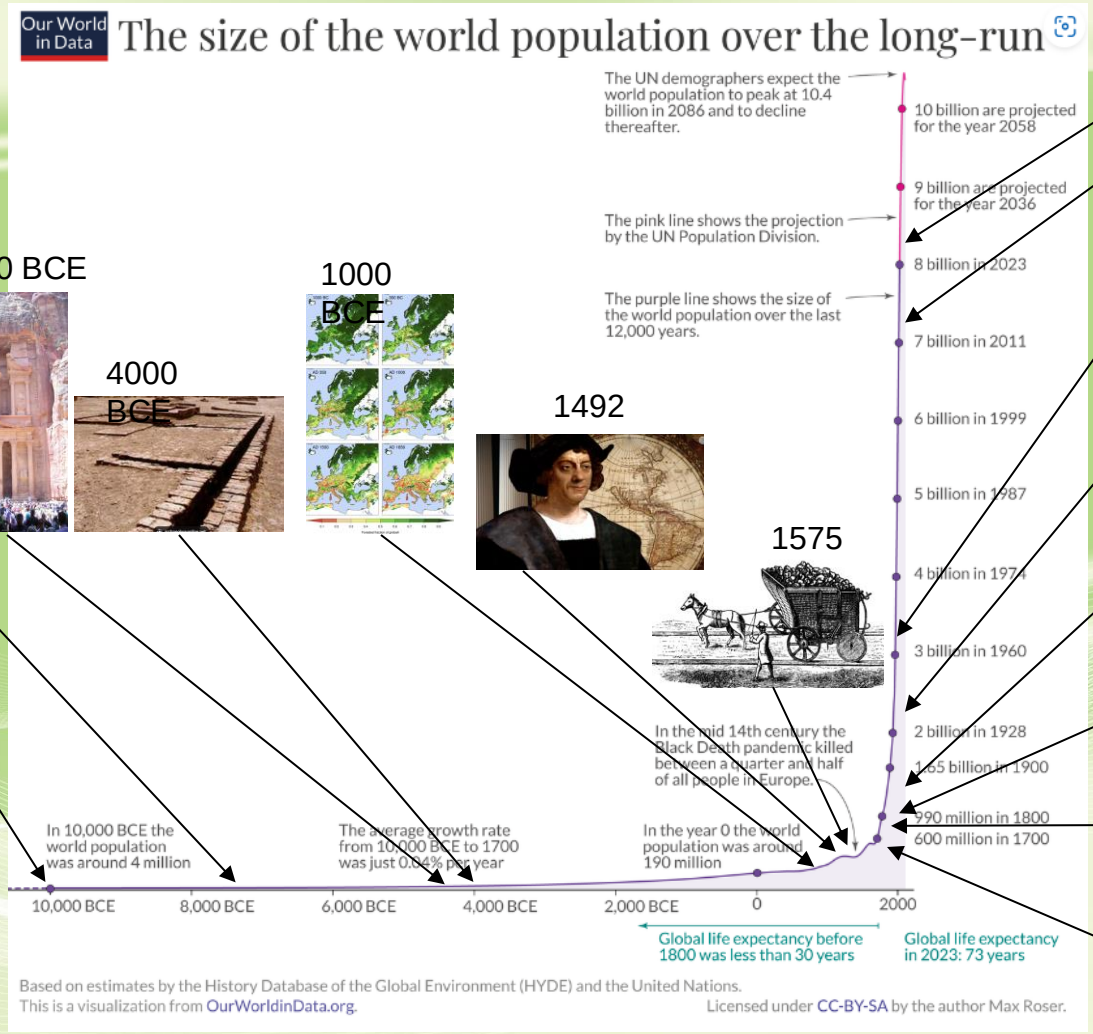
Global life expectancy before 1800 was less than 30 years

Global life expectancy in 2023: 73 years

Based on estimates by the History Database of the Global Environment (HYDE) and the United Nations.
This is a visualization from OurWorldinData.org.

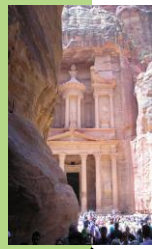


LIVERY CLIMATE ACTION GROUP



7600 BCE

3500 BCE



4000 BCE

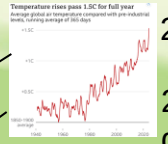
1000 BCE

1492

1575

10000 BCE

2,000,000 BCE

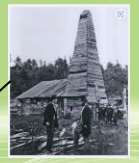


2023 1.5 de

2015 1 deg

1964

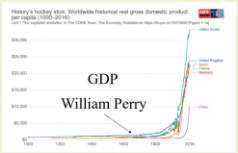
Guy Callendar 1938



1859

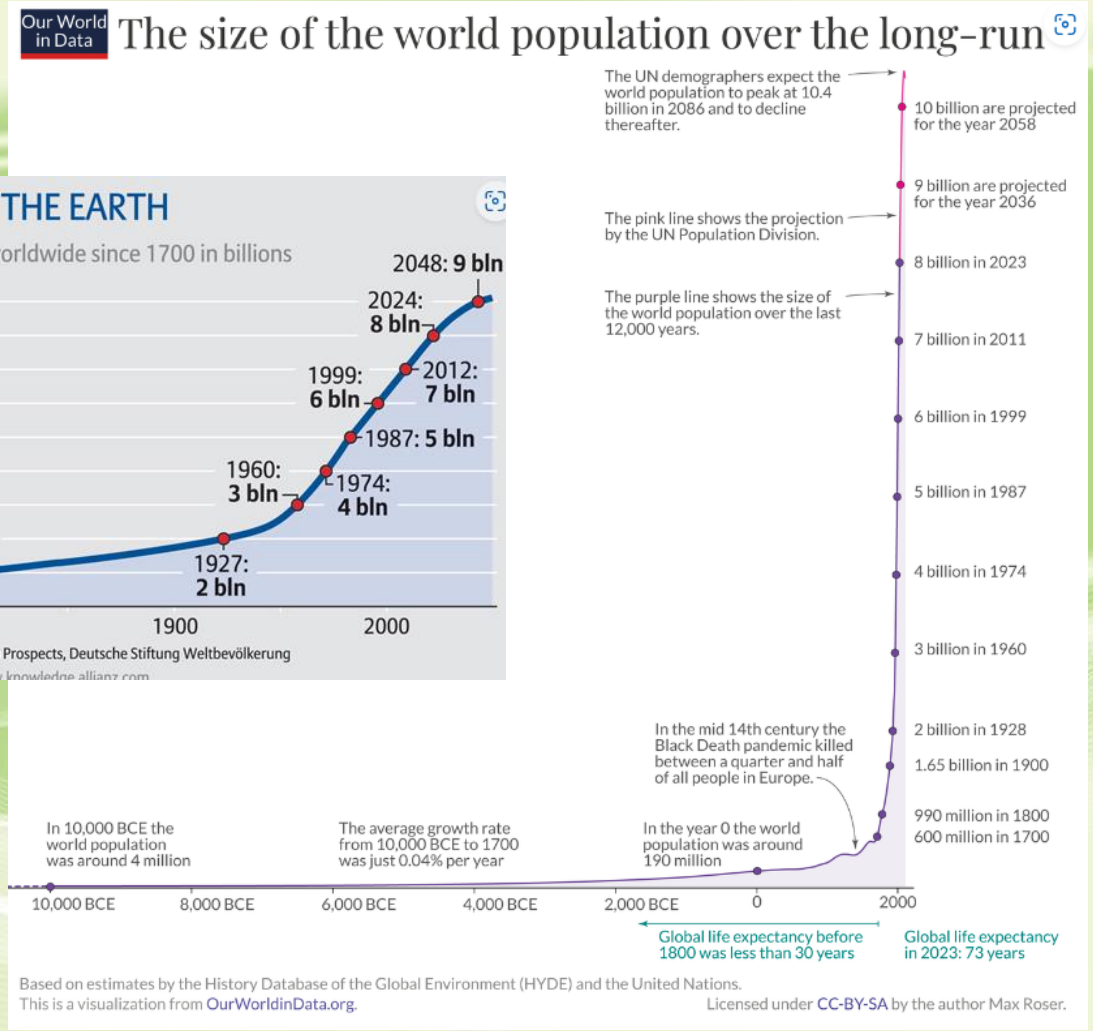
1790

1760



1652

What have we done

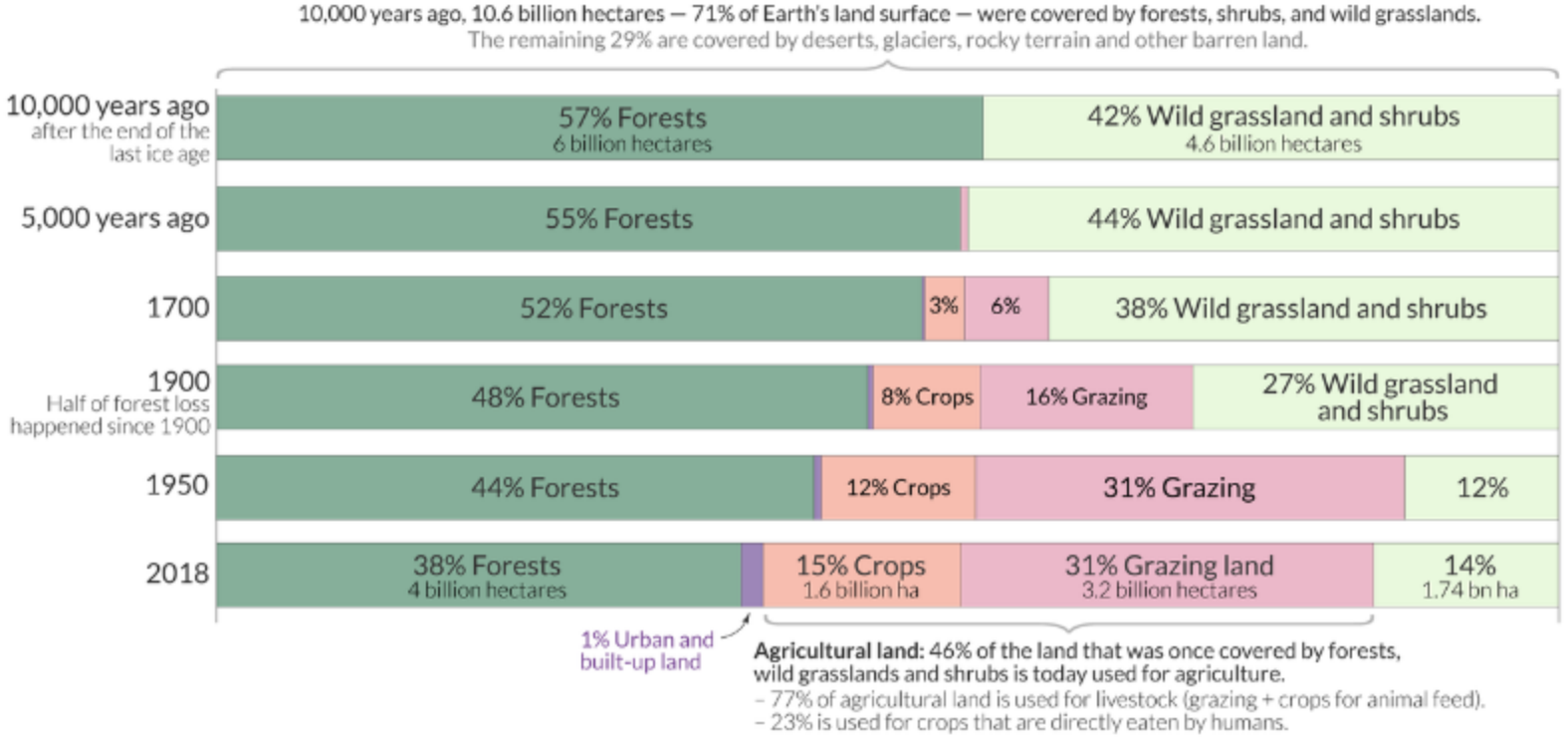


LIVERY CLIMATE ACTION GROUP

Humanity destroyed one third of the world's forests by expanding agricultural land

Agriculture is by far the largest driver of deforestation. To bring deforestation to an end humanity has to find ways to produce more food on less land.

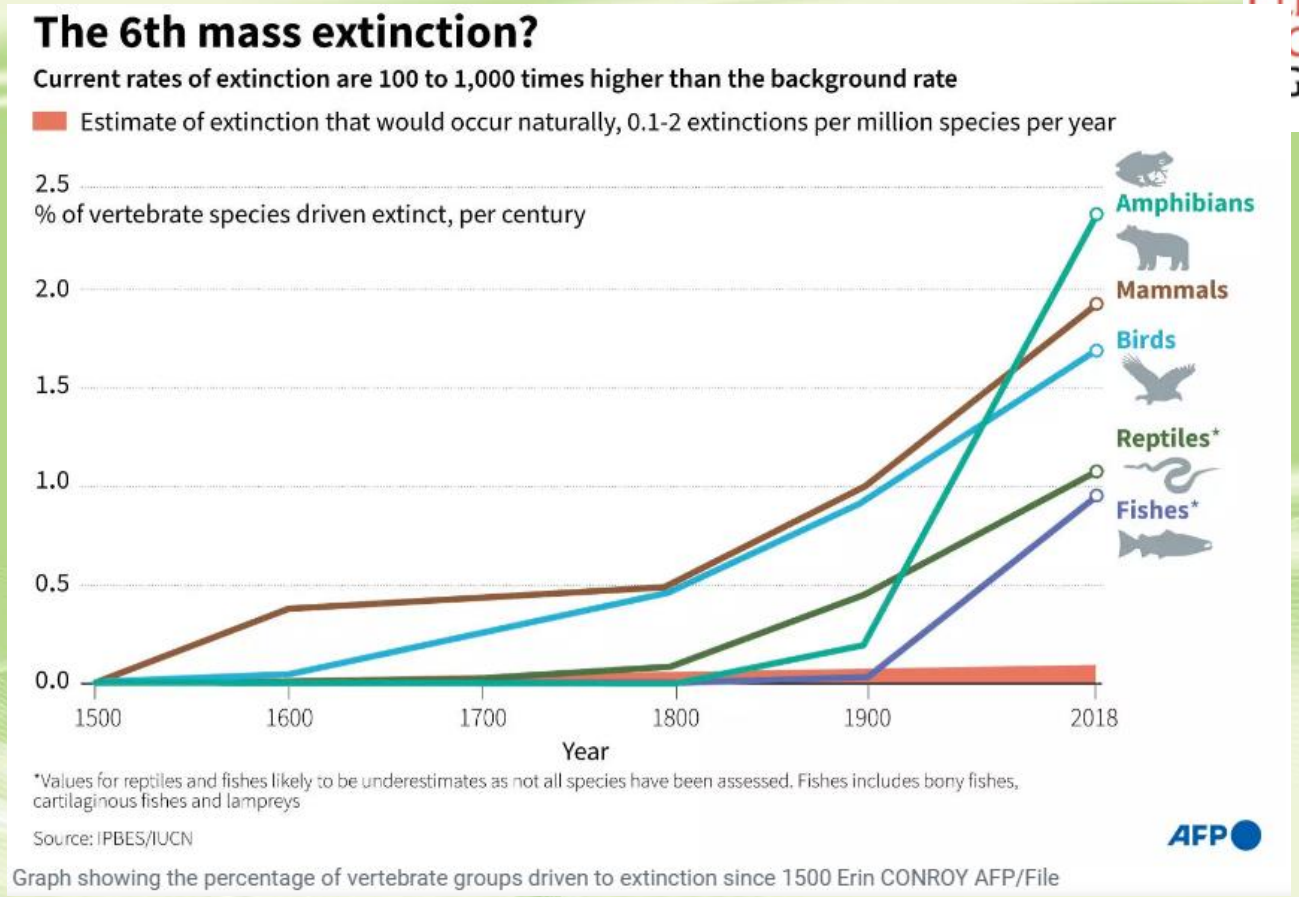
Our World in Data



Data: Historical data on forests from Williams (2003) – Deforesting the Earth. Historical data on agriculture from The History Database of Global Environment (HYDE). Modern data from the FAO.

OurWorldinData.org – Research and data to make progress against the world's largest problems.

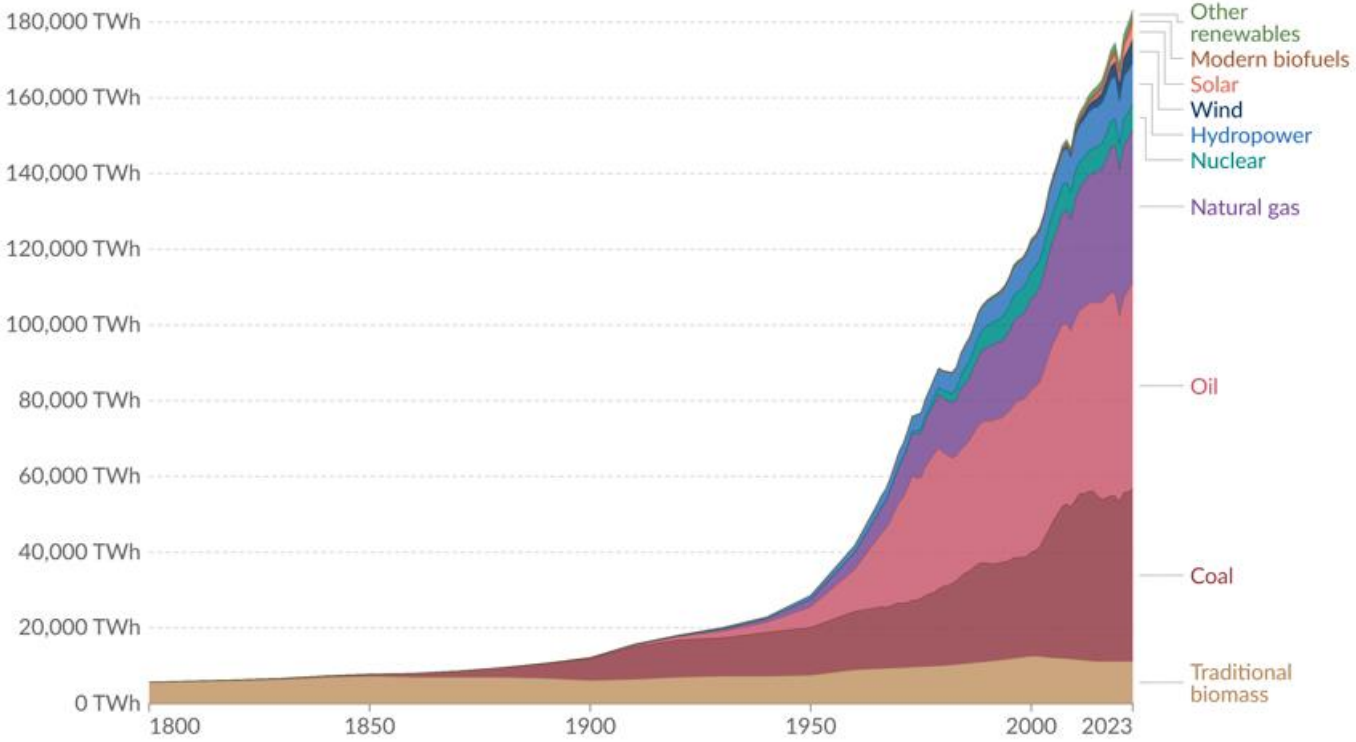
LIVERY CLIMATE ACTION GROUP



Graph showing the percentage of vertebrate groups driven to extinction since 1500 Erin CONROY AFP/File

Global primary energy consumption by source

Primary energy[1] is based on the substitution method[2] and measured in terawatt-hours[3].



Data source: Energy Institute - Statistical Review of World Energy (2024); Smil (2017)

OurWorldinData.org/energy | CC BY

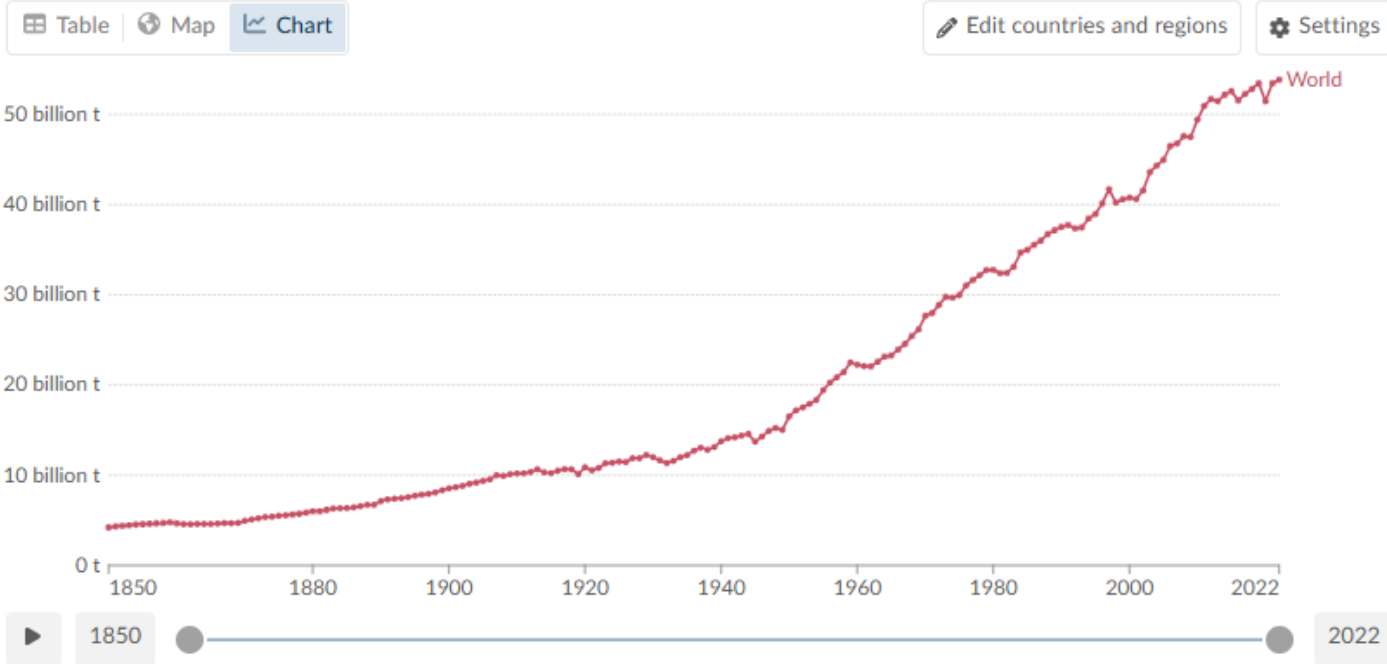
Note: In the absence of more recent data, traditional biomass is assumed constant since 2015.

LIVERY CLIMATE ACTION GROUP

Our World in Data

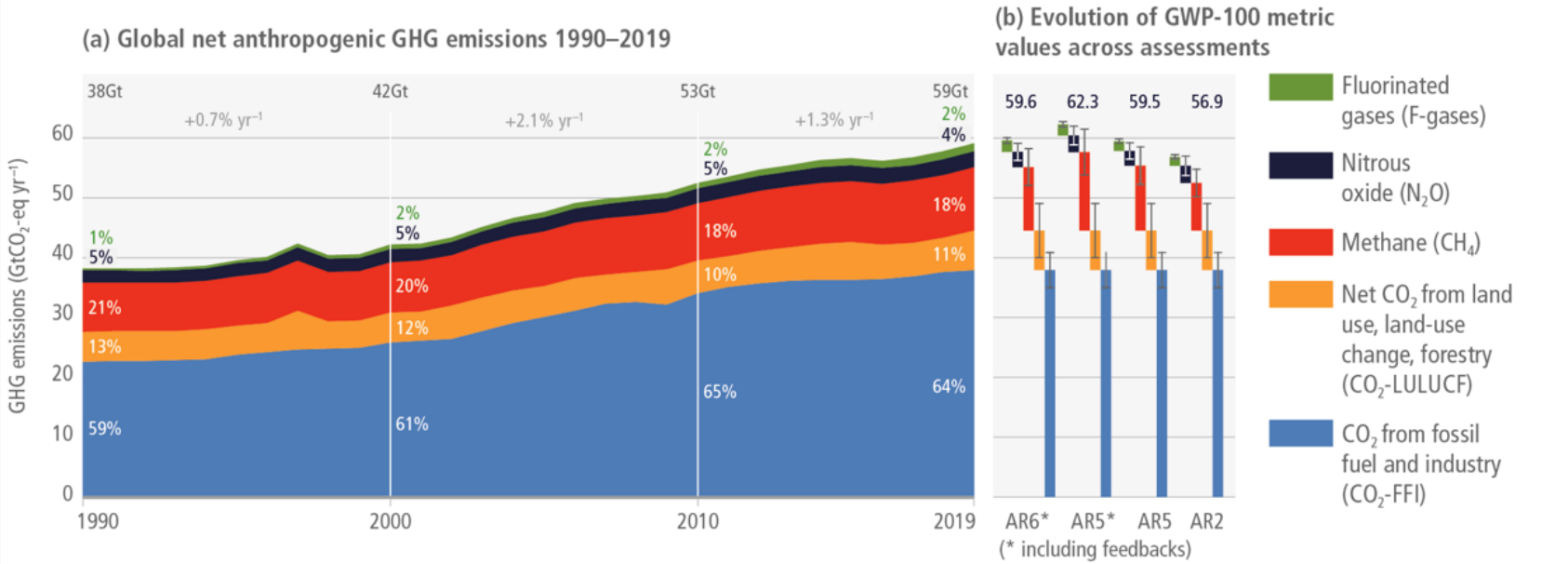
Greenhouse gas emissions

Greenhouse gas emissions include carbon dioxide, methane and nitrous oxide from all sources, including land-use change. They are measured in tonnes of carbon dioxide-equivalents over a 100-year timescale.



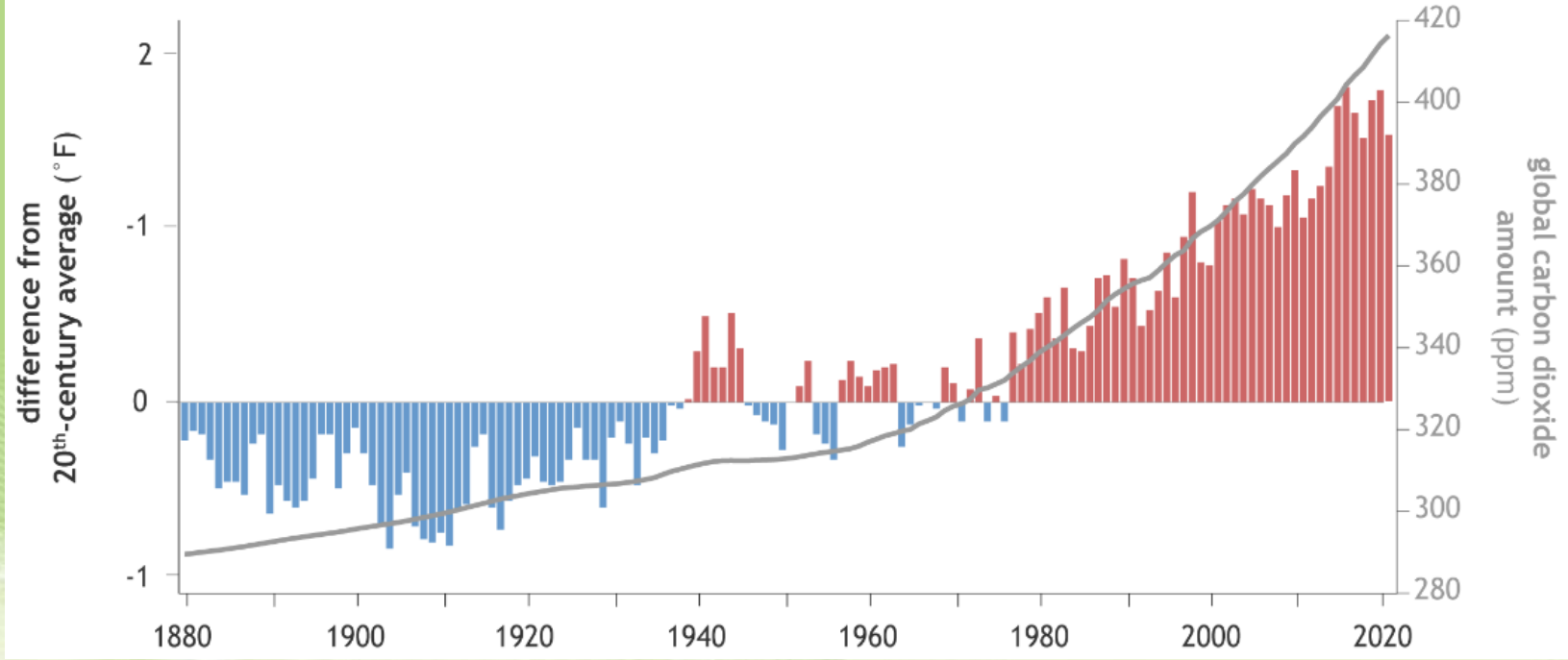
LIVERY CLIMATE ACTION GROUP

Emissions of greenhouse gases have continued to increase since 1990, at varying rates



LIVERY CLIMATE ACTION GROUP

Changes in global temperature and average atmospheric carbon dioxide (1880-2021)



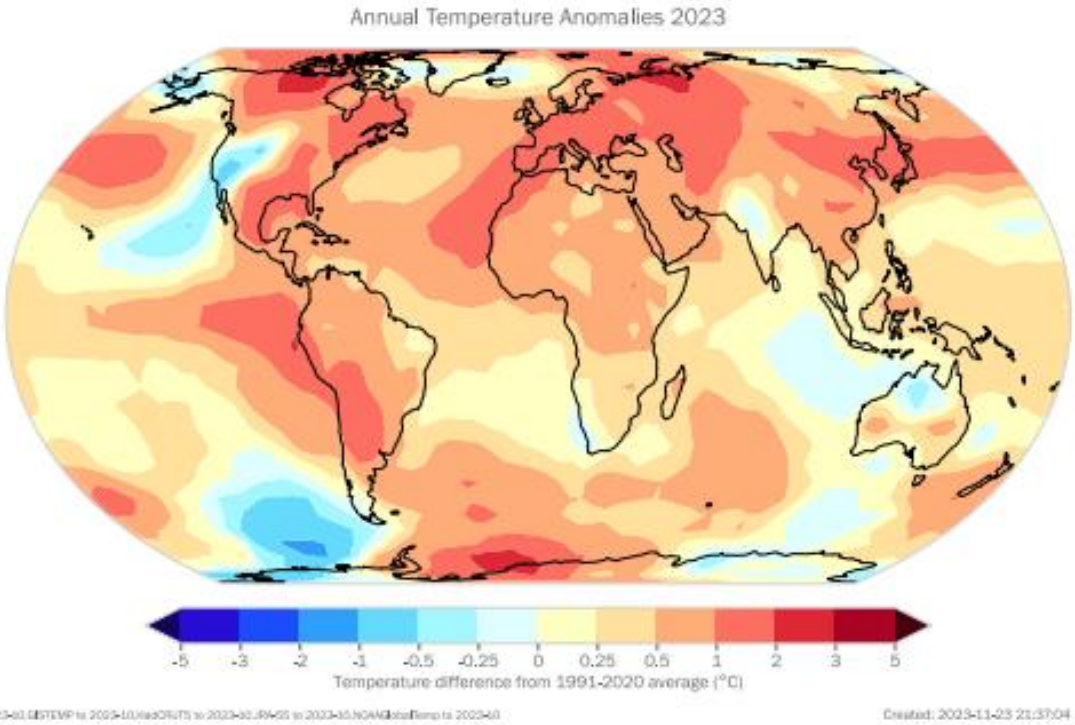


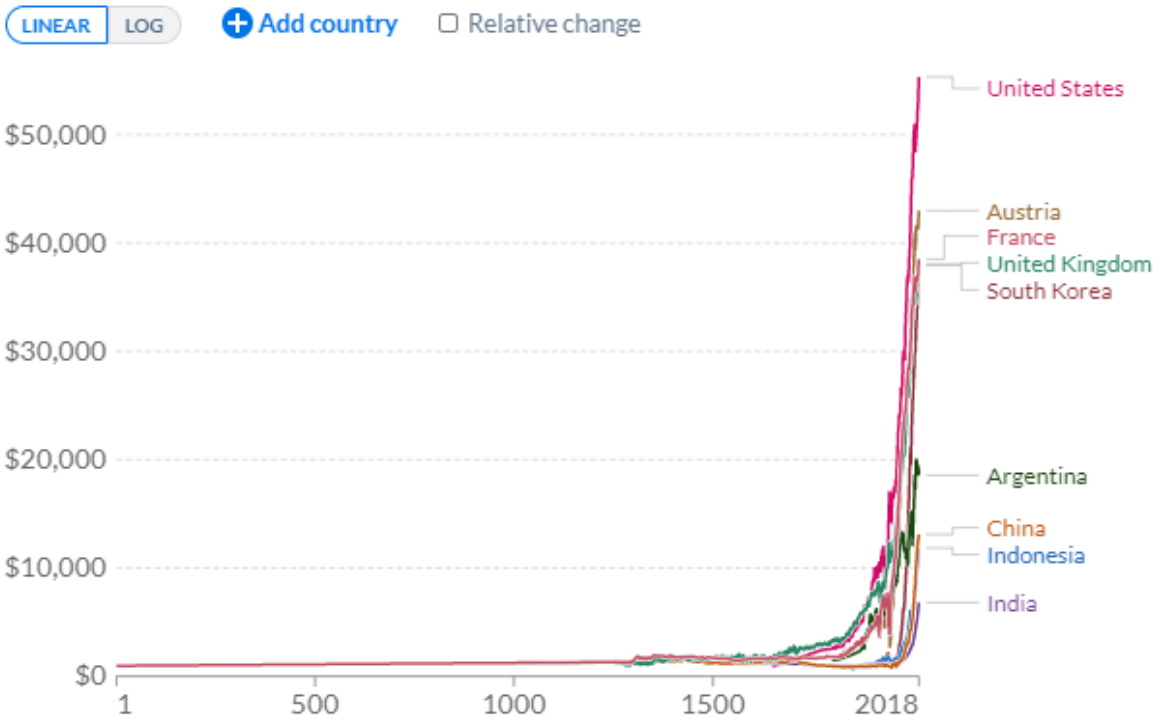
Figure 3: Mean near-surface temperature anomalies (difference from the 1991–2020 average) for 2023 to October. Data are the median of five data sets as indicated in the legend, see Data sets and methods for details.

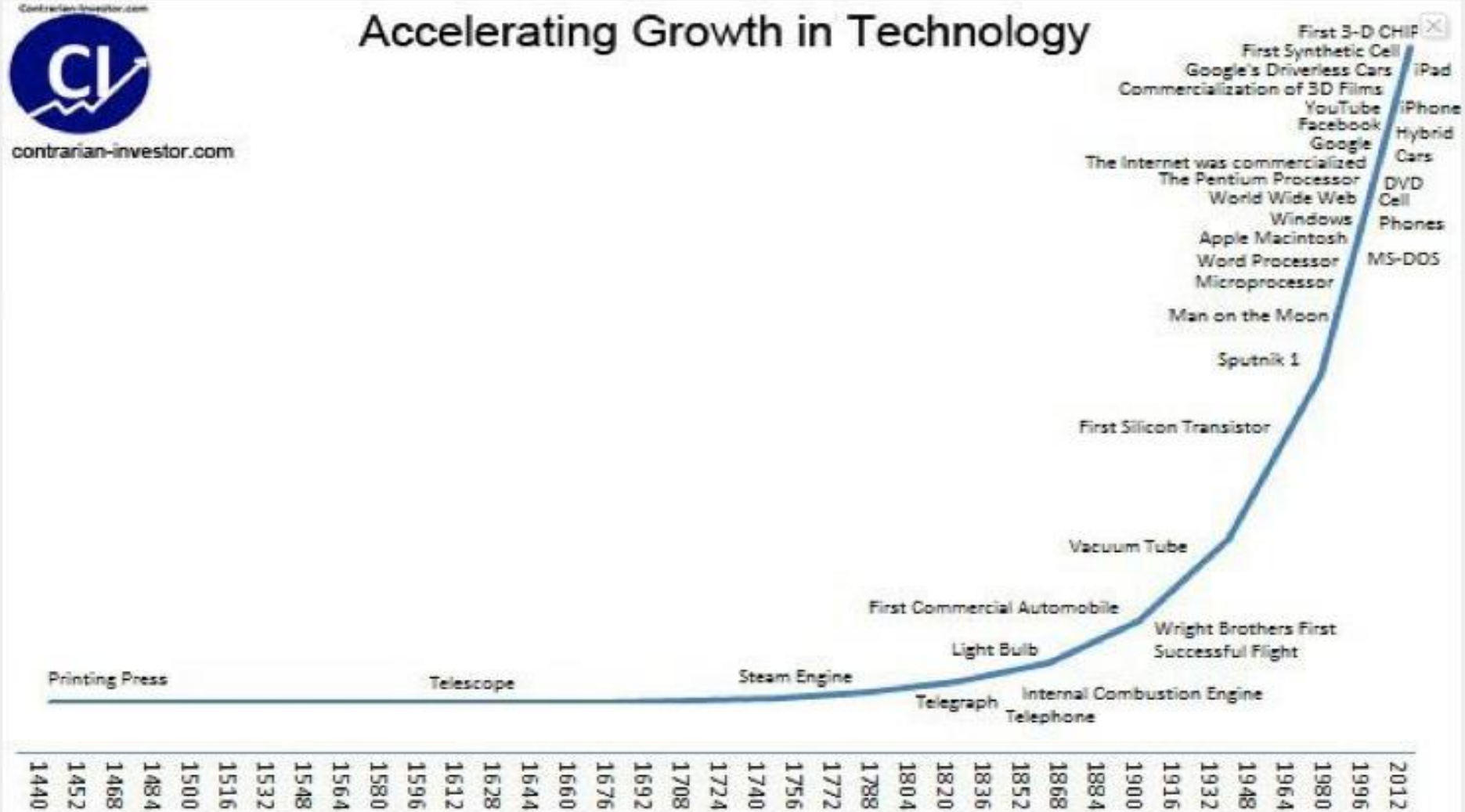
LIVERY CLIMATE ACTION GROUP

GDP per capita, 1 to 2018

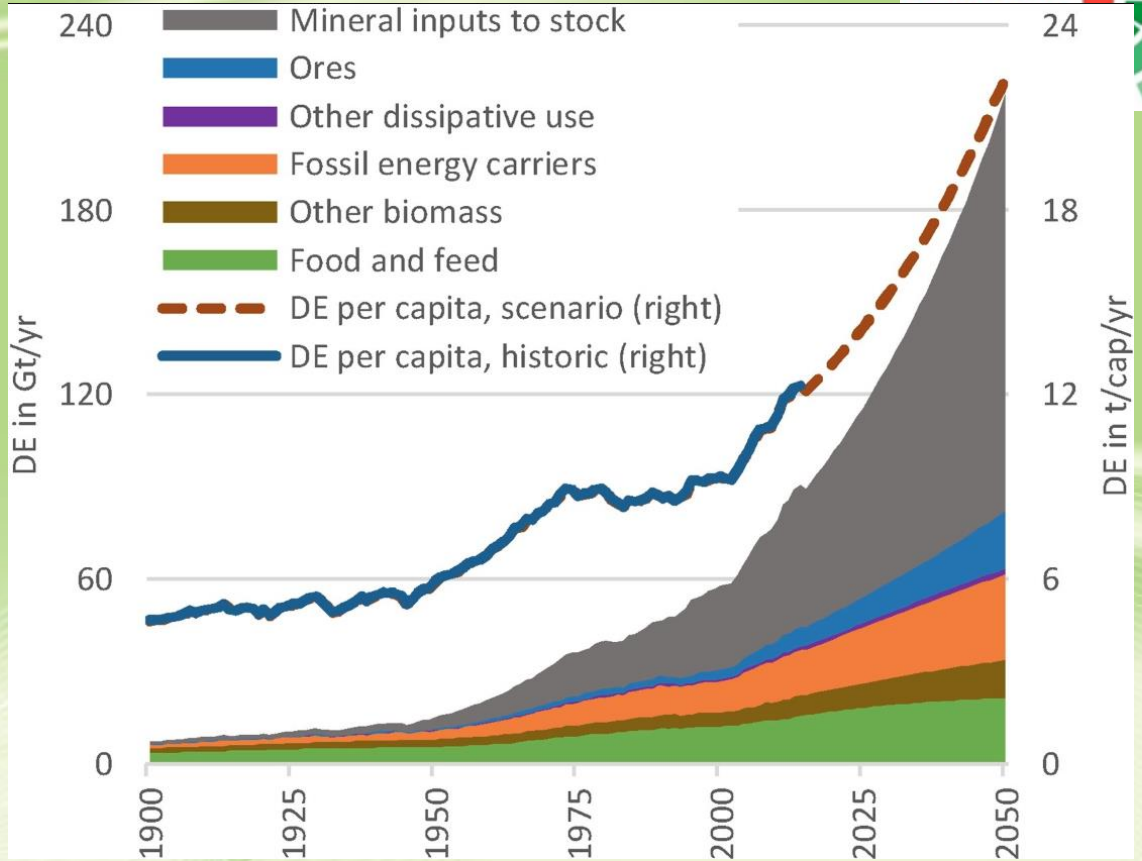
This data is adjusted for differences in the cost of living between countries, and for inflation.
It is measured in constant 2011 international-$.

Our World in Data




Accelerating Growth in Technology
contrarian-investor.com
First 3-D CHIP
First Synthetic Cell
Google's Driverless Cars
Commercialization of 3D Films
YouTube
Facebook
Google
The Internet was commercialized
The Pentium Processor
World Wide Web
Windows
Apple Macintosh
Word Processor
Microprocessor
Man on the Moon
Sputnik 1
First Silicon Transistor
Vacuum Tube
First Commercial Automobile
Light Bulb
Steam Engine
Telegraph
Telephone
Internal Combustion Engine
Wright Brothers First Successful Flight
Printing Press
Telescope
iPad
iPhone
Hybrid Cars
DVD
Cell Phones
MS-DOS
1440
1452
1468
1484
1500
1516
1532
1548
1564
1580
1596
1612
1628
1644
1660
1676
1692
1708
1724
1740
1756
1772
1788
1804
1820
1836
1852
1868
1884
1900
1916
1932
1948
1964
1980
1996
2012

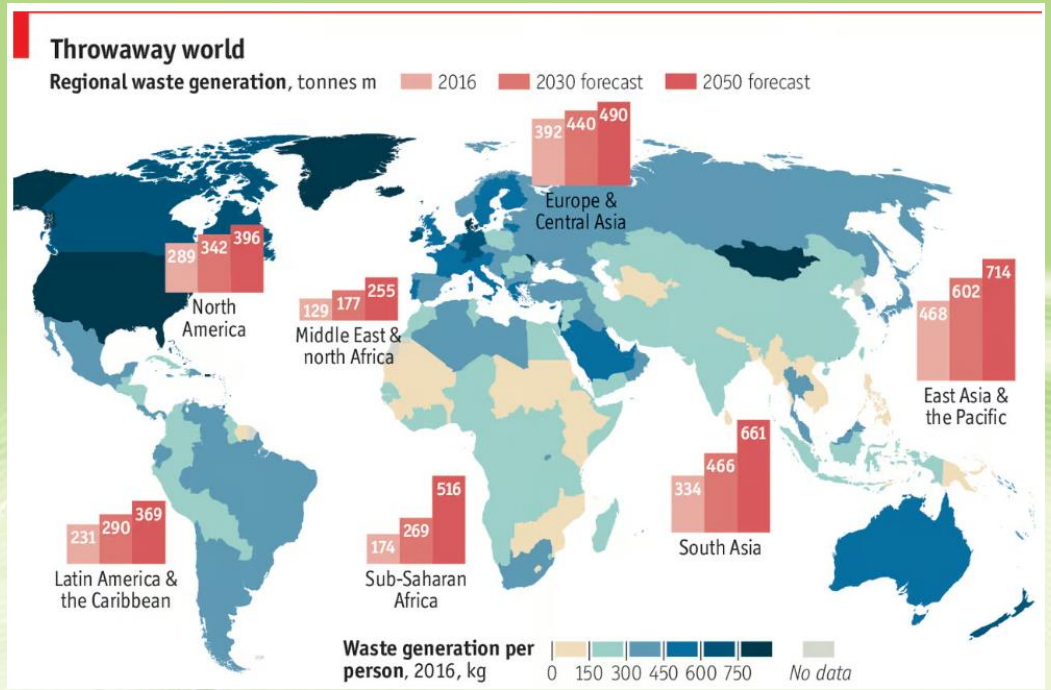
Past 6 years over half a trillion
tonnes of materials—
nearly as much as the entirety
of the 20th century.



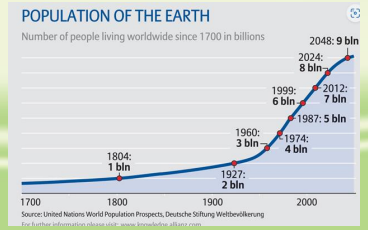
Global waste management outlook

Focus on Global South sub-Saharan Africa, South Asia and Latin America

Global municipal solid waste generation is expected to increase from 2.1bn tonnes in 2023 to 3.8bn tonnes in 2050 with at least 33% of waste mismanaged

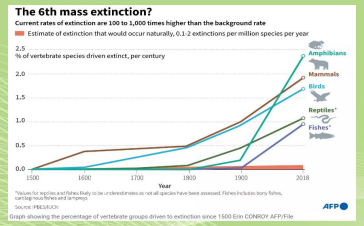


WBG, 2018 and UNDP, 2024

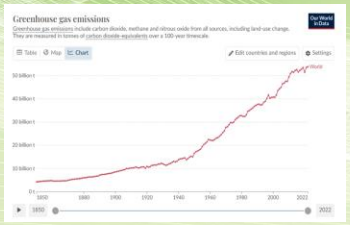


Up * 4

Down 0.46

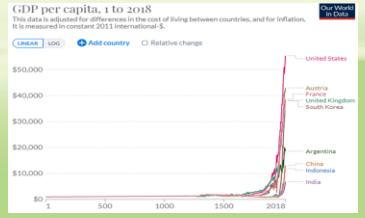


Up * 2.5



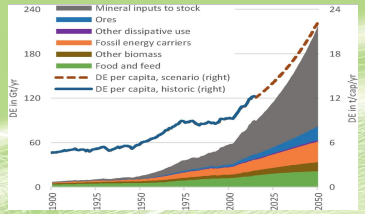
Up * 5

In the last 100 years

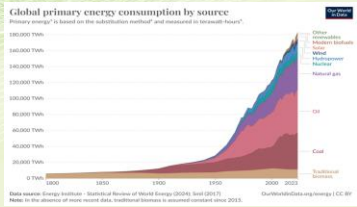


Up * 24

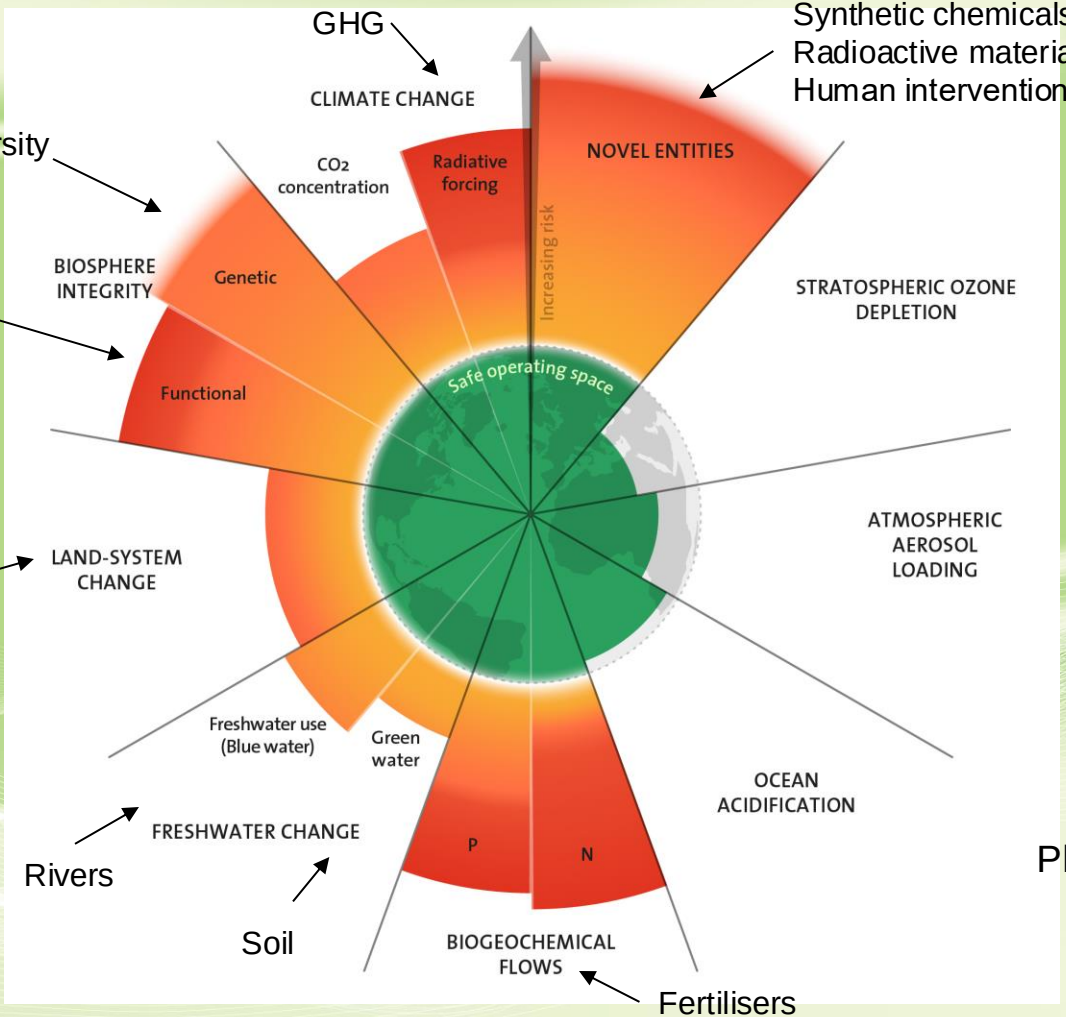
Up * 10



Up * 12



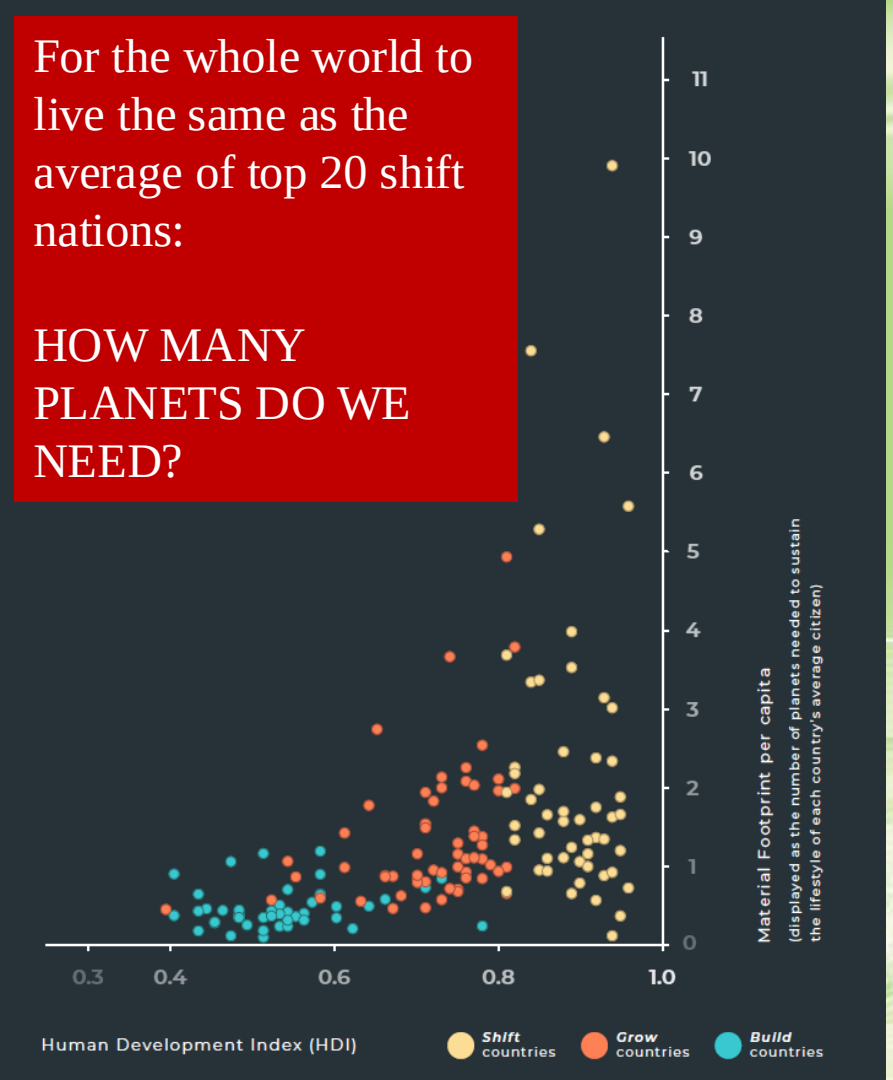
Up * 9



Planetary Boundaries

For the whole world to live the same as the average of top 20 shift nations:

HOW MANY PLANETS DO WE NEED?



A: 1.6

B: 2.6

C: 3.6

D: 4.6

LIVERY CLIMATE ACTION GROUP

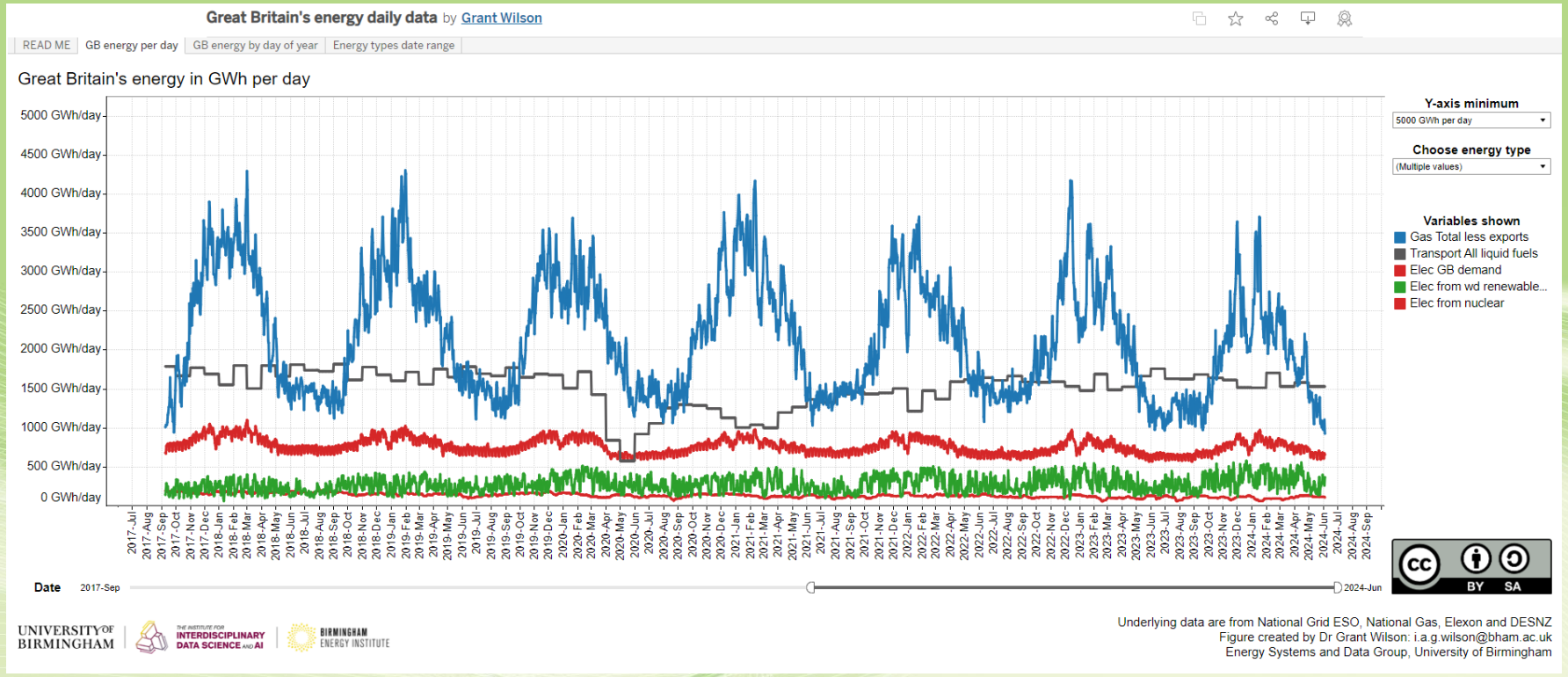
Circular Gap Report 2024

LIVERY CLIMATE ACTION GROUP

Where have we got to in the UK

Transition to a Sustainable Energy Future - Realism & Roadblocks
University of Strathclyde – 06 March 2024

GB Energy Demand - GWh/day - 2017-2024

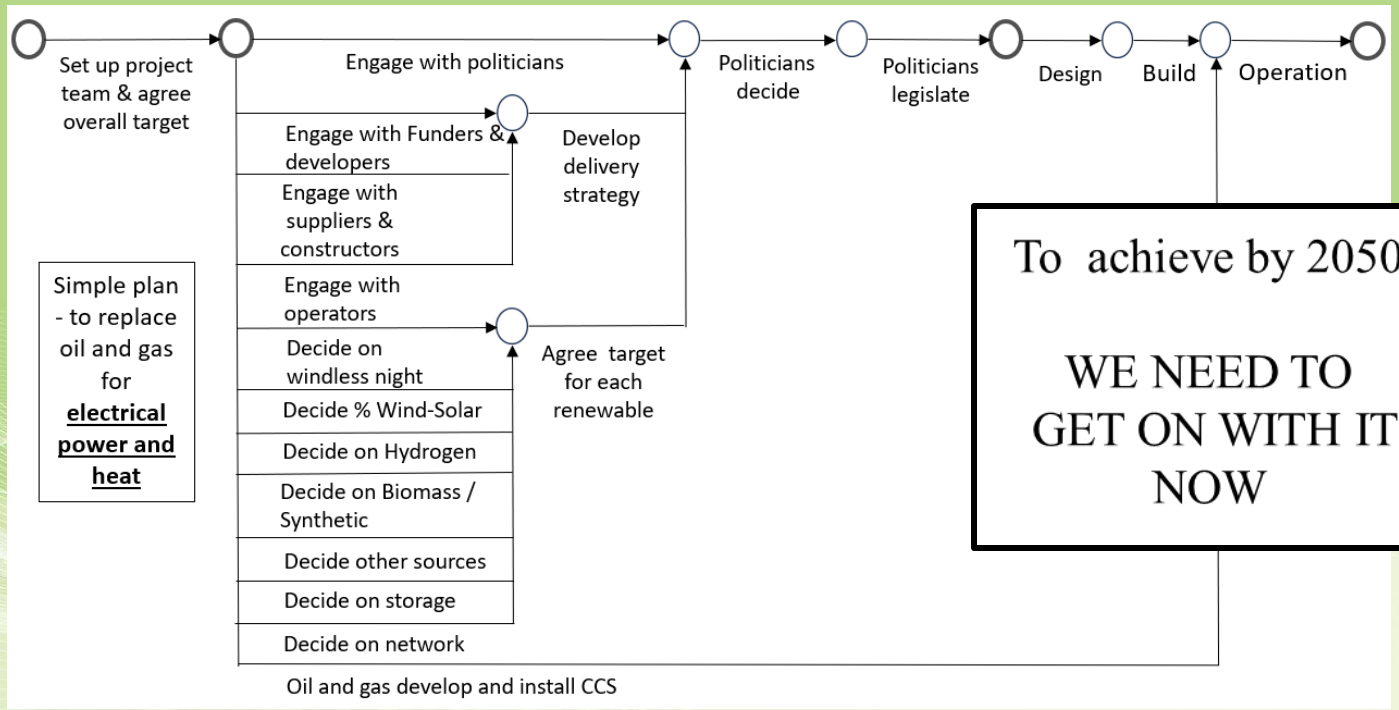


UK Energy (Power and Heat)

Where are we now?

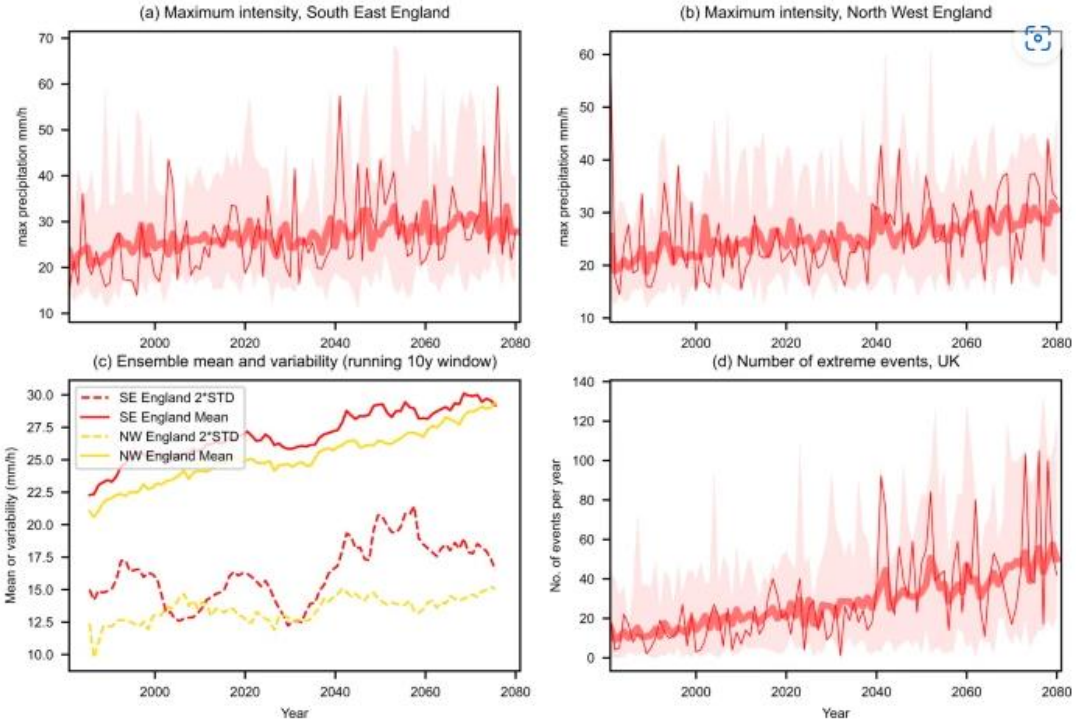
Is there a joined-up plan

Where are we going?



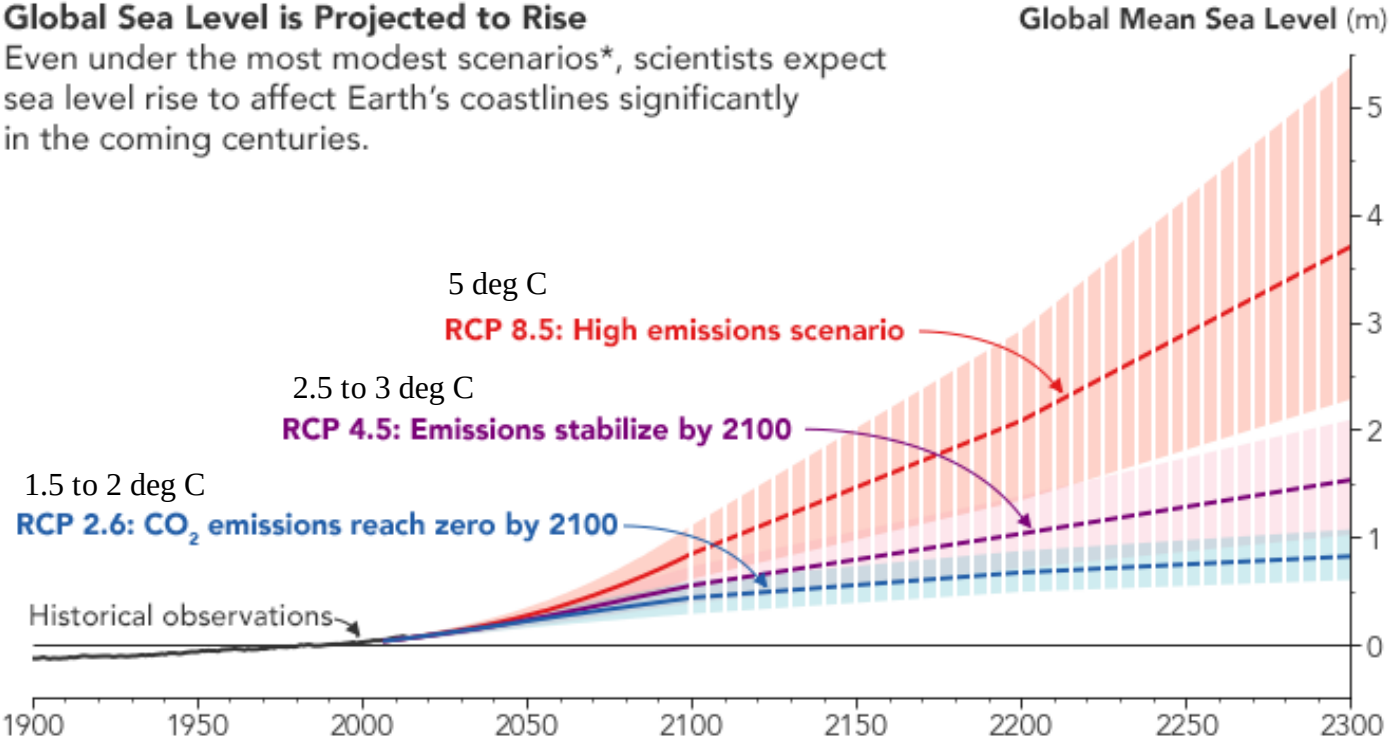
LIVERY CLIMATE ACTION GROUP

Fig. 3: Evolution of hourly precipitation in the convection-permitting model.



Global Sea Level is Projected to Rise

Even under the most modest scenarios*, scientists expect sea level rise to affect Earth's coastlines significantly in the coming centuries.



*Scientists use **Representative Concentration Pathways (RCPs)** to calculate future projections based on near-term emissions strategies and their expected outcomes in the future.
The RCP values refer to the amount of radiative forcing (in W/m²) in the year 2100.

LIVERY CLIMATE ACTION GROUP

LIVERY CLIMATE ACTION GROUP

Agricultural run off

Sewage

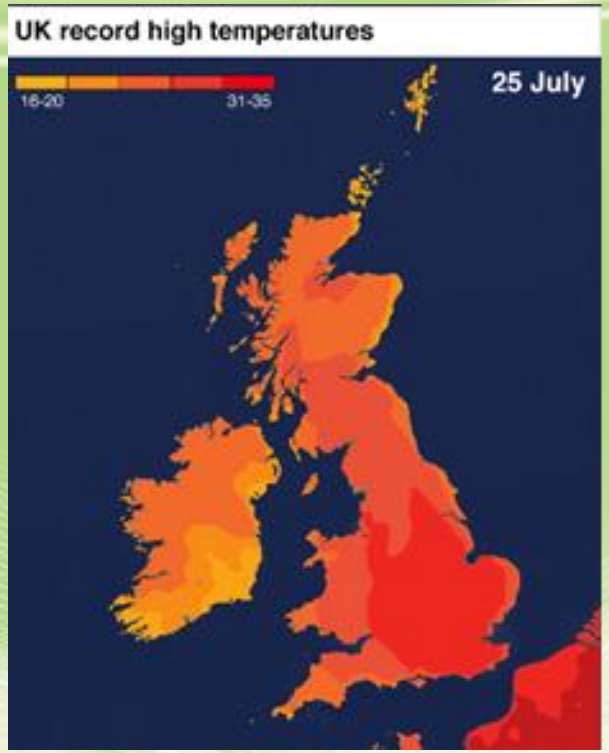
Highway & Road run off

Synthetic chemicals and substances
Radioactive materials
Human interventions in evolution (GMO's etc)

NOVEL ENTITIES

PFAS, Microplastics, Medicines

LIVERY CLIMATE ACTION GROUP



ARUP

Decline by 90% by 2050

Terrestrial and freshwater

The abundance of 753 terrestrial and freshwater species has on average fallen by 19% across the UK since 1970.

Within this average figure, 290 species have declined in abundance (38%) and 205 species have increased (27%).

The UK distributions of 4,979 invertebrate species have on average decreased by 13% since 1970.

Stronger declines were seen in some insect groups which provide key ecosystem functions such as pollination (average 18% decrease in species' distributions) and pest control (34% decrease). By contrast, insect groups providing freshwater nutrient cycling initially declined before recovering to above the 1970 value (average 64% increase in species' distributions).

Since 1970, the distributions of 54% of flowering plant species and 59% of bryophytes (mosses and liverworts) have decreased across Great Britain.

By comparison, only 15% and 26% of flowering plants and bryophytes, respectively, have increased. In Northern Ireland, since 1970, 42% of flowering plant species and 62% of bryophytes have decreased in distribution, compared to 43% and 34%, respectively, that have increased.

Turtle dove, Ben Andrew (rspb-images.com); Forester moth, Mike Read (rspb-images.com); Heath Spotted-Orchid, Andy Hay (rspb-images.com); Ladybird Spider, Ian Hughes (rspb-images.com); Kittiwake, Ben Andrew (rspb-images.com); Grey Seal, Ben Hall (rspb-images.com); Atlantic Yellow Nosed Albatross, Steffen Oppel (rspb-images.com)

10,008 species were assessed using Red List criteria.

2% (151 species) are extinct in Great Britain and a further 16% (almost 1,500 species) are now threatened with extinction here. In Northern Ireland, 281 (12%) of 2,508 species assessed are threatened with extinction from the island of Ireland.

Marine

The abundance of 13 species of seabird has fallen by an average of 24% since 1986.

The situation is worse in Scotland, where the abundance of 11 seabird species has fallen by an average of 49% since 1986. These results pre-date the potentially major impact of the ongoing outbreak of Highly Pathogenic Avian Influenza.

UK Visas and Immigration

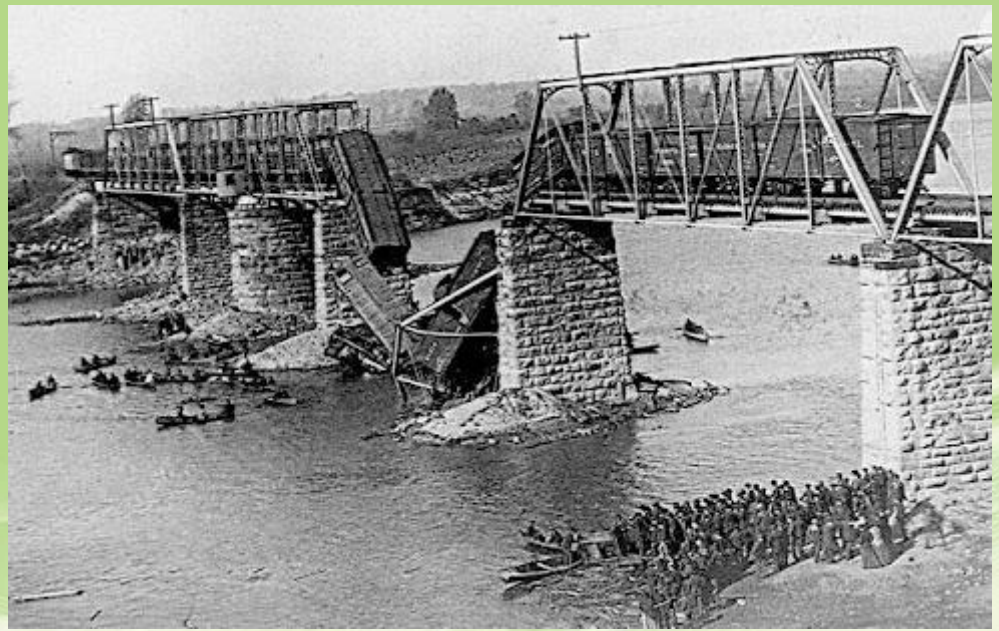
Guidance

Skilled Worker visa: eligible occupations and codes

Updated 4 April 2024

2121	Civil engineers – all jobs	England, Scotland, Wales, Northern Ireland	80% of going rate: £27,760 (£14.24 per hour)
2122	Mechanical engineers – all jobs	England, Scotland, Wales, Northern Ireland	80% of going rate: £26,400 (£13.54 per hour)
2123	Electrical engineers – all jobs	England, Scotland, Wales, Northern Ireland	80% of going rate: £31,440 (£16.12 per hour)
2124	Electronics engineers – all jobs	England, Scotland, Wales, Northern Ireland	80% of going rate: £27,120 (£13.91 per hour)
2126	Design and development engineers – all jobs	England, Scotland, Wales, Northern Ireland	80% of going rate: £27,280 (£13.99 per hour)
2127	Production and process engineers – all jobs	England, Scotland, Wales, Northern Ireland	80% of going rate: £25,600 (£13.13 per hour)
2129	Engineering professionals not elsewhere classified – all jobs	England, Scotland, Wales, Northern Ireland	80% of going rate: £26,720 (£13.70 per hour)

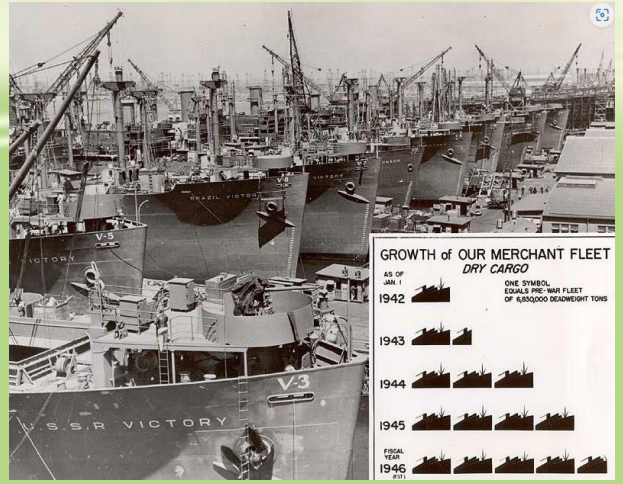
LIVERY CLIMATE ACTION GROUP



Is there Hope?

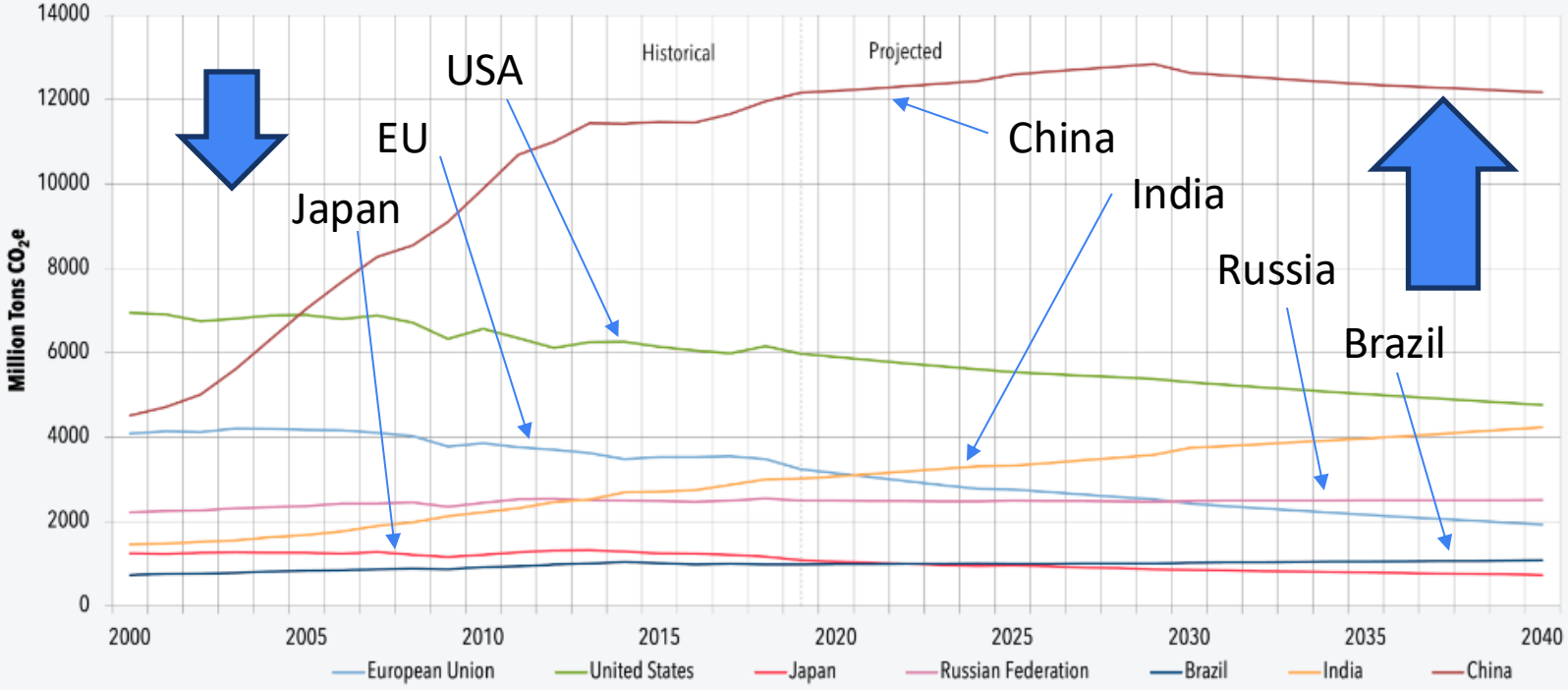
Three moments when humankind achieved incredible things

We need that mind set applied to treasuring our planet



Encouraged

Greenhouse Gas Emissions for Major Economies, 2000–2040

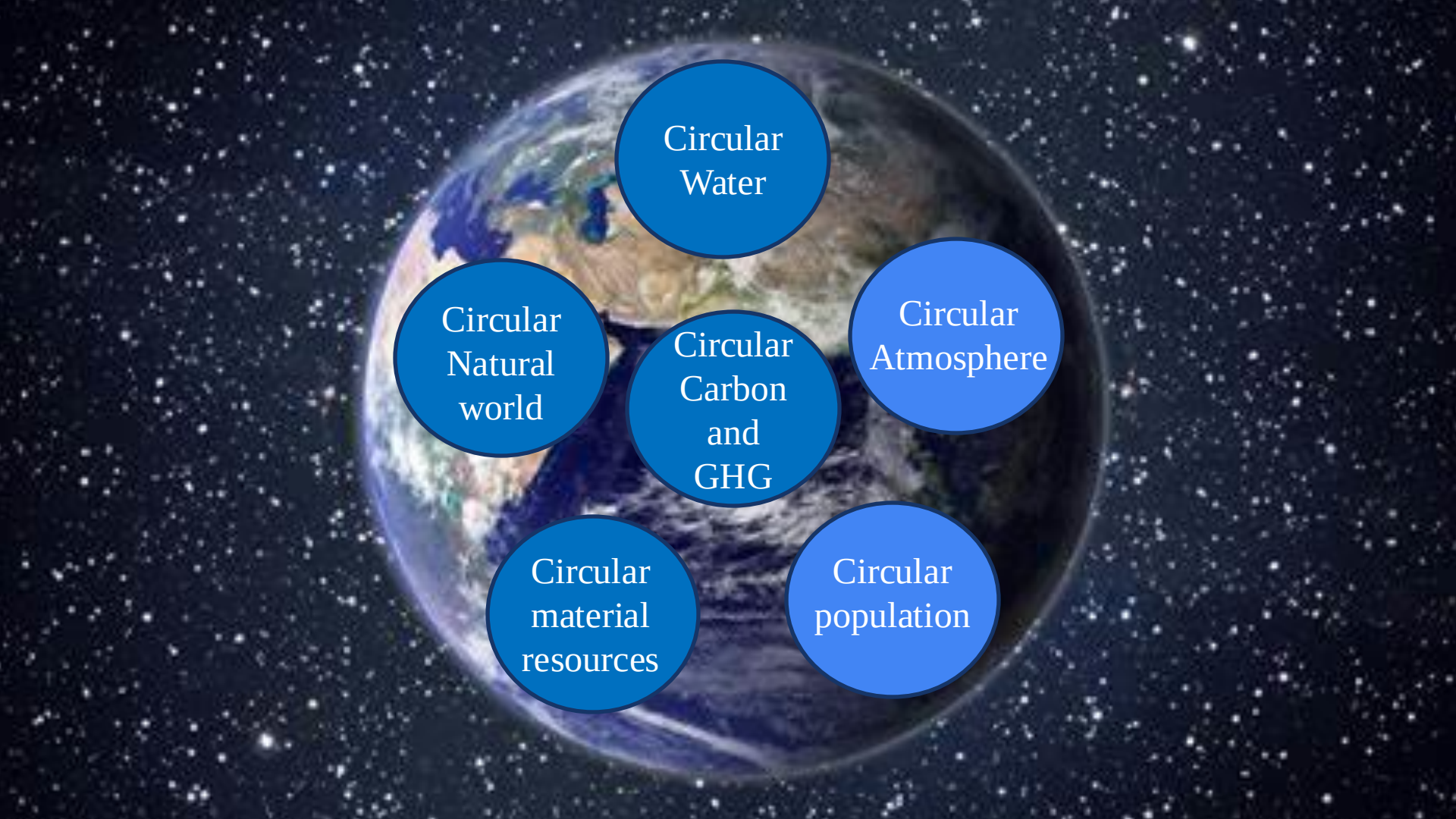


Encouraged by the efforts of the young

They realise what is happening to our world and are passionate about doing something

What must we do


Start treasuring our
planet’s whole
Ecology


Circular Water
Circular Natural world
Circular Carbon and GHG
Circular Atmosphere
Circular material resources
Circular population


Circular Ecology
and
Circular Economy

Providing we do and start treasuring our planet

NOW

There is hope

Thank you

barton.allan@outlook.com

Panel 1: Water

The Worshipful Company of Water Conservators

Prof Carolyn Roberts

Tim Munday

The Worshipful Company of Water Conservators

Dr David Lloyd Owen

LIVERY

Photo Credit: Ella Brown

Photo Credit: Janie Airey

Panel 2: Energy

The Worshipful Company of Fuellers

LIVERY CLIMATE ACTION GROUP

Prof Averil MacDonald

Jon Clark

Ashutosh Shastri

Panel 3: Bio-diversity

Dr Heather Barrett-Mold OBE

Ben Bishop

Dr Cristina Banks-Leite

15:35 Tea and cake, plus:
Learned societies: Displays
Additional schools displays: St Saviour's and St Olave's, Walsall Academy

16:05 Walsall academy will discuss their project as featured on the BBC

16:30 Panel 4: Skills (Alex Hughes, Simon Sadinsky, Faiza Khan)

17:05 Keynote speaker: Dr Thom Waite, UK Deputy Chief Medical Officer on health and climate change

17:25 Dr Emma Howard-Boyd - key points from the London Climate Resilience Review

Walsall Academy Eco-club

LIVERY CLIMATE ACTION GROUP

Panel 4: Skills

LIVERY CLIMATE ACTION GROUP

GREEN JOBS FOUNDATION

City & Guilds

THE KING'S FOUNDATION

Alex Hughes

Simon Sadinsky

Faiza Khan MBE

Prof Thomas Waite OBE
Deputy Chief Medical Officer for England

Climate change and Health

Why is climate change a health issue ?

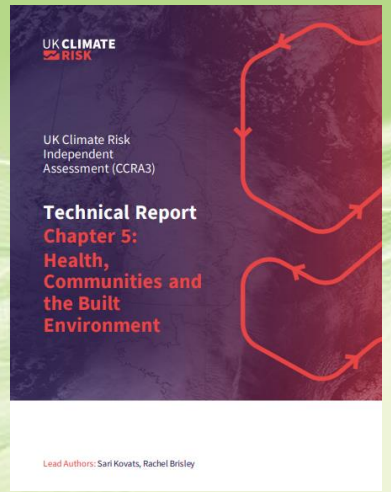
LIVERY CLIMATE ACTION GROUP

LIVERY CLIMATE ACTION GROUP

For more detail…

UKHSA: Health Effects of Climate Change in the UK (2023)

UK Climate Risk Independent Assessment (CCRA3) chapter 5 (2021)



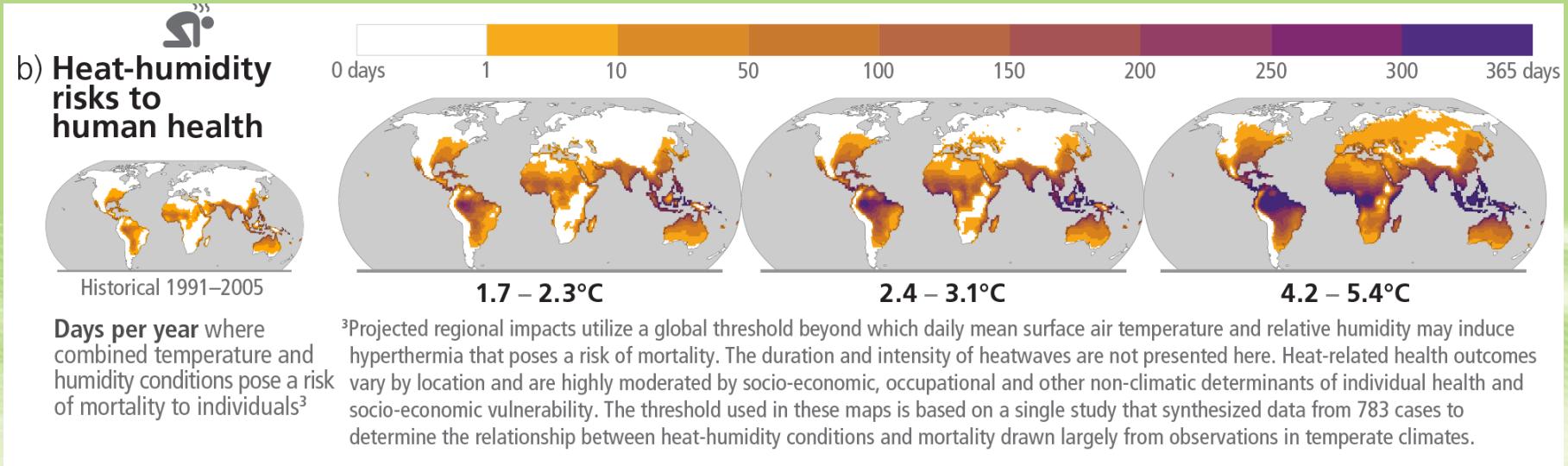
Major health impacts of climate change

- Direct impact via heat / temperature stress
- Water and infectious diseases
- Vector borne diseases
- Natural disasters, especially floods, droughts, storms
- Water and temperature on agriculture- potential impacts on malnutrition and poverty

Major health impacts of climate change

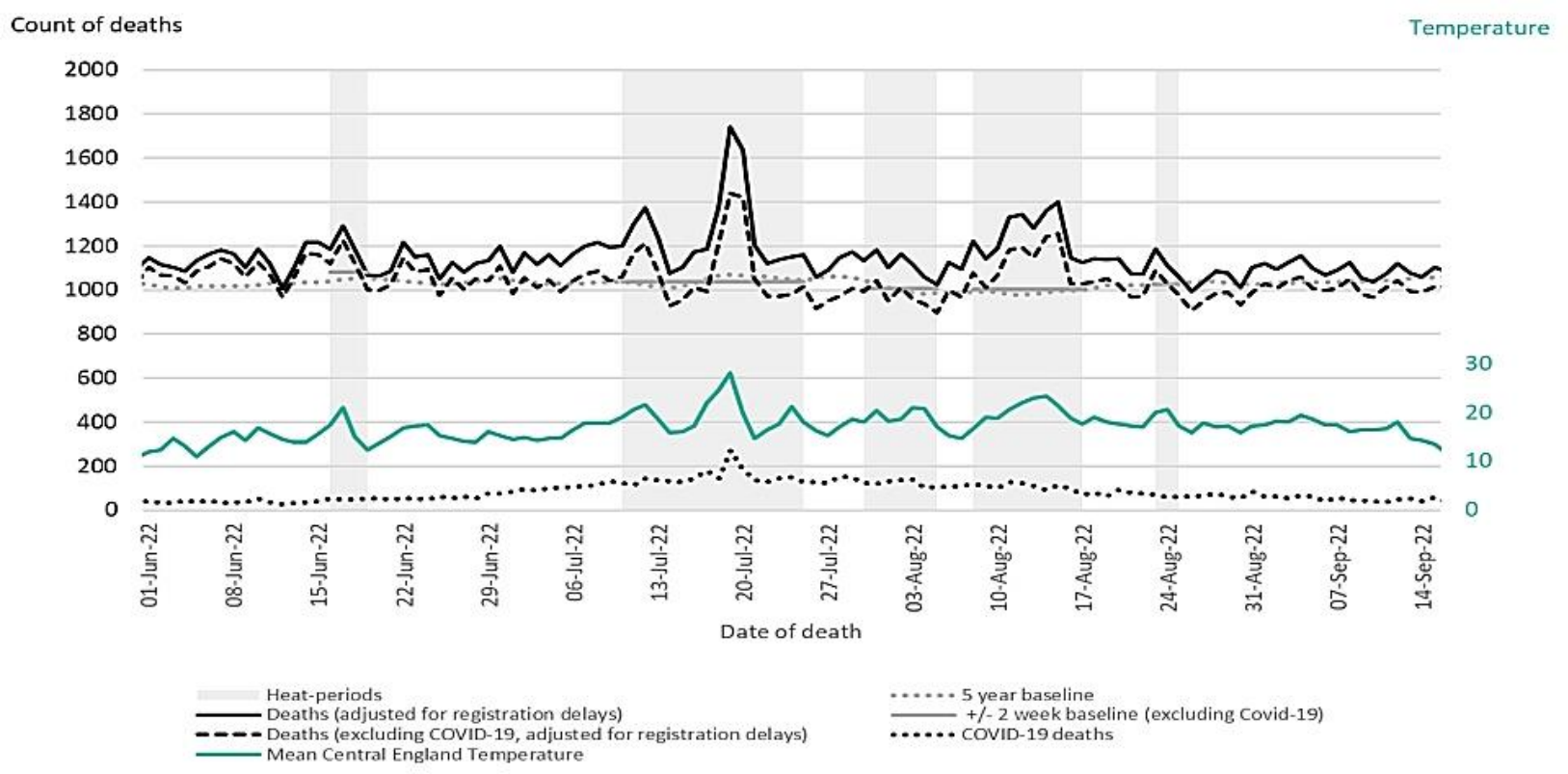
- **Direct impact via heat / temperature stress**
- Water and infectious diseases
- Vector borne diseases
- Natural disasters, especially floods, droughts, storms
- Water and temperature on agriculture- potential impacts on malnutrition and poverty

In all climate scenarios heat/humidity risks are unequally distributed



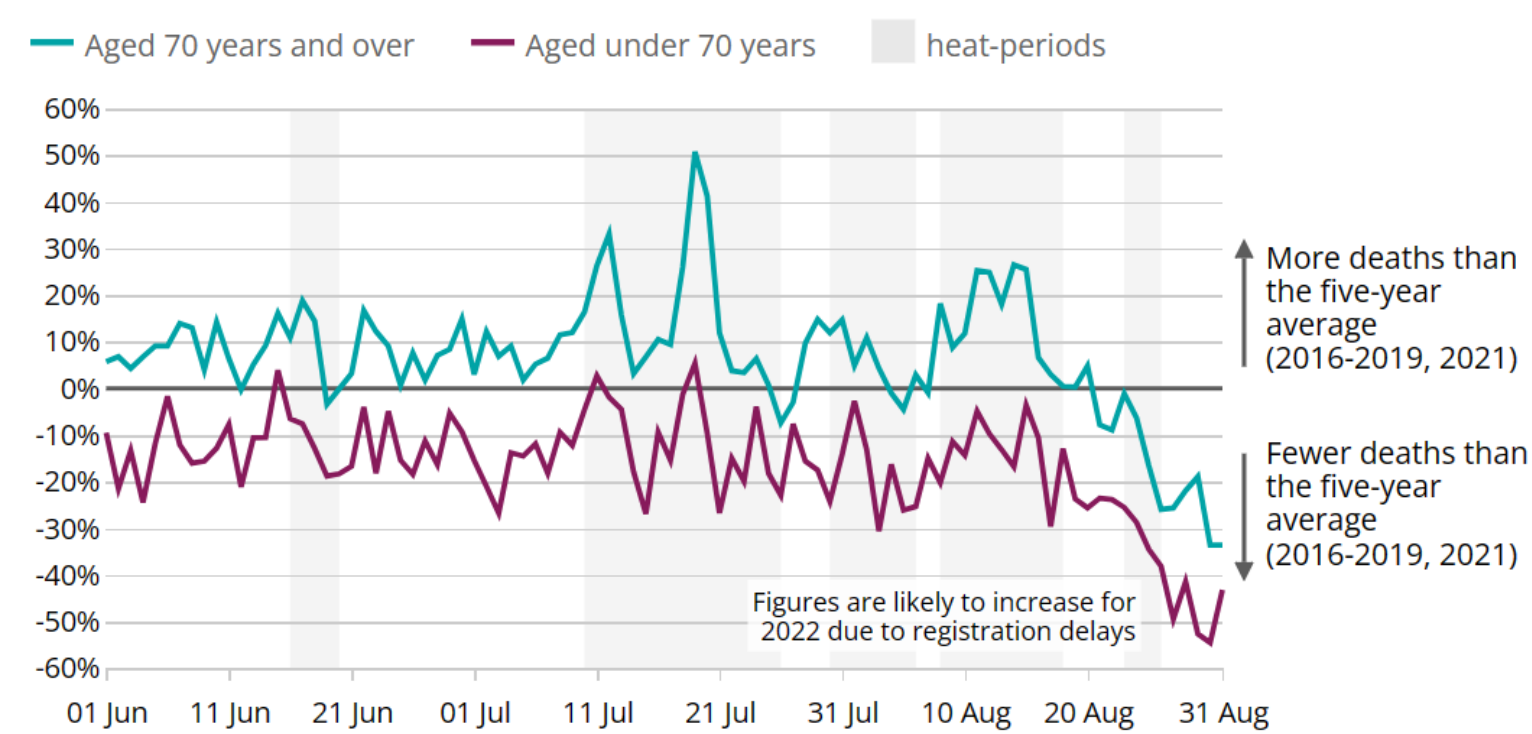
Source: IPCC AR6 (2023)

Direct effects of heat on daily mortality



Source: UKHSA and ONS, 2022

Direct effects of heat on daily mortality

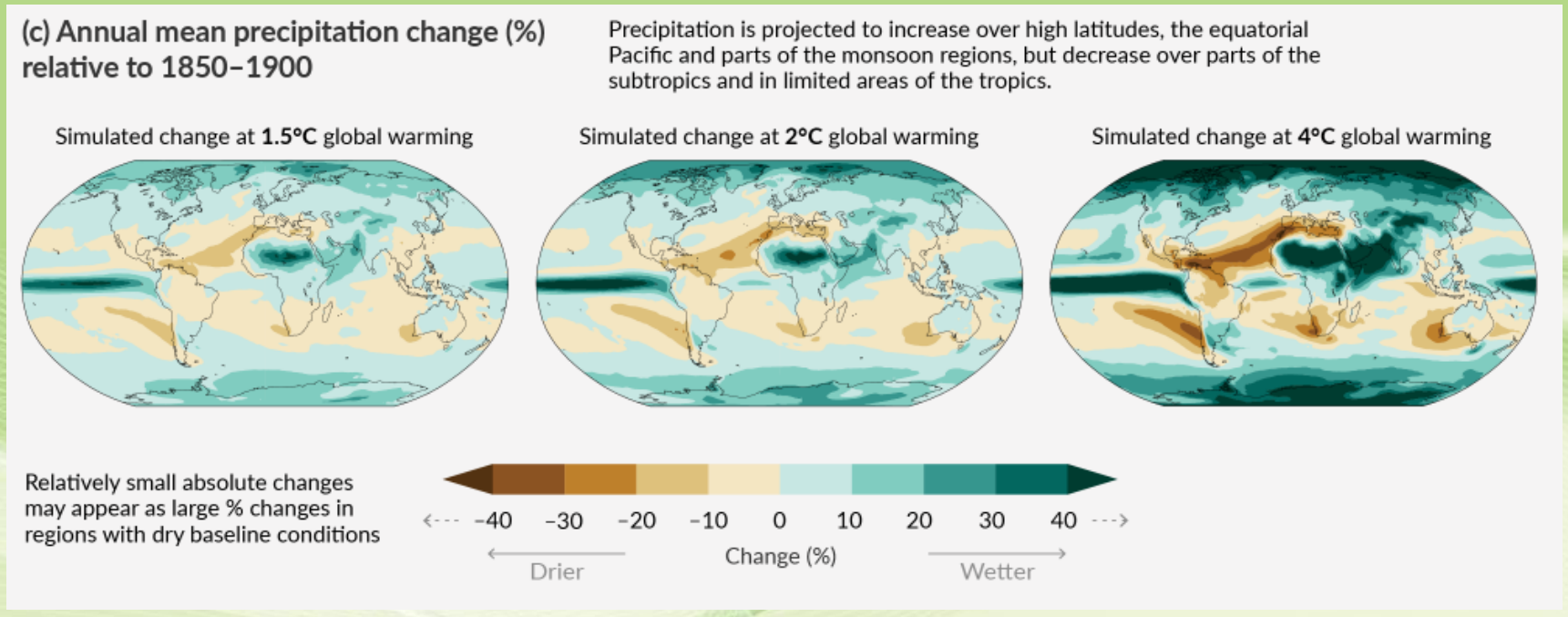


Source: UKHSA and ONS, 2022

Major health impacts of climate change

- Direct impact via heat / temperature stress
- **Water and infectious diseases**
- Vector borne diseases
- Natural disasters, especially floods, droughts, storms
- Water and temperature on agriculture- potential impacts on malnutrition and poverty

Climate change leads to more intense rainfall and flooding; drought elsewhere



Source: IPCC AR6 (2023)

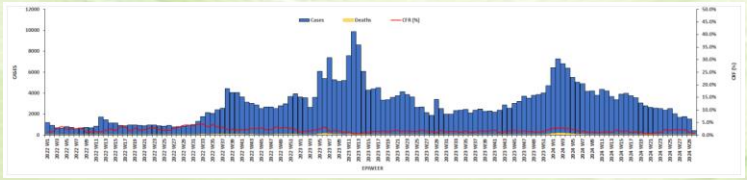
Water environment drives multiple infections

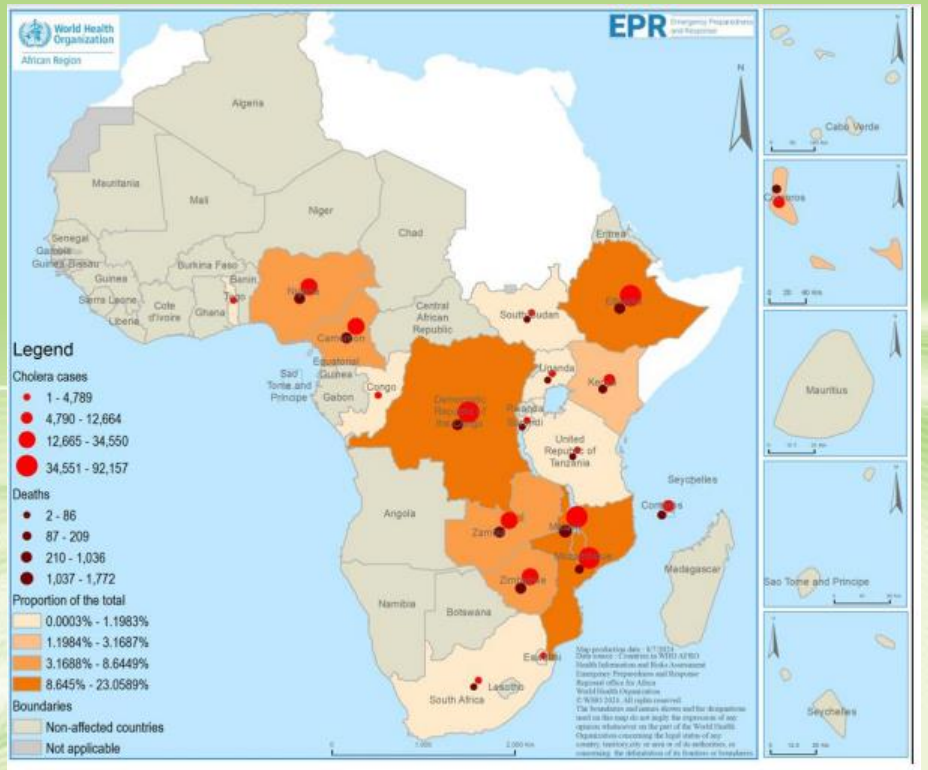
Category	Description	Examples
Water-borne	Ingestion of pathogens in contaminated water	Cholera, typhoid, polio
Water-washed (a) Skin and eyes (b) Diarrhoeal disease	Lack of hygiene/sanitation and/or lack of access to clean water	Scabies, trachoma
Water-based (a) Skin penetration (b) Ingested	Infection by organisms that spend part of their life cycle in water	Schistosomiasis
Water related vector borne disease (a) Biting near water (b) Breeding in water	Spread by insects that bite or breed near water	Malaria, dengue fever, West Nile Virus

LIVERY CLIMATE ACTION GROUP

Cholera cases and deaths in the WHO African region, 2022-2024 (source: WHO)

- Cholera is preventable but deadly, causing severe dehydration, diarrhoea and vomiting
- Malawi: storms and cyclones were followed by 59,000 cases of cholera and 1750 deaths





Engineers, food handlers, farmers and cooks are key to preventing water derived infection

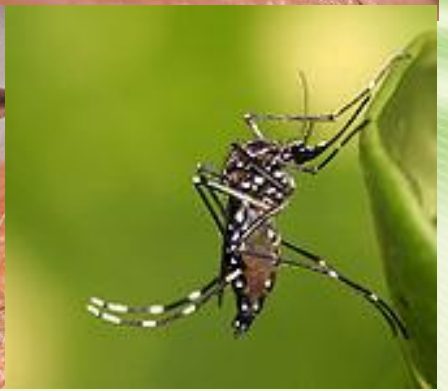
- Clean water and sewer technology
- Cooking and freezing techniques
- Hygienic animal husbandry
- Identifying and isolating diseased animals
- All of these cost money

Major health impacts of climate change

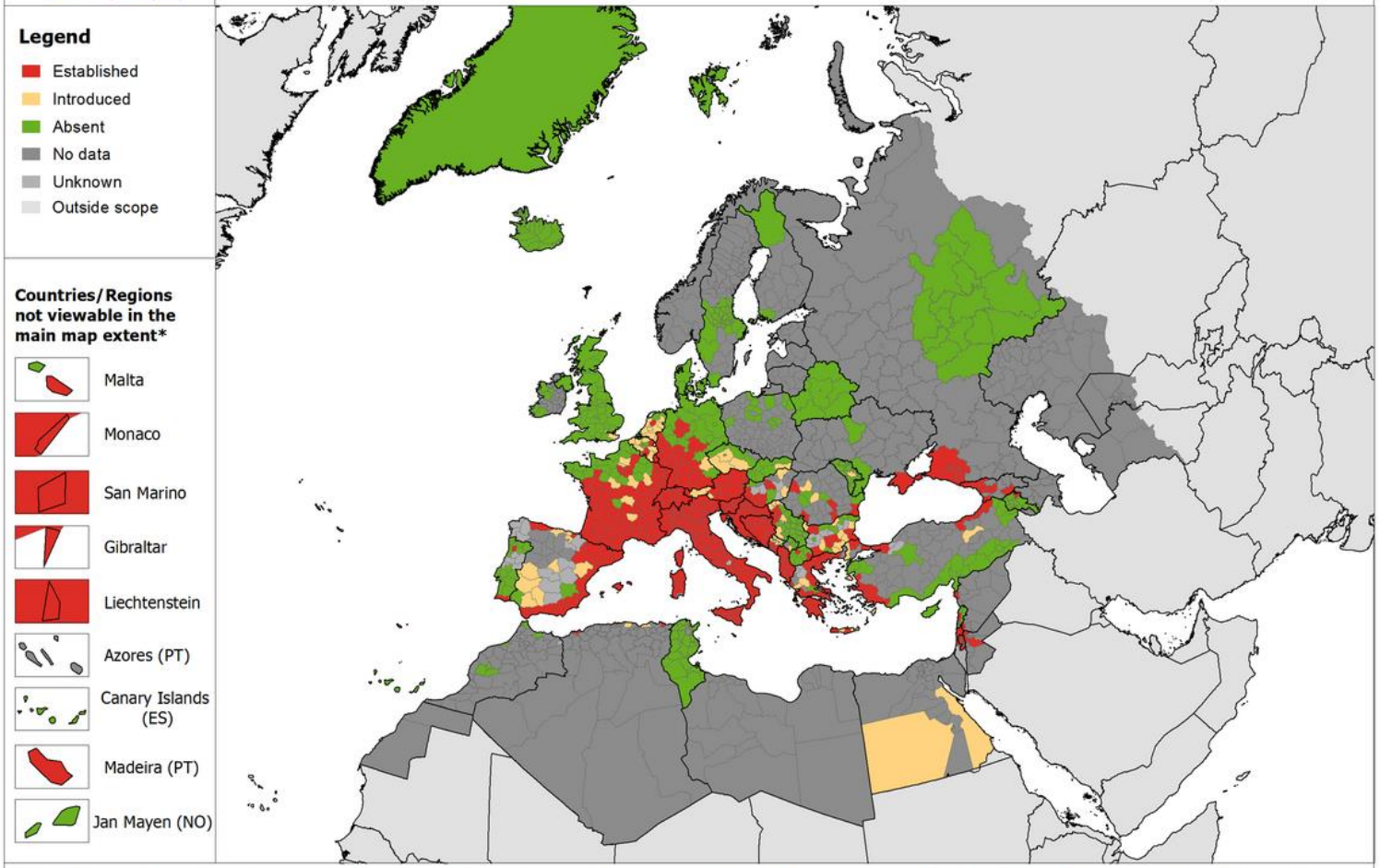
- Direct impact via heat / temperature stress
- Water and infectious diseases
- **Vector borne diseases**
- Natural disasters, especially floods, droughts, storms
- Water and temperature on agriculture- potential impacts on malnutrition and poverty

Vector borne diseases are influenced by water and temperature

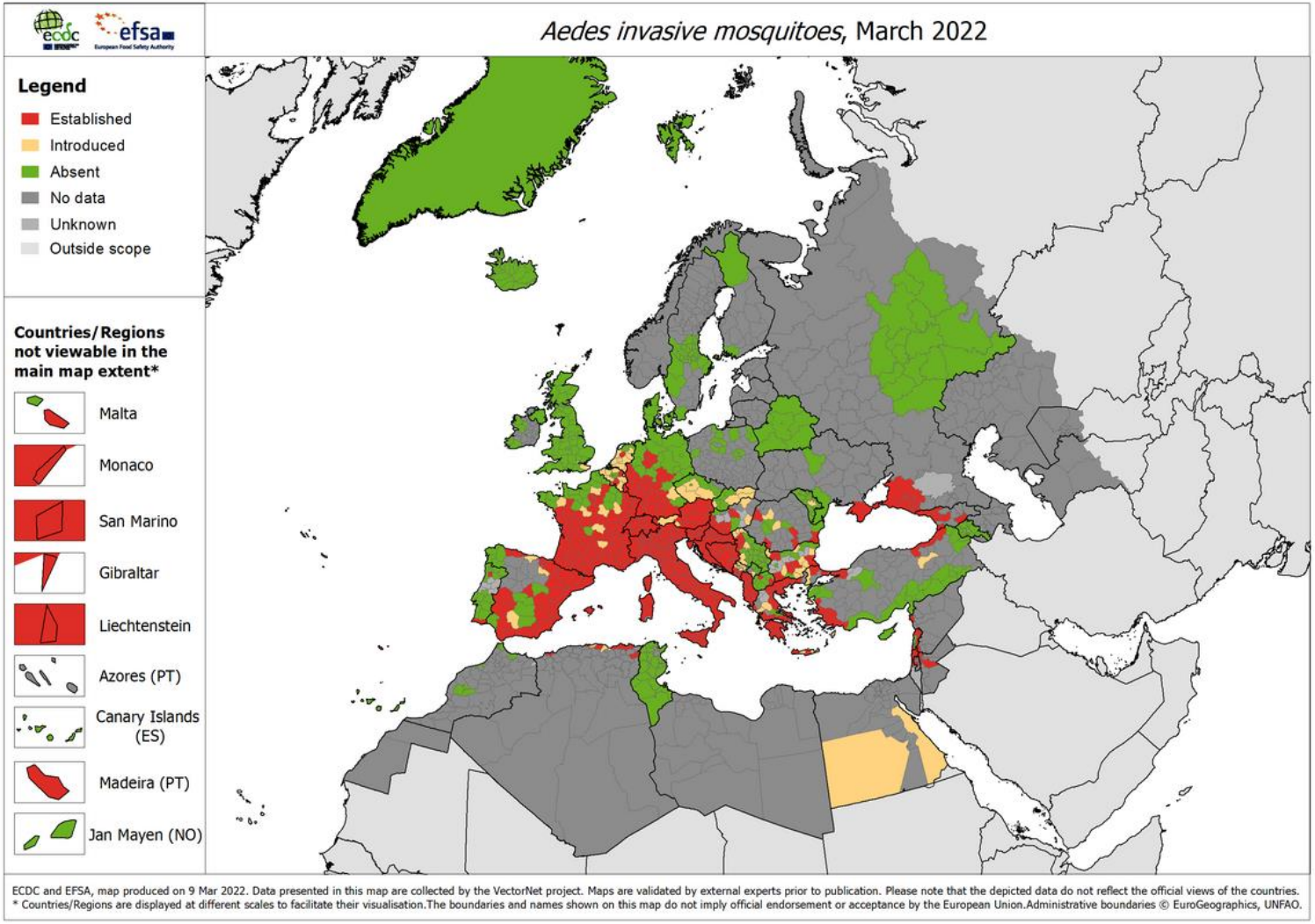
Disease	Vector
Plague	Flea
Malaria	Anopheles mosquito
Dengue, Zika, Yellow Fever	Aedes mosquito
Sleeping Sickness	Tsetse fly
Lyme disease, Tickborne Encephalitis, Typhus	Ticks



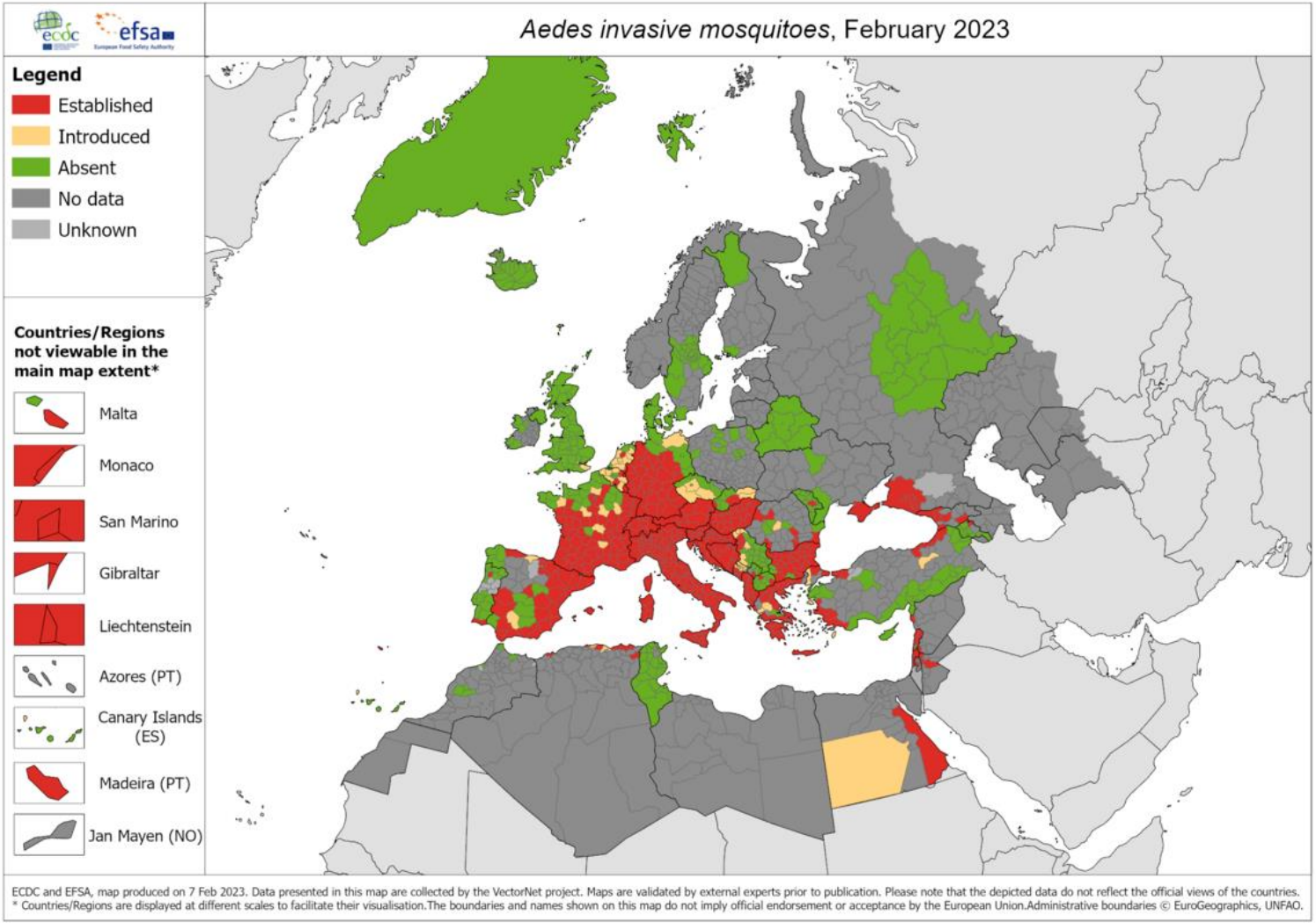
Aedes invasive mosquitoes, September 2021

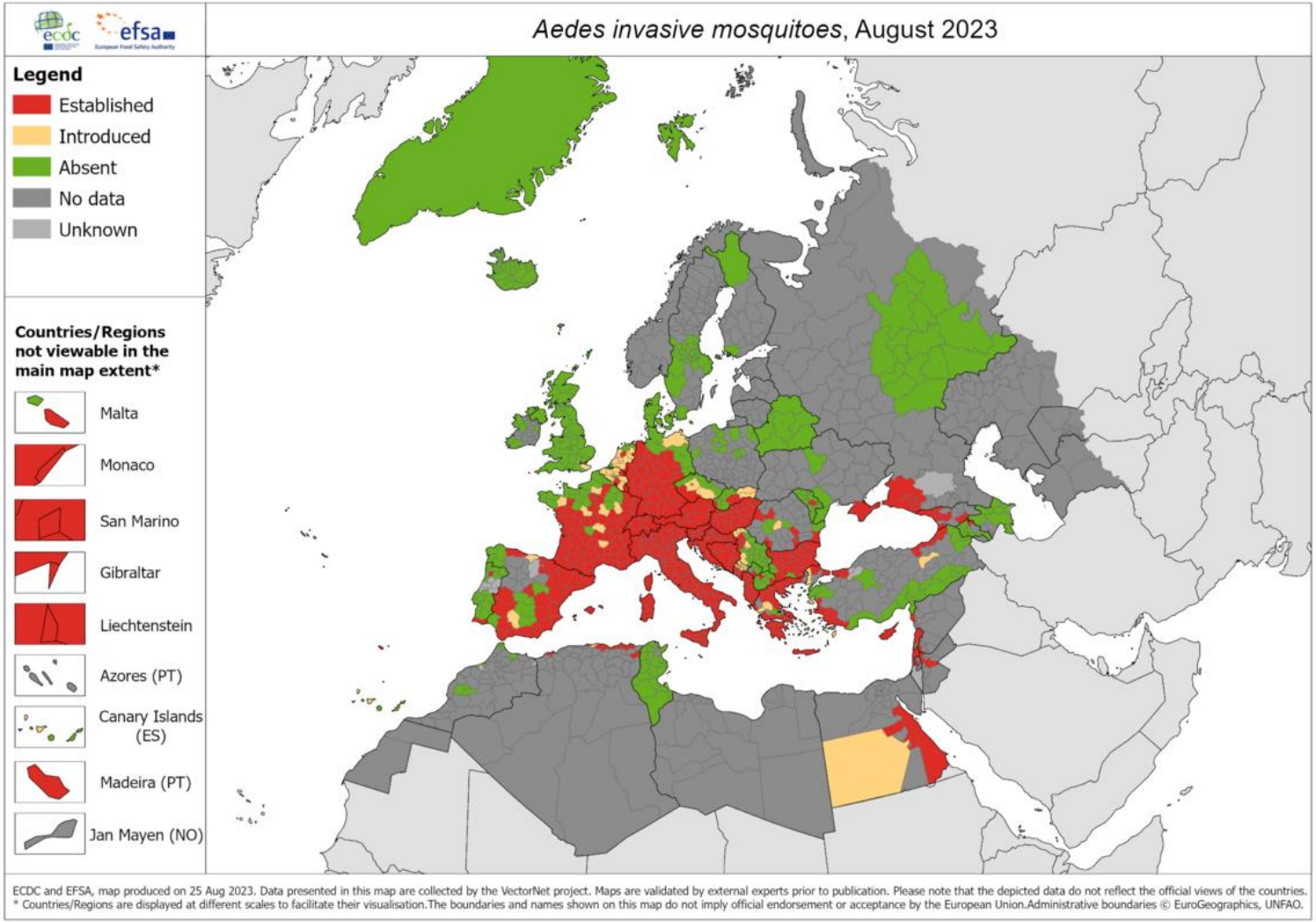


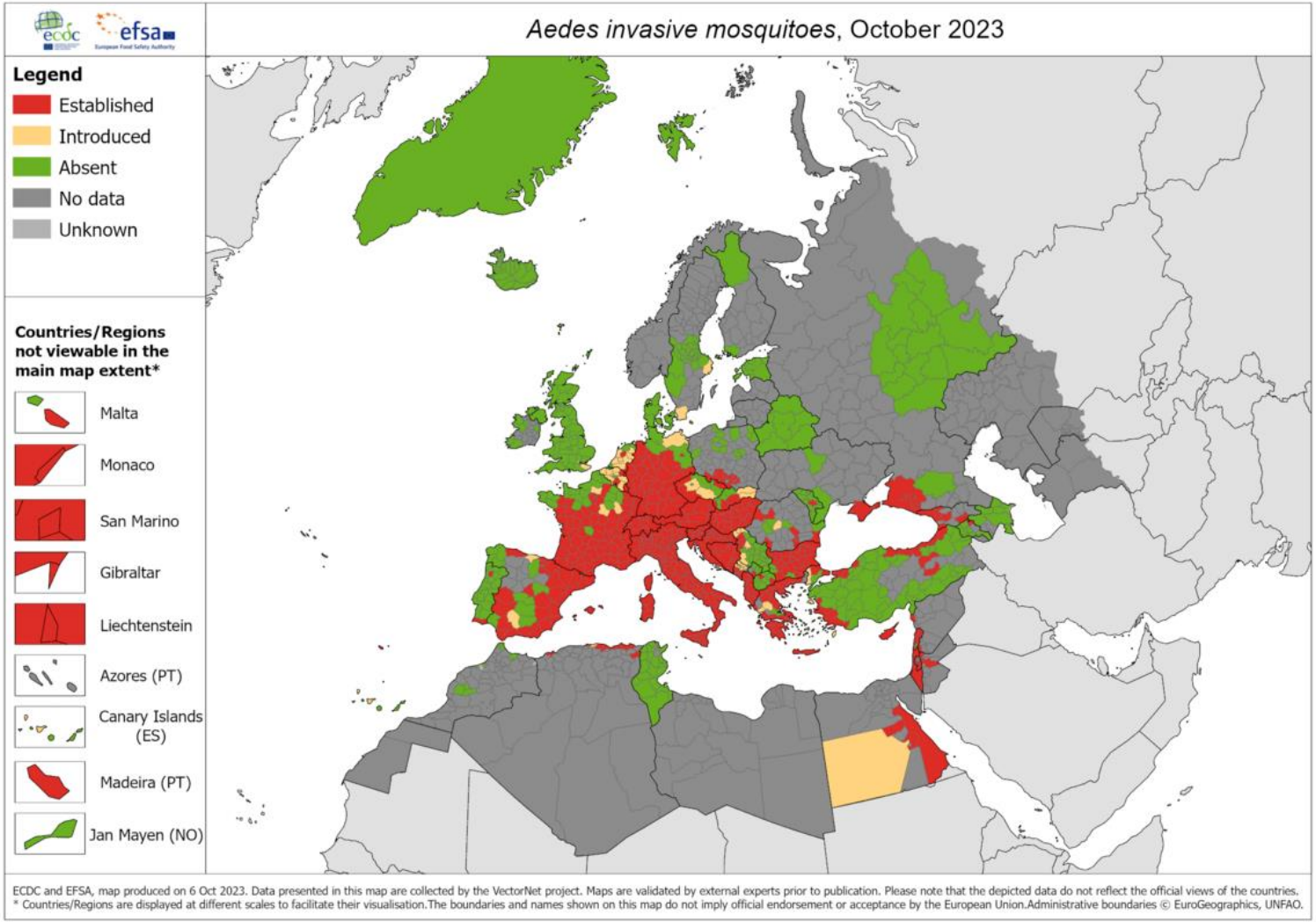
ECDC and EFSA, map produced on 27 Sep 2021. Data presented in this map are collected by the VectorNet project. Maps are validated by external experts prior to publication. Please note that the depicted data do not reflect the official views of the countries.
* Countries/Regions are displayed at different scales to facilitate their visualisation.The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union.Administrative boundaries © EuroGeographics, UNFAO.

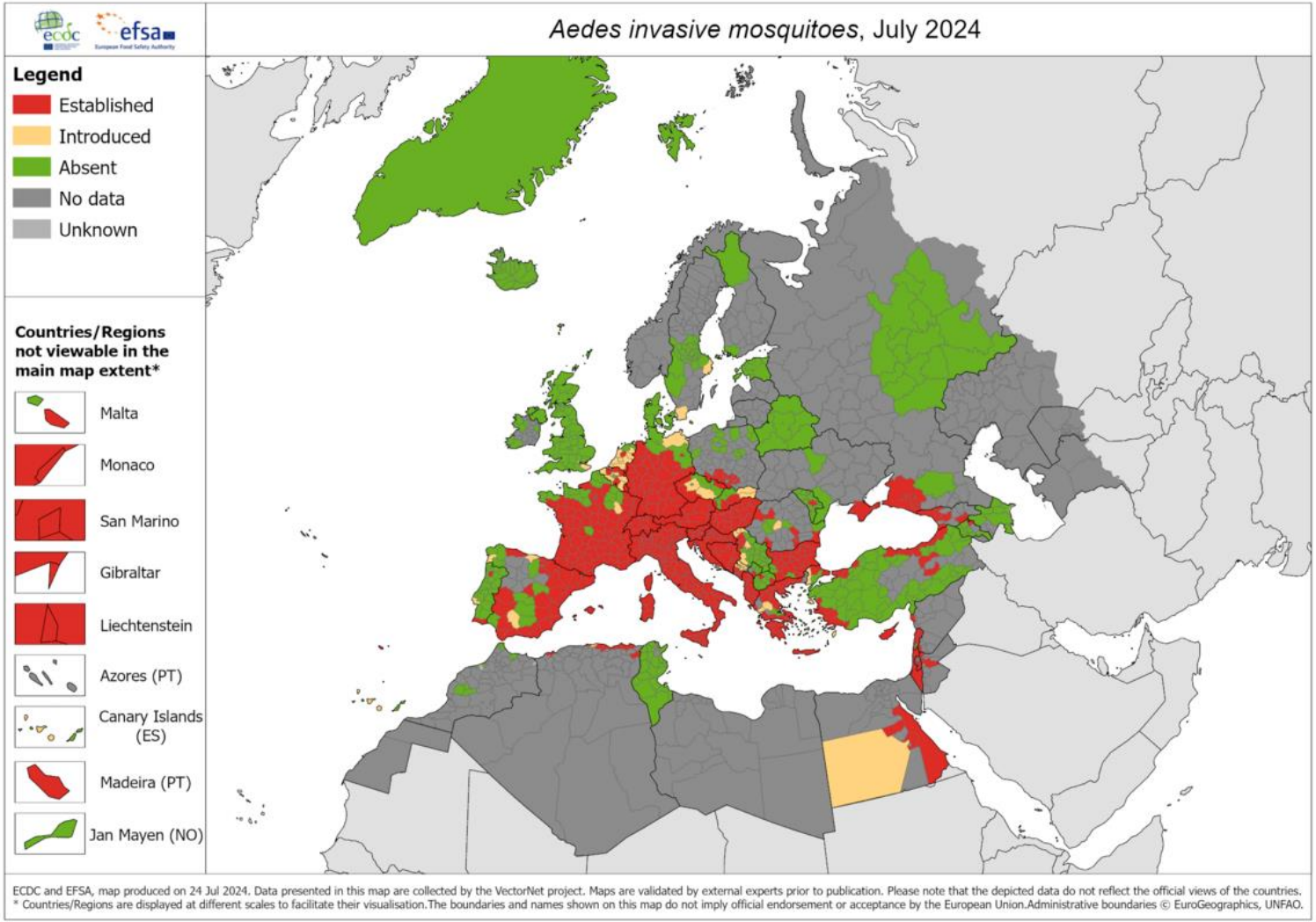


ECDC and EFSA, map produced on 9 Mar 2022. Data presented in this map are collected by the VectorNet project. Maps are validated by external experts prior to publication. Please note that the depicted data do not reflect the official views of the countries.
* Countries/Regions are displayed at different scales to facilitate their visualisation.The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union.Administrative boundaries © EuroGeographics, UNFAO.


ecdc
efsa
European Food Safety Authority
Aedes invasive mosquitoes, February 2023
Legend
Established
Introduced
Absent
No data
Unknown
Countries/Regions not viewable in the main map extent*
Malta
Monaco
San Marino
Gibraltar
Liechtenstein
Azores (PT)
Canary Islands (ES)
Madeira (PT)
Jan Mayen (NO)
ECDC and EFSA, map produced on 7 Feb 2023. Data presented in this map are collected by the VectorNet project. Maps are validated by external experts prior to publication. Please note that the depicted data do not reflect the official views of the countries.
* Countries/Regions are displayed at different scales to facilitate their visualisation.The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union.Administrative boundaries © EuroGeographics, UNFAO.

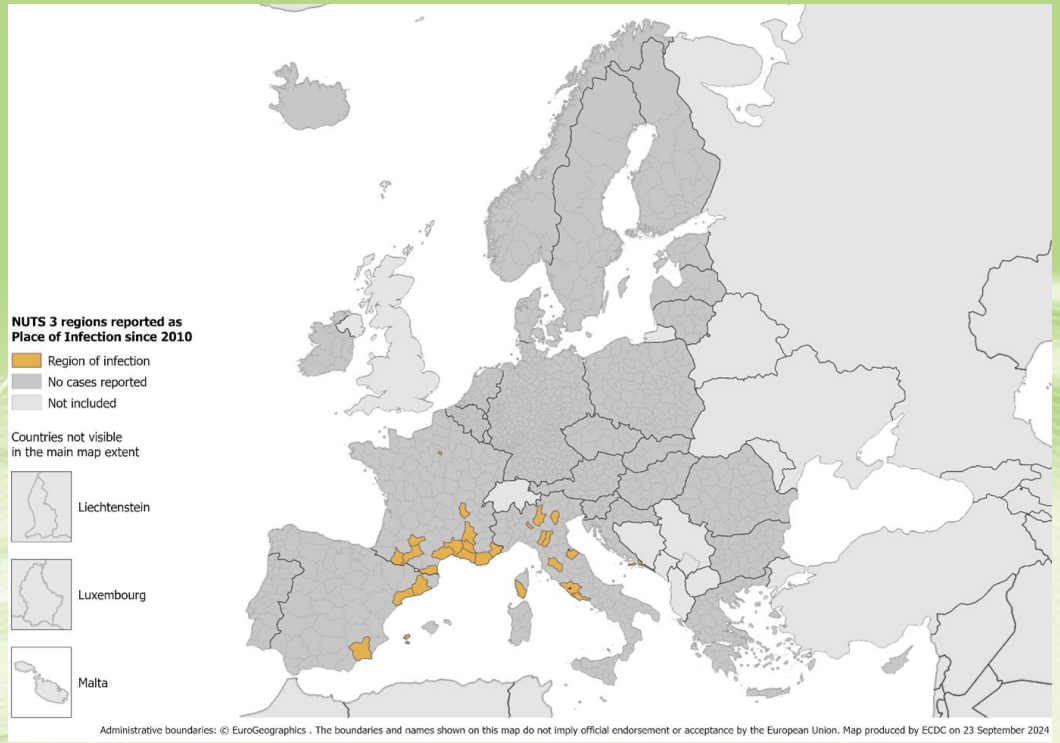

ecdc
efsa
European Food Safety Authority
Aedes invasive mosquitoes, August 2023
Legend
Established
Introduced
Absent
No data
Unknown
Countries/Regions not viewable in the main map extent*
Malta
Monaco
San Marino
Gibraltar
Liechtenstein
Azores (PT)
Canary Islands (ES)
Madeira (PT)
Jan Mayen (NO)
ECDC and EFSA, map produced on 25 Aug 2023. Data presented in this map are collected by the VectorNet project. Maps are validated by external experts prior to publication. Please note that the depicted data do not reflect the official views of the countries.
* Countries/Regions are displayed at different scales to facilitate their visualisation.The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union.Administrative boundaries © EuroGeographics, UNFAO.


ecdc
efsa
European Food Safety Authority
Aedes invasive mosquitoes, October 2023
Legend
Established
Introduced
Absent
No data
Unknown
Countries/Regions not viewable in the main map extent*
Malta
Monaco
San Marino
Gibraltar
Liechtenstein
Azores (PT)
Canary Islands (ES)
Madeira (PT)
Jan Mayen (NO)
ECDC and EFSA, map produced on 6 Oct 2023. Data presented in this map are collected by the VectorNet project. Maps are validated by external experts prior to publication. Please note that the depicted data do not reflect the official views of the countries.
* Countries/Regions are displayed at different scales to facilitate their visualisation.The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union.Administrative boundaries © EuroGeographics, UNFAO.


ecdc
efsa
European Food Safety Authority
Aedes invasive mosquitoes, July 2024
Legend
Established
Introduced
Absent
No data
Unknown
Countries/Regions not viewable in the main map extent*
Malta
Monaco
San Marino
Gibraltar
Liechtenstein
Azores (PT)
Canary Islands (ES)
Madeira (PT)
Jan Mayen (NO)
ECDC and EFSA, map produced on 24 Jul 2024. Data presented in this map are collected by the VectorNet project. Maps are validated by external experts prior to publication. Please note that the depicted data do not reflect the official views of the countries.
* Countries/Regions are displayed at different scales to facilitate their visualisation.The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union.Administrative boundaries © EuroGeographics, UNFAO.

Locally acquired dengue fever, Europe 2010 to present day

- 2024
  - France 57 cases
  - Italy 41 cases
  - Spain 8 cases
- 2023
  - France 45 cases
  - Italy 82 cases
  - Spain 3 cases
- 2022
  - France 65 cases
  - Spain 6 cases (Ibiza)



Climate change and health

- Many interventions which tackle climate change are good for health

  - Air pollution (indoor and outdoor)
  - Insulating/ventilating homes
  - Increasing physical activity
  - Changes to agriculture and diet

Major health impacts of climate change

- Direct impact via heat / temperature stress
- Water and infectious diseases
- Vector borne diseases
- Natural disasters, especially floods, droughts, storms
- Water and temperature on agriculture- potential impacts on malnutrition and poverty

Dr Emma Howard-Boyd

The London Climate Resilience Review

Close

Thanks to all speakers, schools, delegates and many others for making today a success.

Please make your way upstairs for drinks, speeches and networking.

But before you go!
Please complete a feedback form by scanning this code