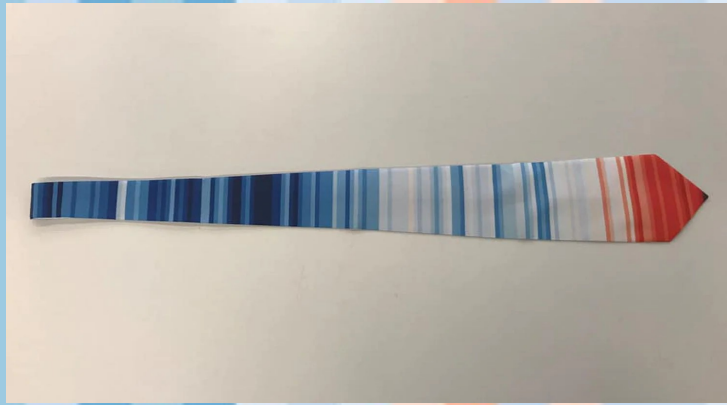
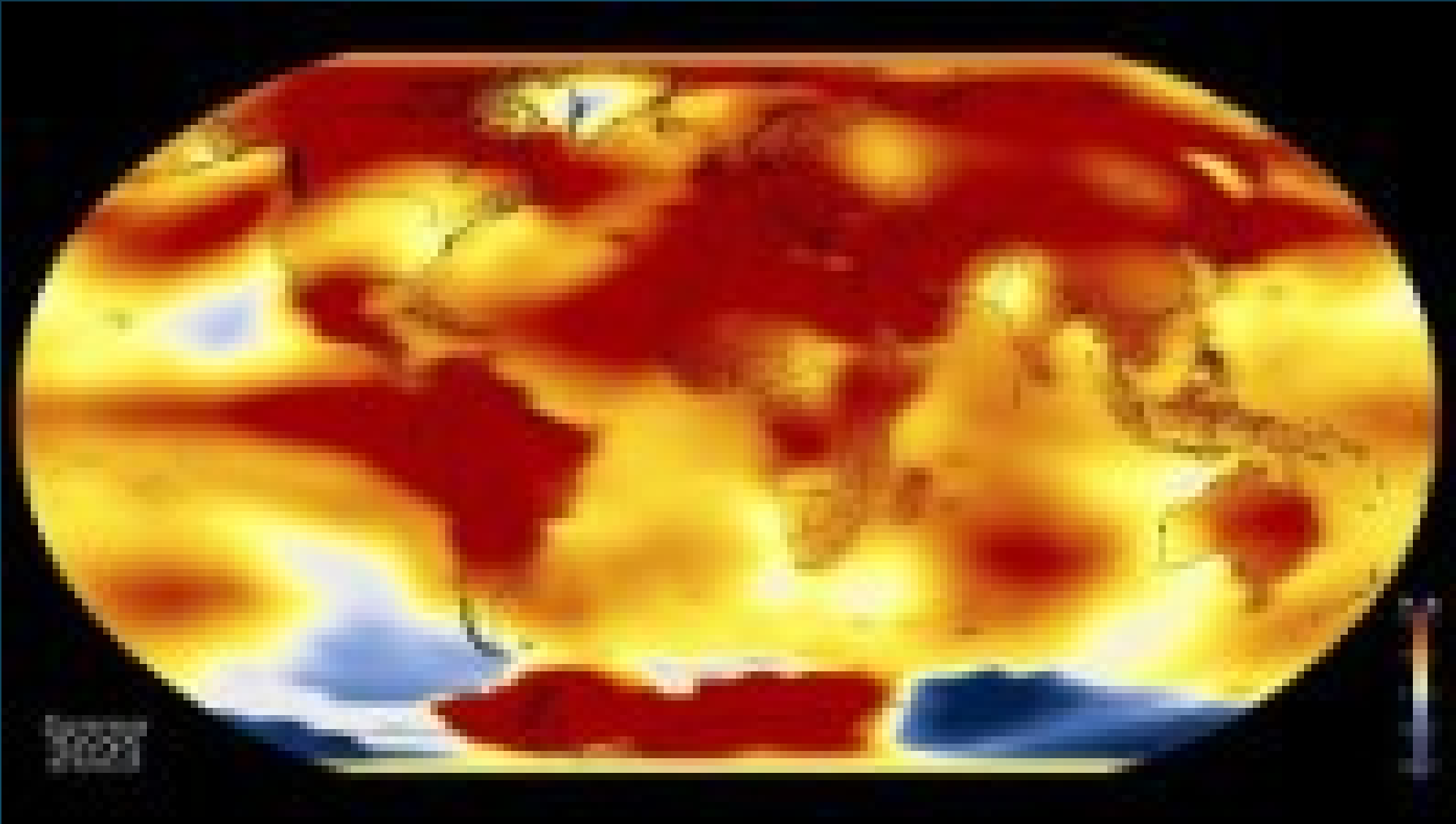


Klimaatbeleid in een complexe wereld

de moeilijke weg naar klimaatneutraliteit





Nooit geziene uitdagingen: 'triple planetary crisis', planetaire grenzen

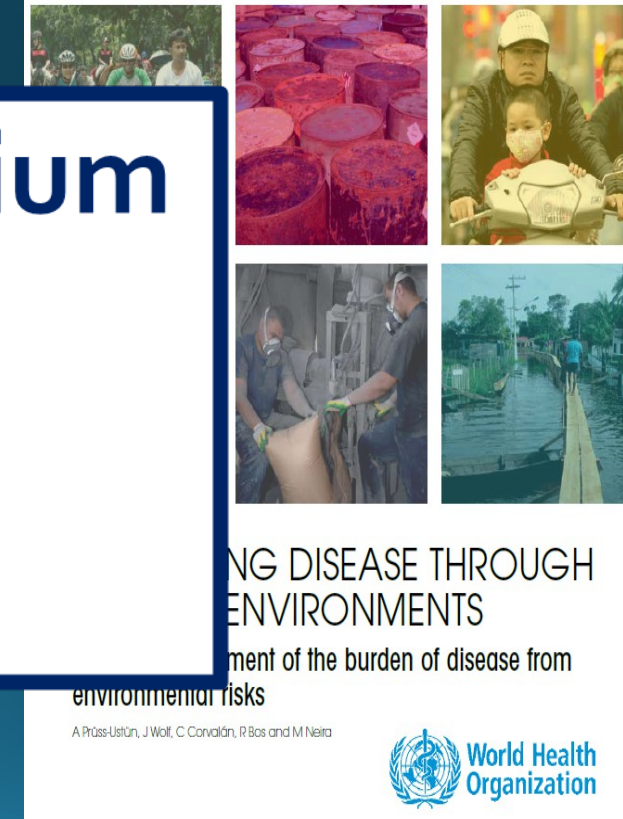
Nooit geziene antwoorden?

1. IPCC: klimaat-
verandering

2. IPBES:
biodiversiteitsverlies

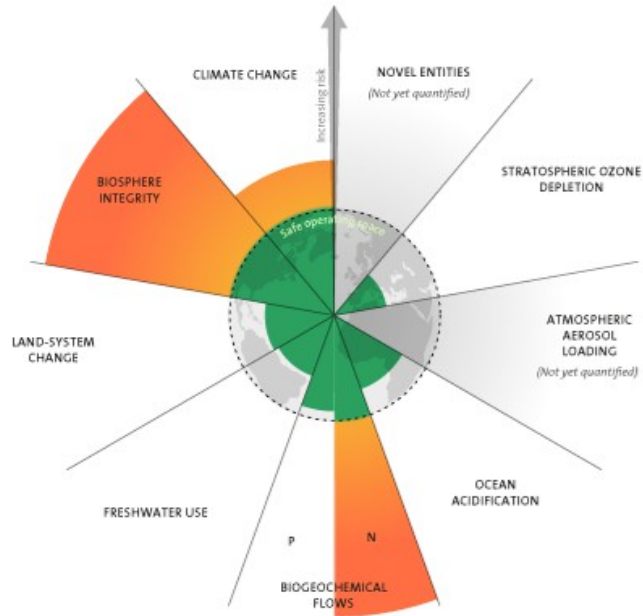
3. IRP:
gronstoffengebruik

4. WHO: milieu,
gezondheid en welzijn



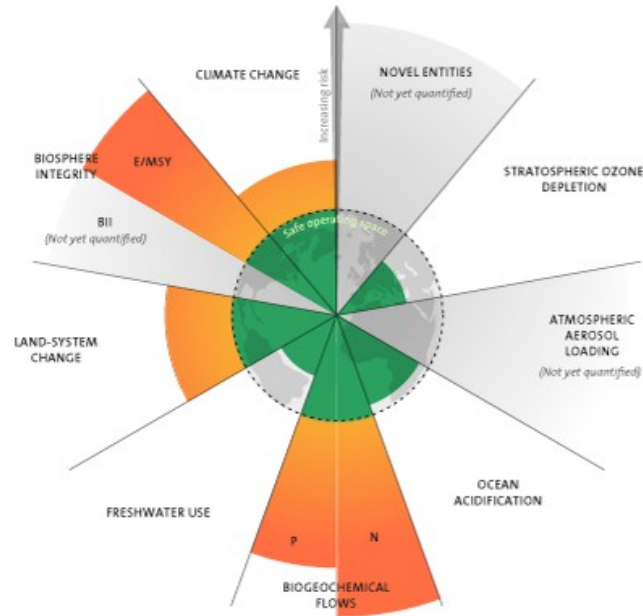
- Urgentie, scharnierdecennium
- Onomkeerbare gevolgen
- Tipping points
- Aan elkaar gekoppeld

2009



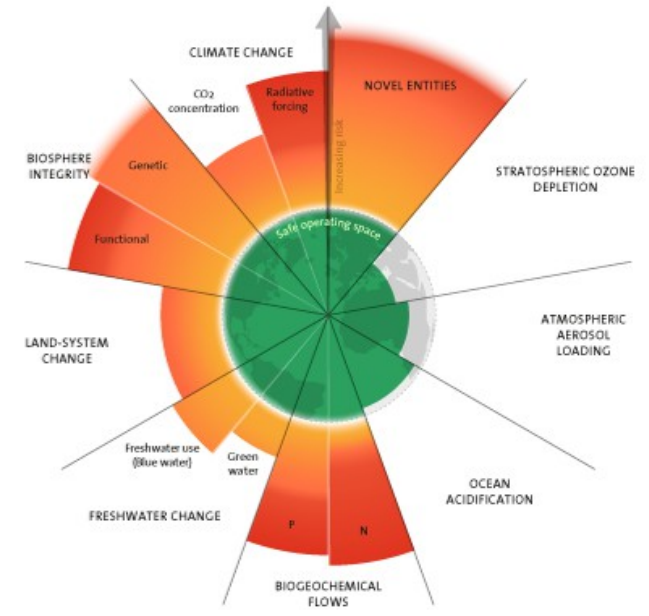
3 boundaries crossed

2015



4 boundaries crossed

2023



6 boundaries crossed

Source: Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023

Global Warming Vulnerable Tipping Points

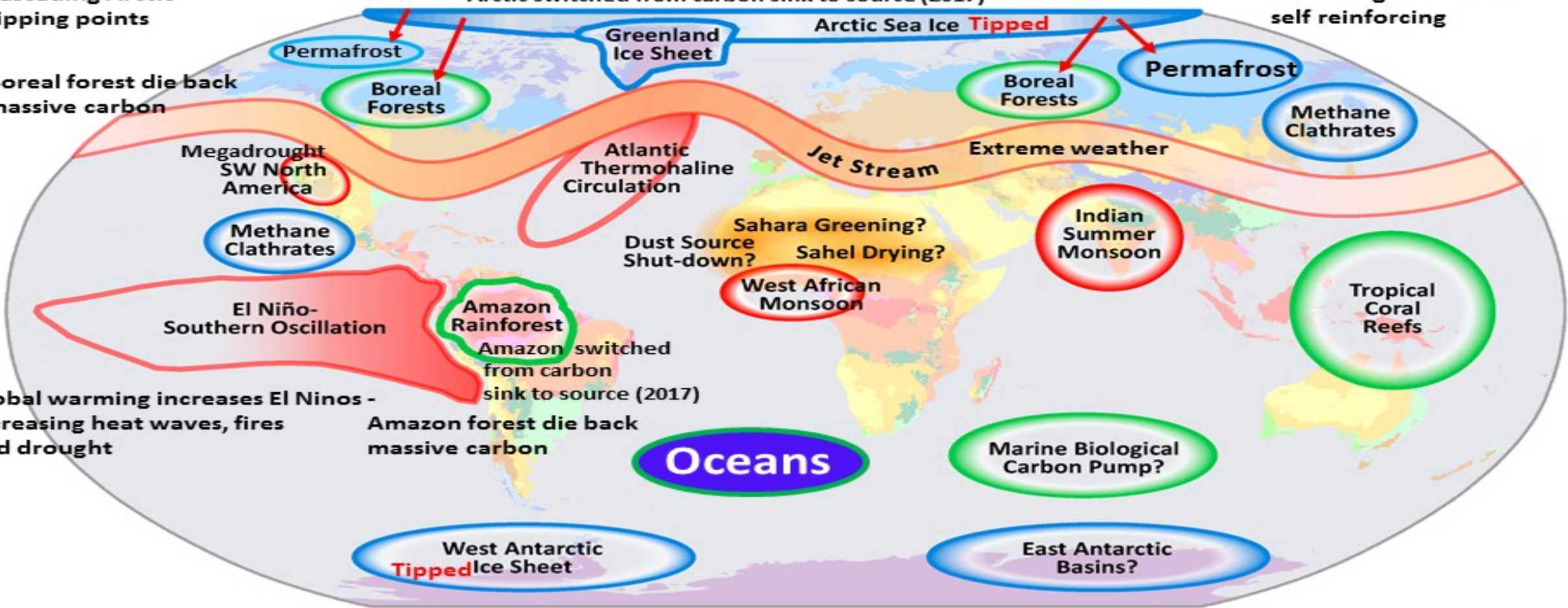
- Cryosphere Entities
- Circulation Patterns
- Biosphere Components

Committed global warming (>2°C) commits most, most likely past tipping
 Thawing permafrost is emitting CO2, methane & nitrous oxide

→
 Cascading Arctic tipping points

Permafrost thaw creates heat becoming irreversible self reinforcing

Boreal forest die back massive carbon



Oceans: Heating, Acidification & Deoxygenation

Adapted from Potsdam Climate Institute Tipping Elements the Achilles Heels of the Earth System

Wereldwijd antwoord: sustainable development goals (nog maar eens!)



EARTH SUMMIT

AGENDA

21

THE UNITED NATIONS
PROGRAMME OF ACTION
FROM 1992



1 NO POVERTY 	2 ZERO HUNGER 	3 GOOD HEALTH AND WELL-BEING 	4 QUALITY EDUCATION 	5 GENDER EQUALITY 	6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY 	8 DECENT WORK AND ECONOMIC GROWTH 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	10 REDUCED INEQUALITIES 	11 SUSTAINABLE CITIES AND COMMUNITIES 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION 	14 LIFE BELOW WATER 	15 LIFE ON LAND 	16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	17 PARTNERSHIPS FOR THE GOALS 	SUSTAINABLE DEVELOPMENT GOALS

The Classic that Launched the Environmental Movement

SILENT SPRING

RACHEL CARSON

Introduction by Linda Lear - Afterword by Edward O. Wilson

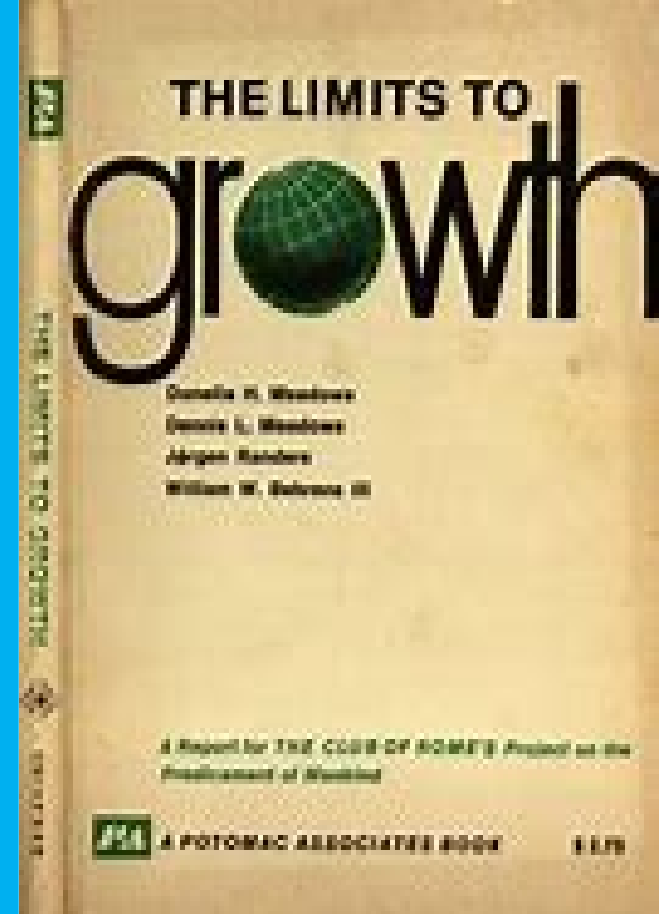
The protection and improvement of the human environment is a major issue which affects the **well-being ...**; it is the **urgent** desire of the peoples of the whole world and the duty of all Governments.

The **capacity of the earth** to produce vital renewable resources must be maintained and, wherever practicable, **restored** or improved.

Man has the fundamental right to ... a **life of dignity** and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations.

Through **ignorance or indifference** we can do massive and **irreversible harm** to the earthly environment ... **[T]hrough fuller knowledge and wiser action**, we can achieve ... a better life in an environment more in keeping with human needs and hopes.

Cooperation through multilateral or bilateral arrangements ... is essential to effectively **control, prevent, reduce and eliminate** adverse environmental effects



STOCKHOLM CONFERENCE ECO

JOINTLY PRODUCED BY
THE ECOLOGIST
AND FRIENDS OF THE EARTH

16th JUNE 1972

THANK YOU SWEDEN

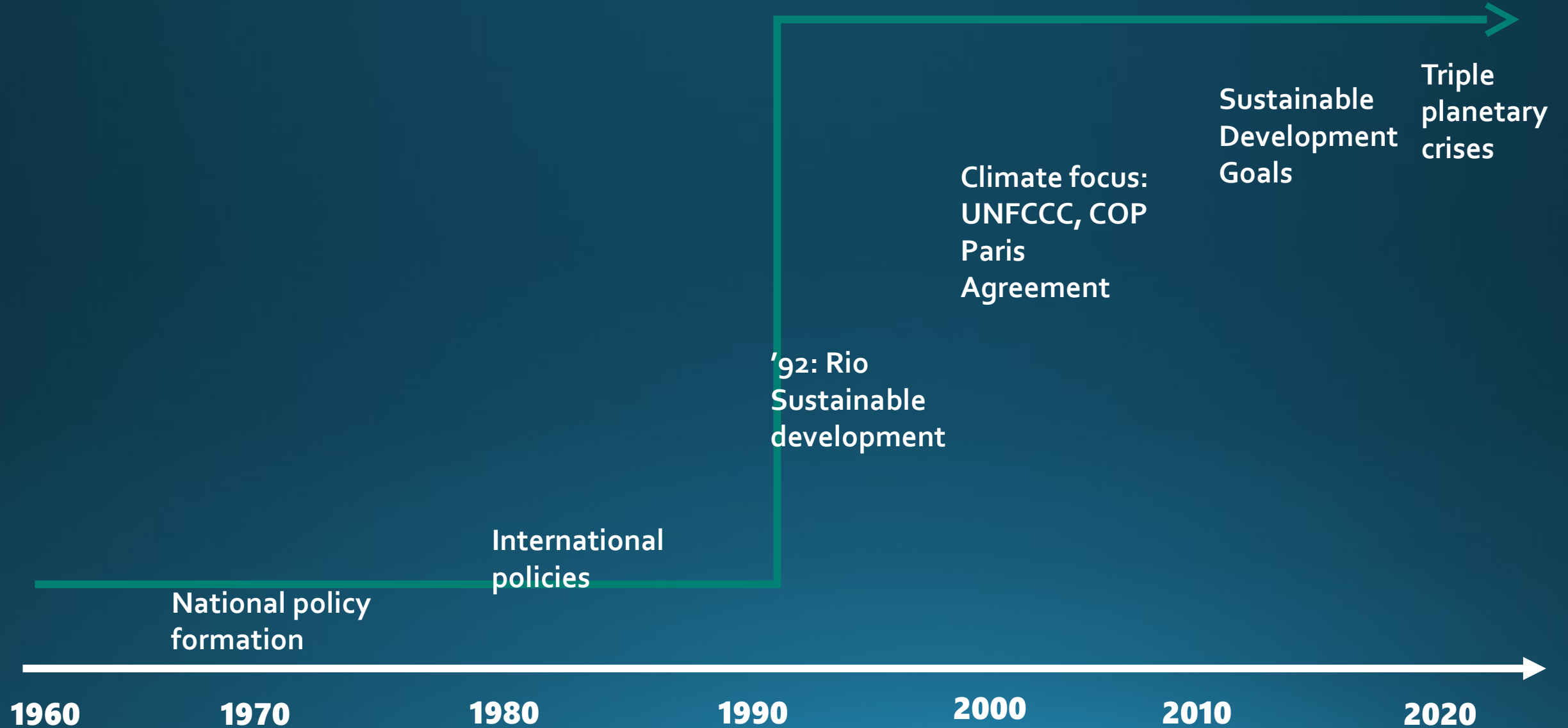
STOCKHOLMS-
KONFERENSENS EKO
ЭКО СТОКГОЛЬМСКОЙ
КОНФЕРЕНЦИИ
ECO DE LA CONFERENCE
DE STOCKHOLM
ECO DE LA CONFERENCE
DE ESTOCOLMOU
斯德哥尔摩会议

OUT OF STOCKHOLM, A NEW INITIATIVE

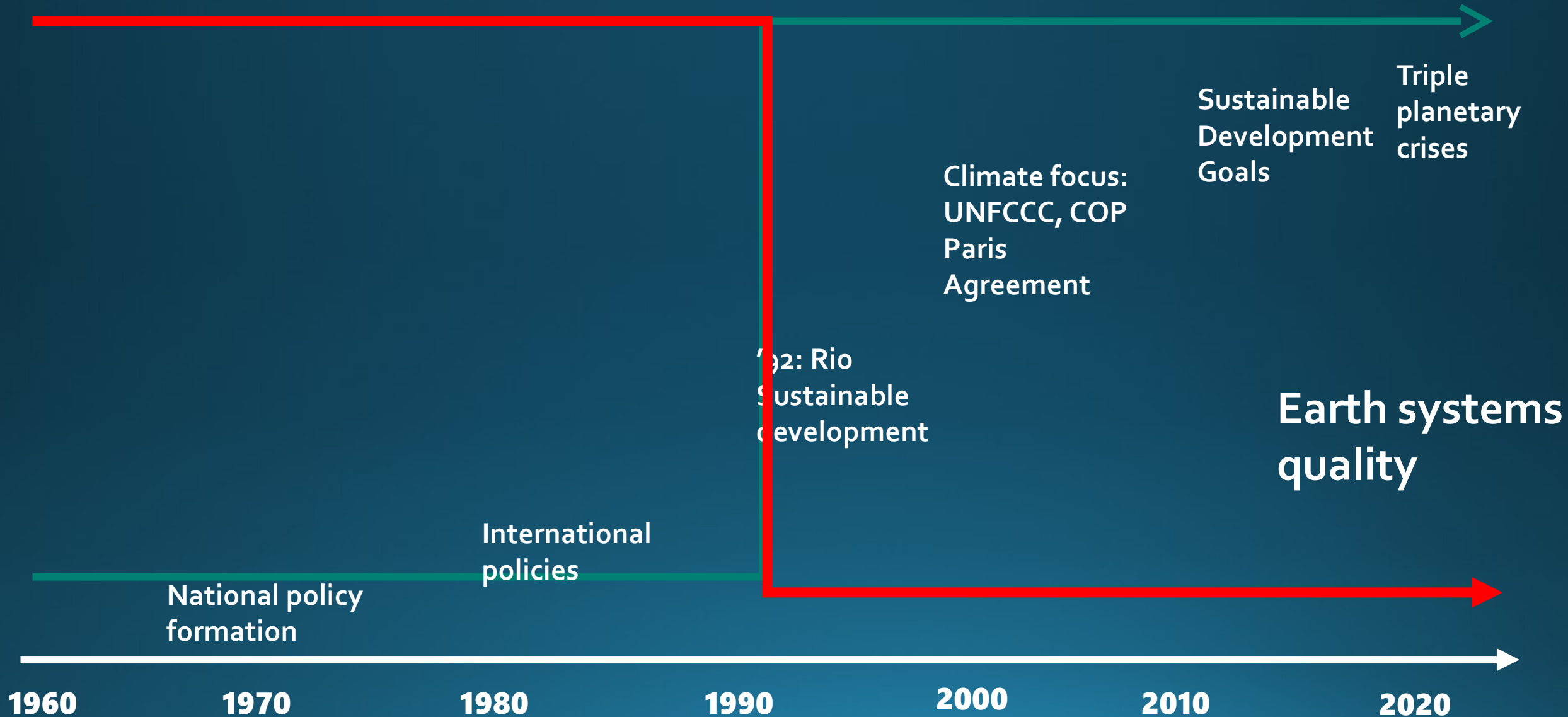
World Ecological Areas Programme Launched



De institutionalisering van milieu, klimaat en duurzaamheid



Institutionalising zonder resultaat?



European Green Deal: potentiële paradigmaverandering

- Eerste klimaat-neutraal continent
- Strategie voor Biodiversiteit 2030
- Nieuw Actie Plan Circulaire Economie
- **Zero pollution** strategie
- **Farm to fork** strategie
- **Rechtvaardige transitie**
- **Sustainable European Investment Plan**
- **Industriële strategie**



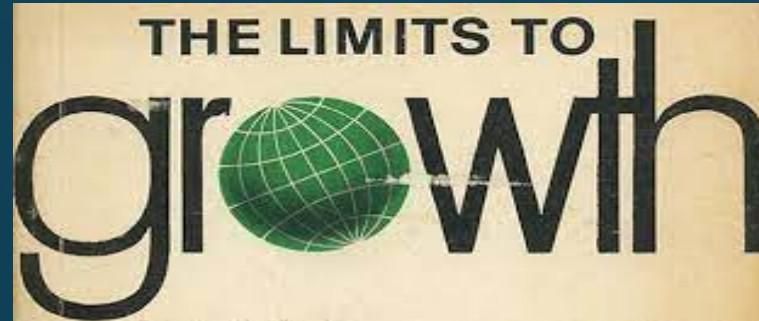
Herdenken en –heruitvinden van ons energie-, voedsel-, en mobiliteitssysteem, en de bebouwde omgeving



Duurzame systeemtransities noodzakelijk

Schaal en aard van de uitdagingen zijn veranderd

1972



Wereldbevolking 3,8 miljard

2022

The Growth of Limits

*Climate Change, Pandemics,
Biodiversity Loss, Security
Threats ...*

Wereldbevolking 8 miljard

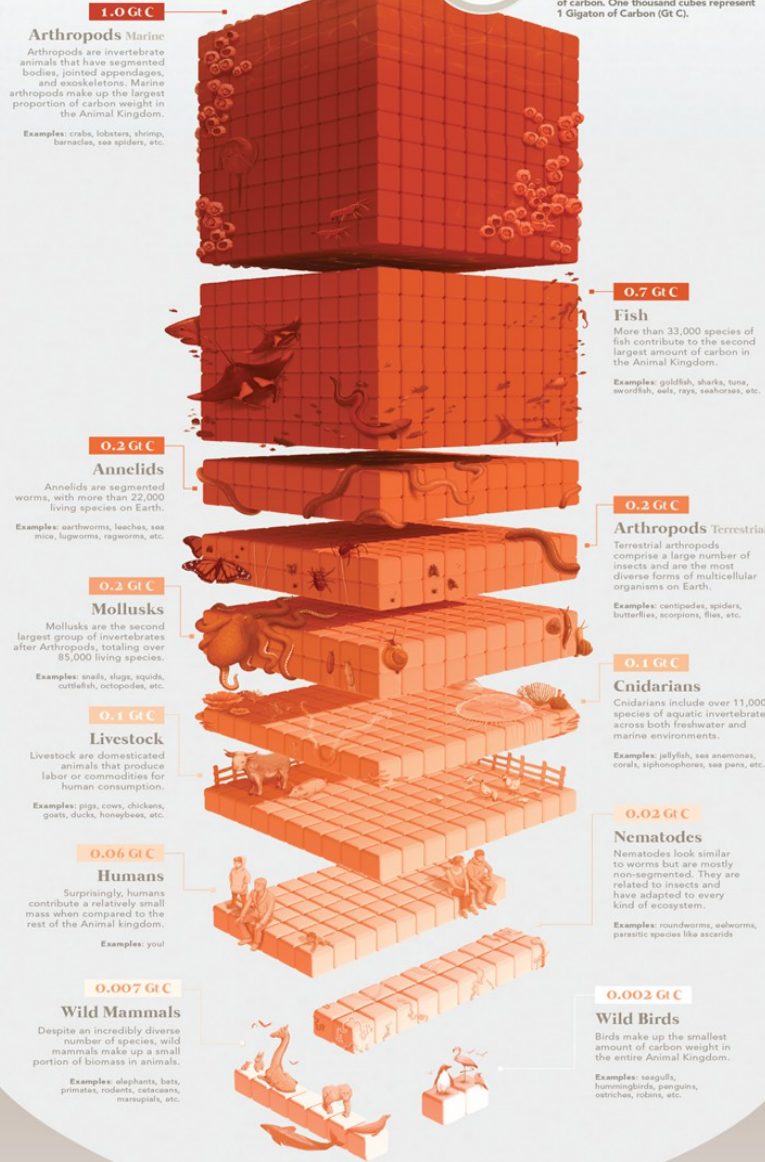
Visualizing the Biomass of Life

Our planet supports **over 8.7 million species**, but it can be difficult to truly appreciate the scale of this incredible diversity. We break down the total composition of the living world in terms of its biomass.

The Biomass of Animals

Biomass is measured by the amount of carbon an organism contains. Carbon is a primary component of all known life on Earth, used in complex biological molecules and compounds.

One cube represents 1 million metric tons of carbon. One thousand cubes represent 1 Gigaton of Carbon (Gt C).



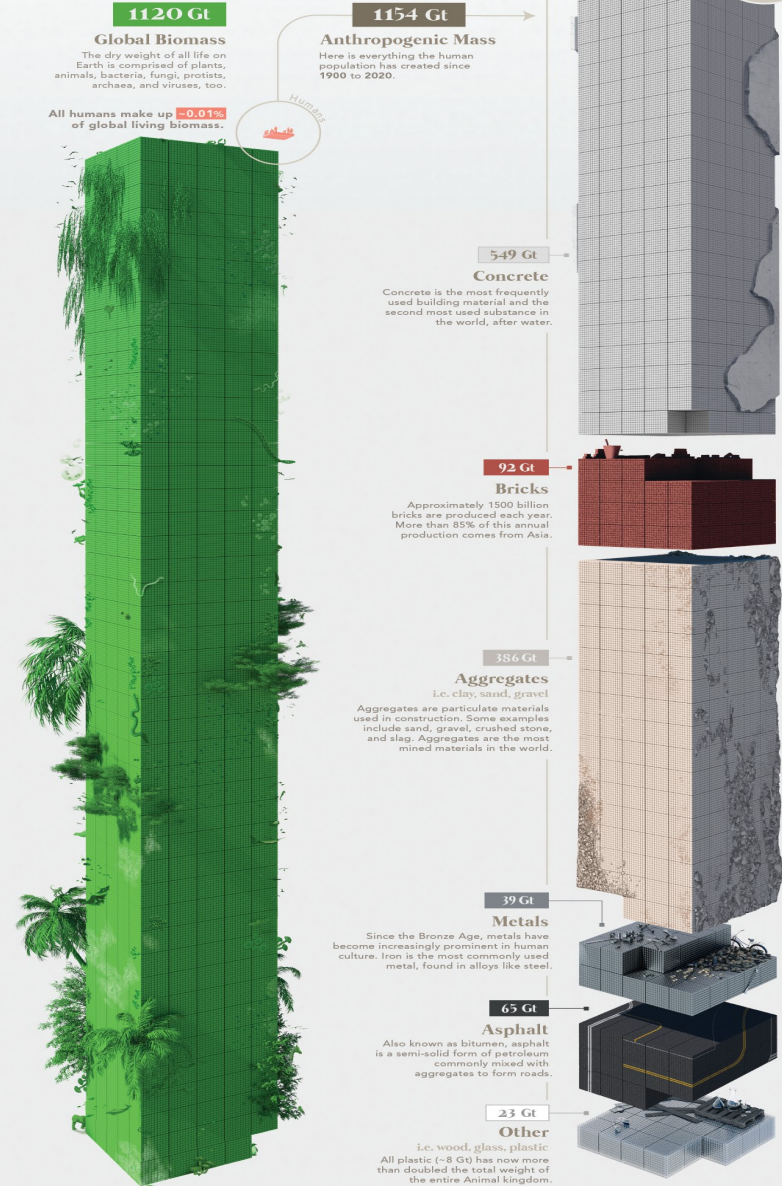
*All other species like reptiles and amphibians, contribute a negligible amount of carbon when compared to other animals.

Visualizing the Scale of Anthropogenic Mass

Anthropogenic mass, or human-made mass, refers to the materials embedded within inanimate solid objects that are made by humans.

In 2020, the amount of anthropogenic mass exceeded the weight of all global living biomass.

As humans continue to dominate Earth, questions surrounding our material output are increasing. We break down the composition of all human-made materials and the rate of their production.



Source: Visualcapitalist.com

De VUCA wereld: een moeilijke context

+

How well can you predict the outcome of your actions?

Complexity
Multiple key decision factors

Volatility
Rate of change

Ambiguity
Lack of clarity about meaning of an event

Uncertainty
Unclear about the present

-

How much do you know about the situation?

+

Eurozone inflation rate (%)



MAKE AMERICA GREAT AGAIN

What makes populism popular?



THE WORLD'S **62** RICHEST PEOPLE OWN THE SAME WEALTH AS THE 3.6 BILLION POOREST PEOPLE

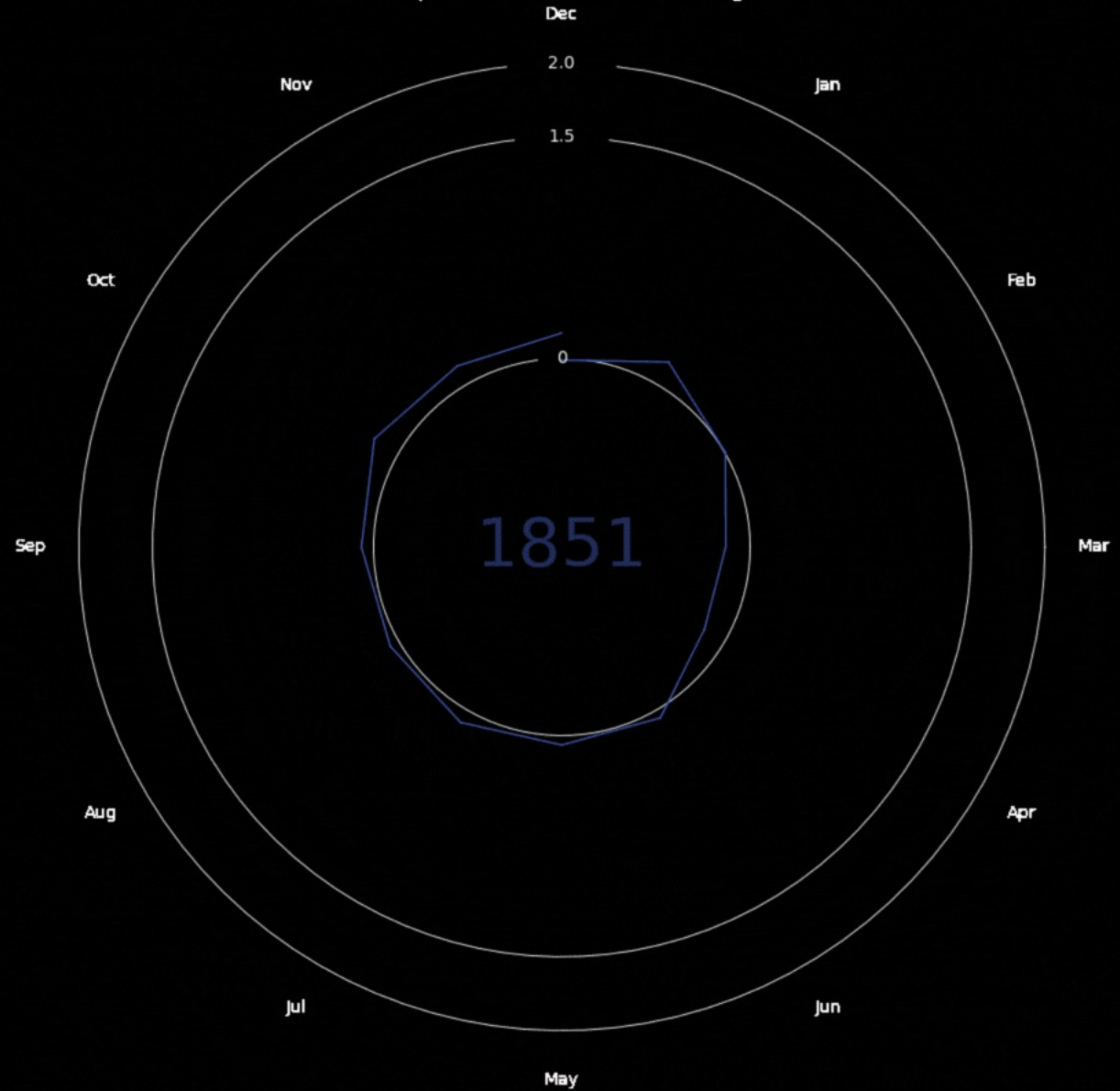
of the story

WHY DO SOME PEOPLE CALL CLIMATE CHANGE FAKE NEWS?

(Geen) uitzonderlijke of onverwachte zomer!



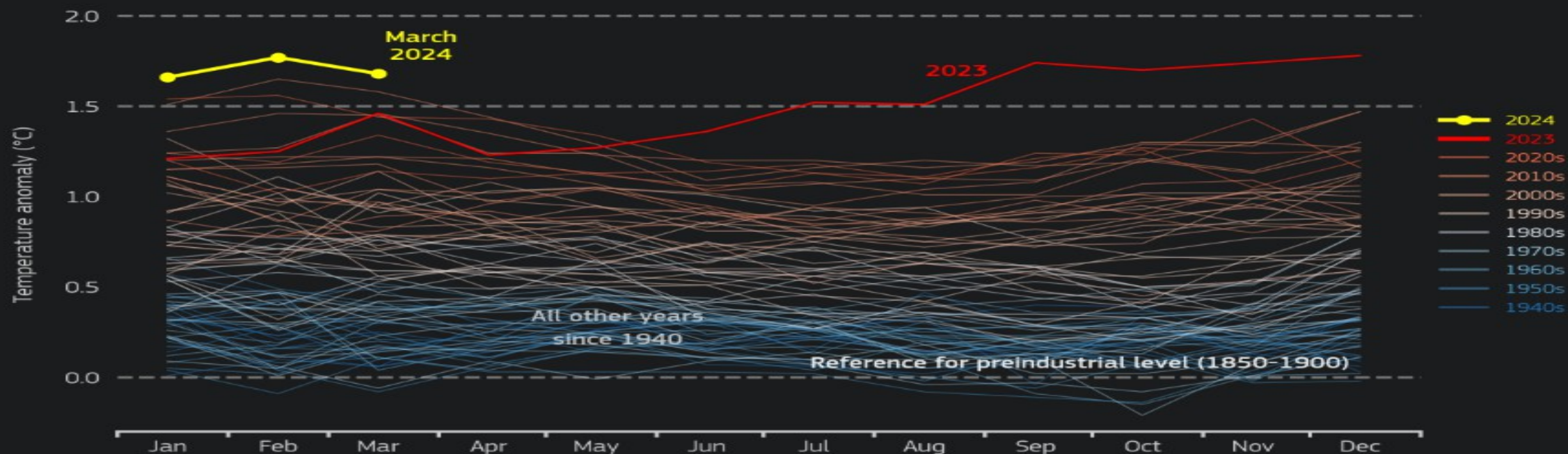
Monthly global mean temperature difference (°C)
Compared to 1850-1900 average



WMO Combined Dataset

Monthly global surface air temperature anomalies

Data: ERA5 1940–2024 • Reference period: 1850–1900 • Credit: C3S/ECMWF



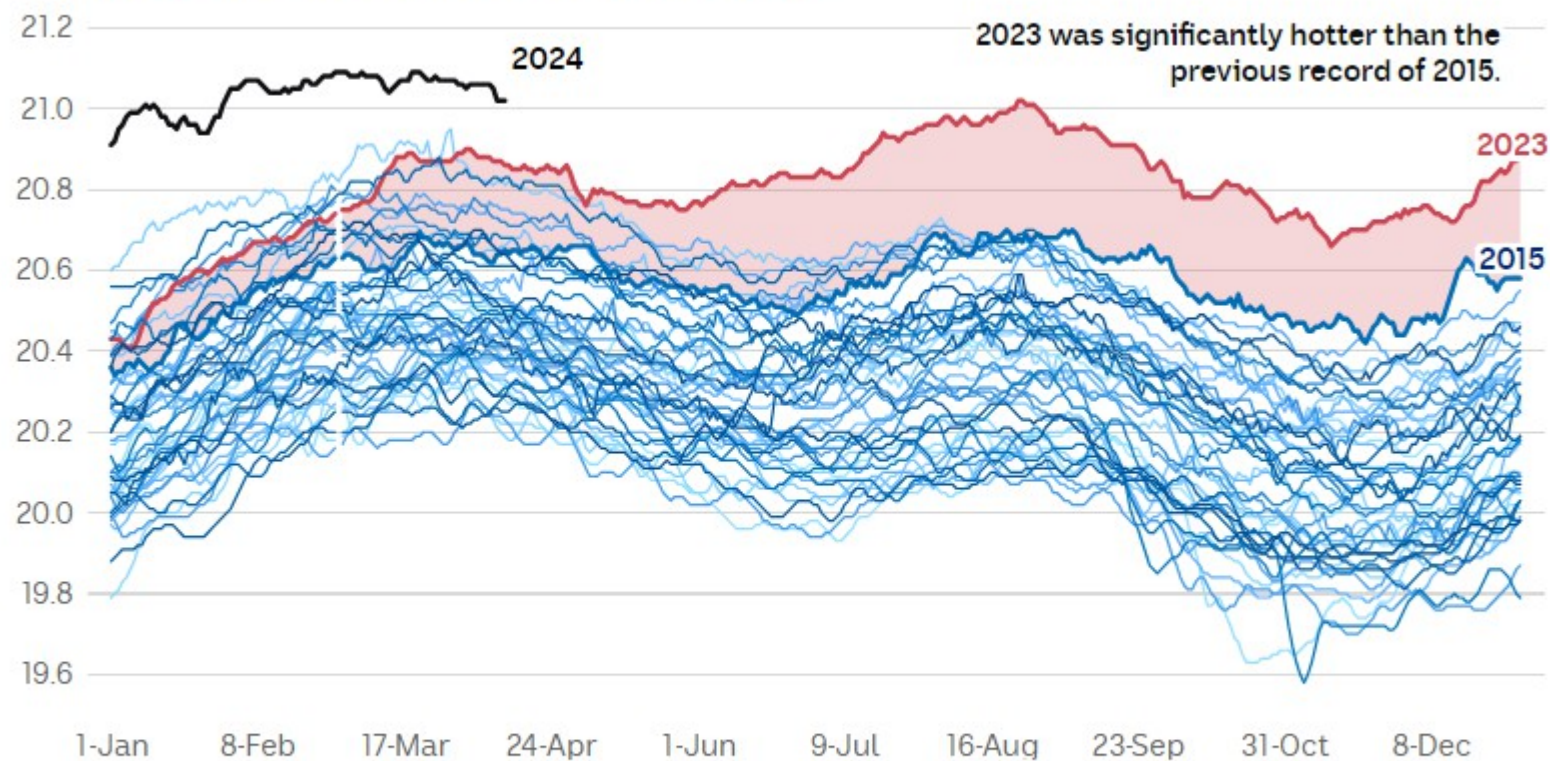
PROGRAMME OF THE
EUROPEAN UNION



Climate
Change Service
climate.copernicus.eu

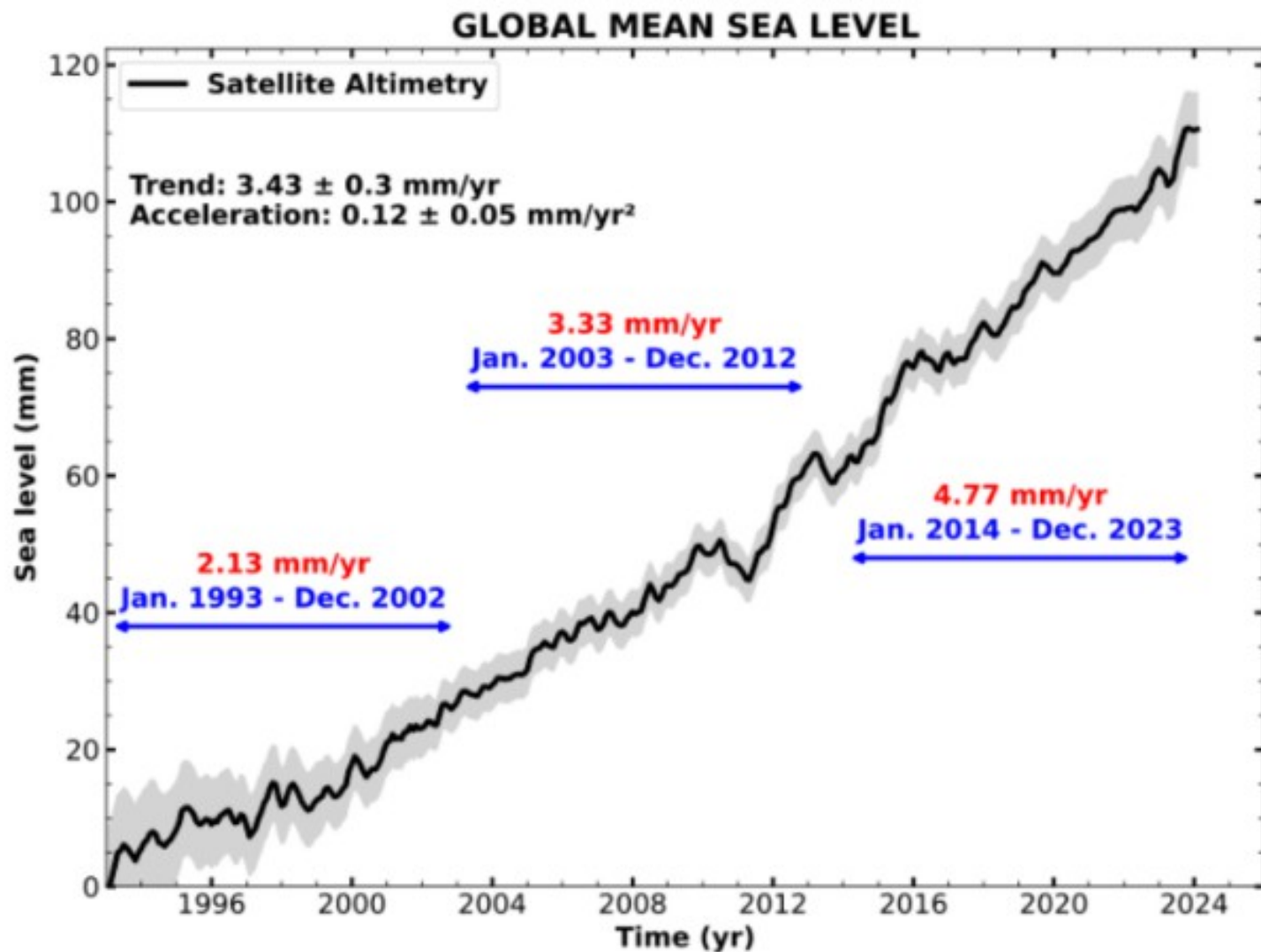
Monthly global surface air temperature anomalies (°C) relative to 1850–1900 from January 1940 to March 2024, plotted as time series for each year. 2024 is shown with a thick yellow line, 2023 with a thick red line, and all other years with thin lines shaded according to the decade, from blue (1940s) to brick red (2020s). Data source: ERA5. Credit: C3S/ECMWF.

Daily mean sea surface temperature



Each of these lines shows the daily global sea surface temperature across a year from 1979.

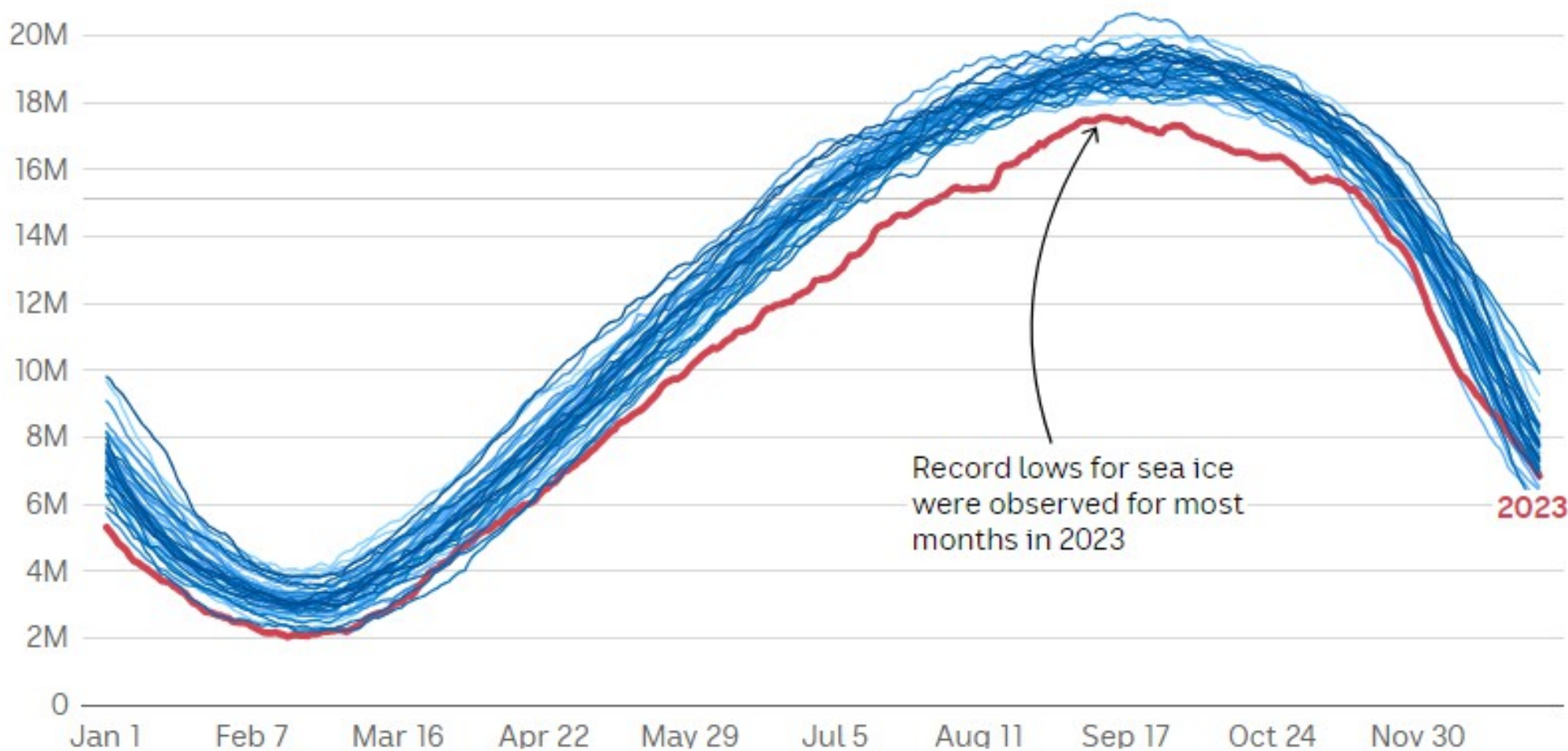
Source: C3S Climate Data Store / [Get the data](#)



Sea level
rise is
accelerating

Global mean sea level rise reached its highest level since records began, according to the World Meteorological Organization's State of the Climate 2023. (Supplied: World Meteorological Organization)

Antarctic sea ice extent



Daily Antarctic sea ice extent from October 1978 to December 2023 in million square kilometers.

Source: Copernicus Annual Climate Summary / [Get the data](#)

Climate

Austria's glaciers 'could vanish by 2050'



The Local Austria - news@thelocal.at

Published: 11 Dec, 2015 CET. Updated: Fri 11 Dec 2015 12:33 CET



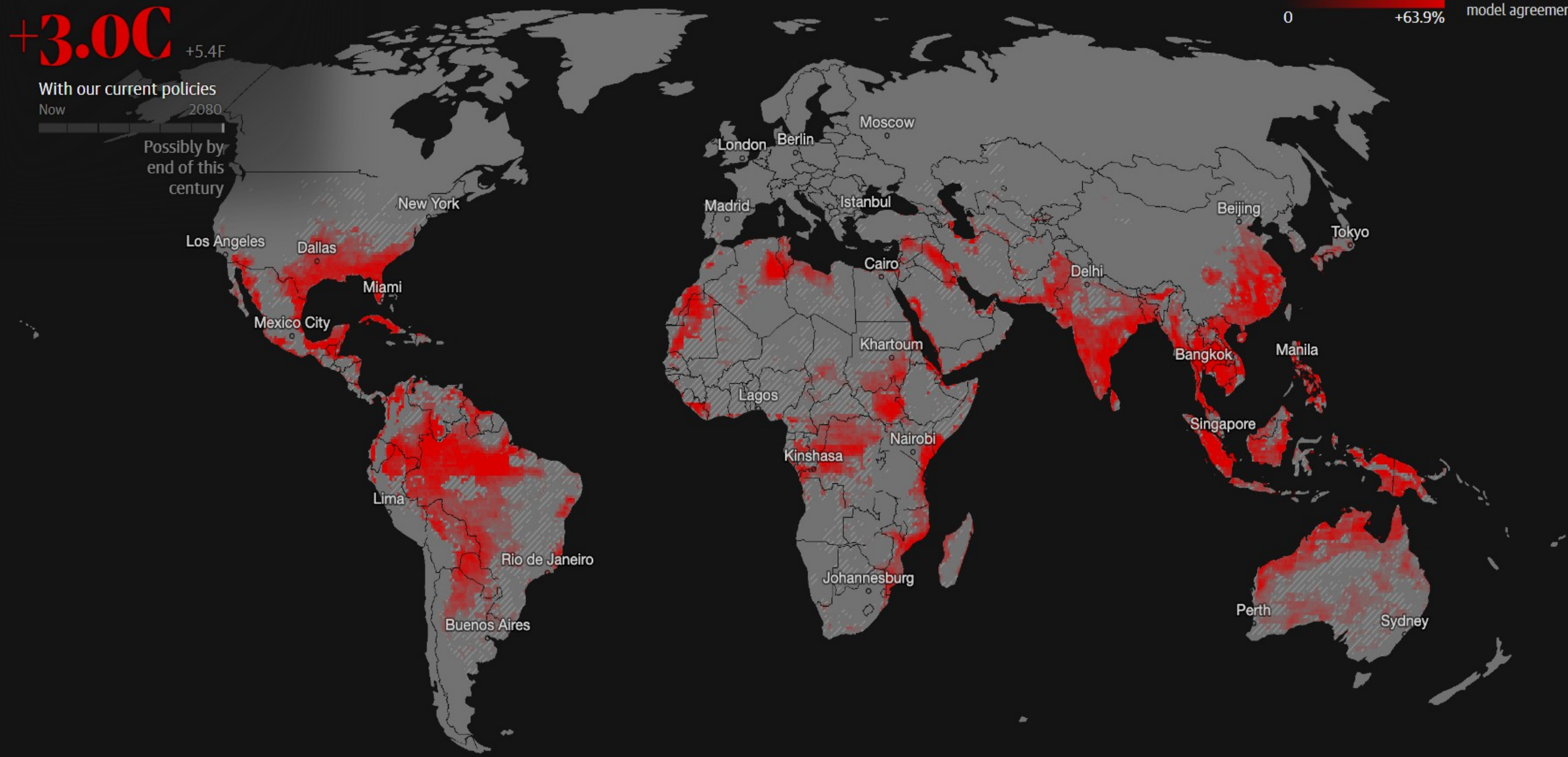
The Pasterze is the longest glacier in Austria. Photo: Foto-webcam.eu

Austrian geologists have warned that the country's glaciers melted faster this year than ever before and predict that all, including the massive Pasterze glacier, will have vanished by the year 2050.

Change in fraction of land annually exposed to heatwaves: Globally

+3.0C +5.4F
With our current policies
Now 2080

Change from 1986-2006
0 +63.9%
Insufficient model agreement



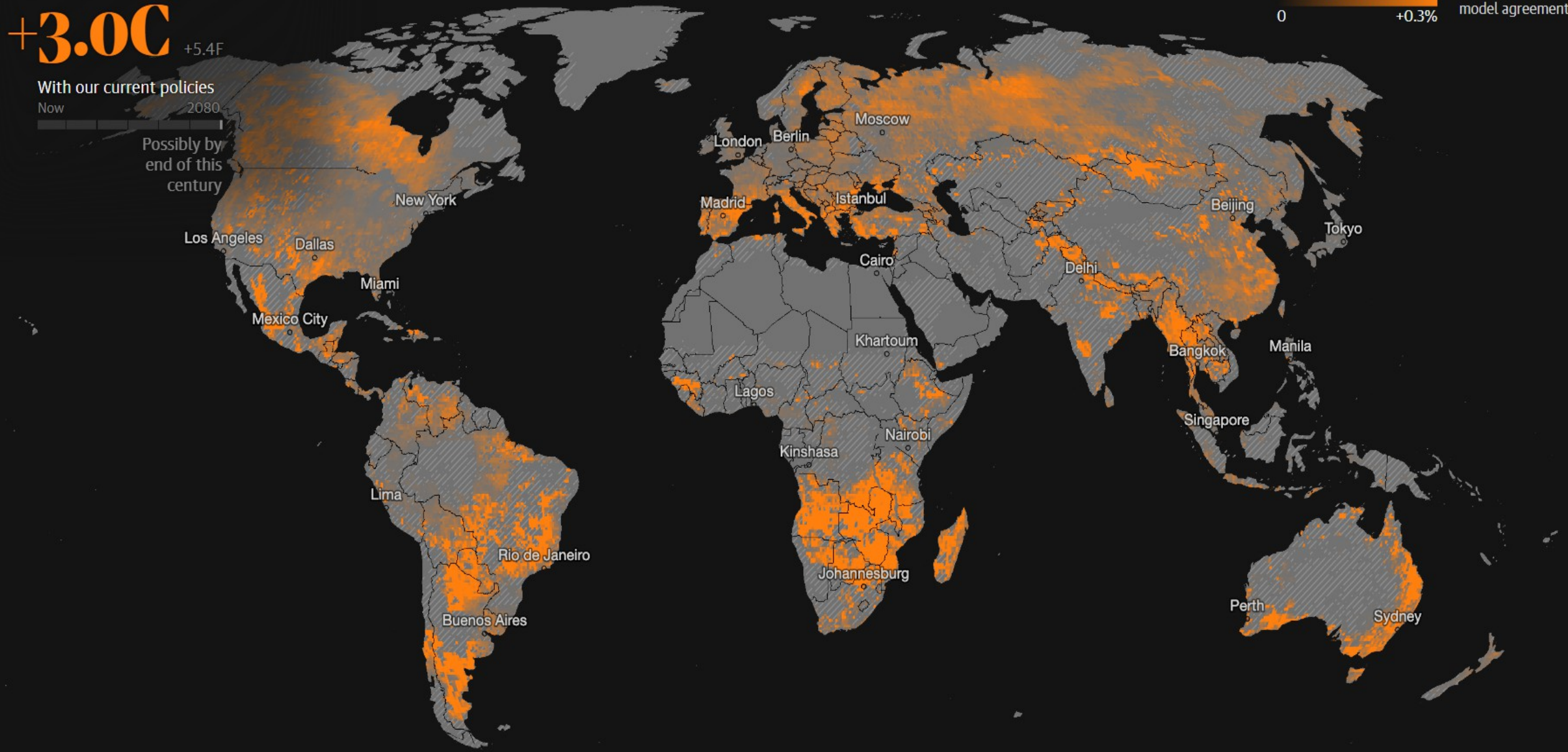
Guardian graphic. Source: Climate Impact Explorer by Climate Analytics. Note: In the data, a heatwave is when a relative indicator based on air temperature and an absolute indicator based on the air temperature and relative humidity are projected to exceed exceptionally high values, according to an analysis of four climate models. When the two of the four models don't agree, they are not visualized. The projected year ranges are the Climate Action Tracker current policies scenario.

Change in fraction of land annually exposed to wildfires: Globally

+3.0C +5.4F

With our current policies
Now 2080

Change from 1986-2006
0 +0.3%
Insufficient model agreement



Guardian graphic. Source: Climate Impact Explorer by Climate Analytics. Note: The data shows where the annual aggregated of areas burned by wildfires is projected to change, according to an analysis of four climate models. When the two of the four models don't agree, they are not visualized. The projected year ranges are the Climate Action Tracker current policies scenario.

Change in fraction of land annually exposed to wildfires: Europe

+3.0C +5.4F

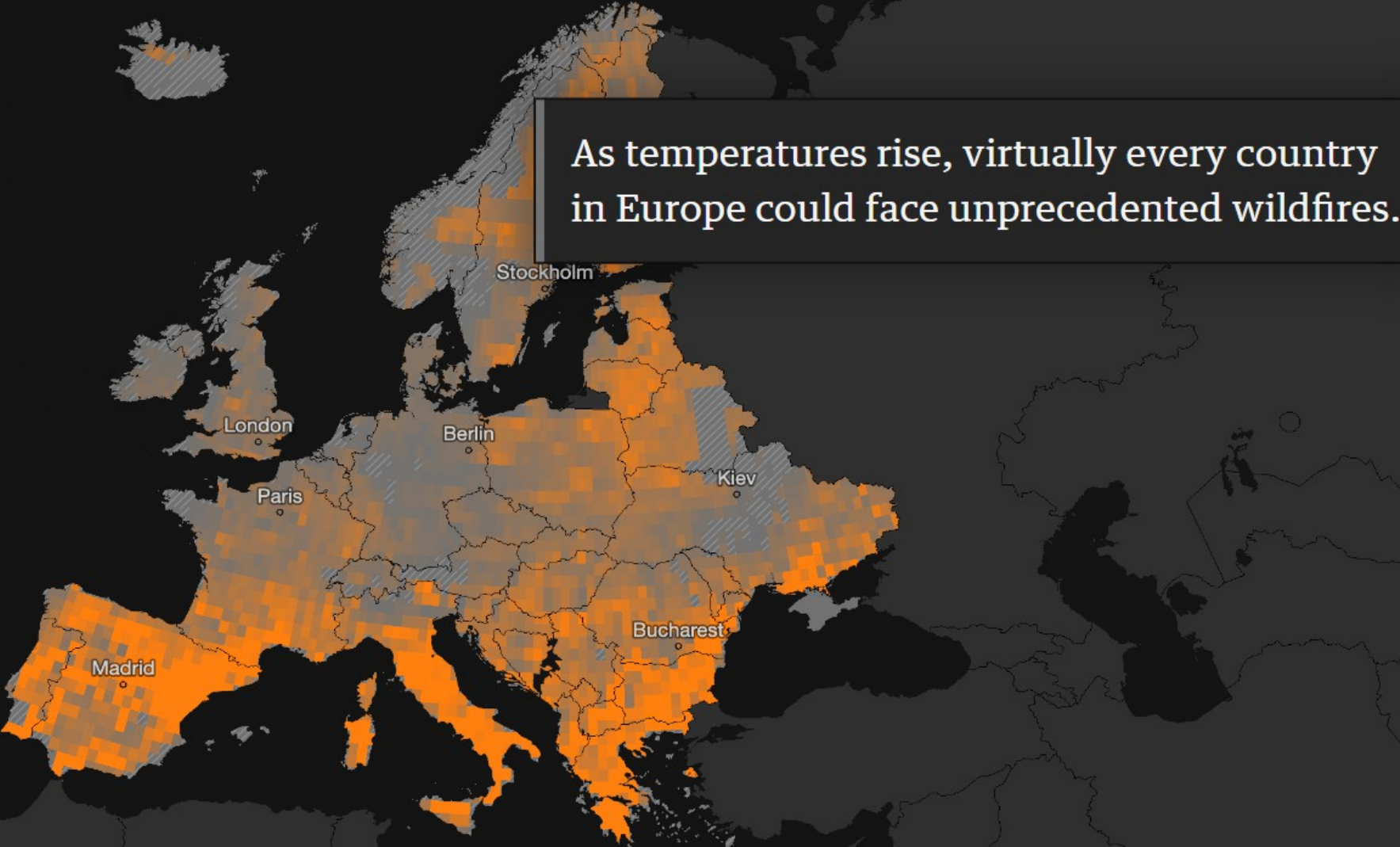
With our current policies

Now 2080



Possibly by
end of this
century

As temperatures rise, virtually every country in Europe could face unprecedented wildfires.





Scientists deliver 'final warning' on climate crisis: act now or it's too late



Super wicked problems

1. Tijd is van cruciaal belang
2. Het beleid benadert de toekomst irrationeel
3. De veroorzakers van de problemen zijn deel van de oplossing
4. Er is geen centraal gezag

(Kelly Levin, Benjamin Cashore, Graeme Auld and Steven Bernstein, 2012, *Policy Sciences*)

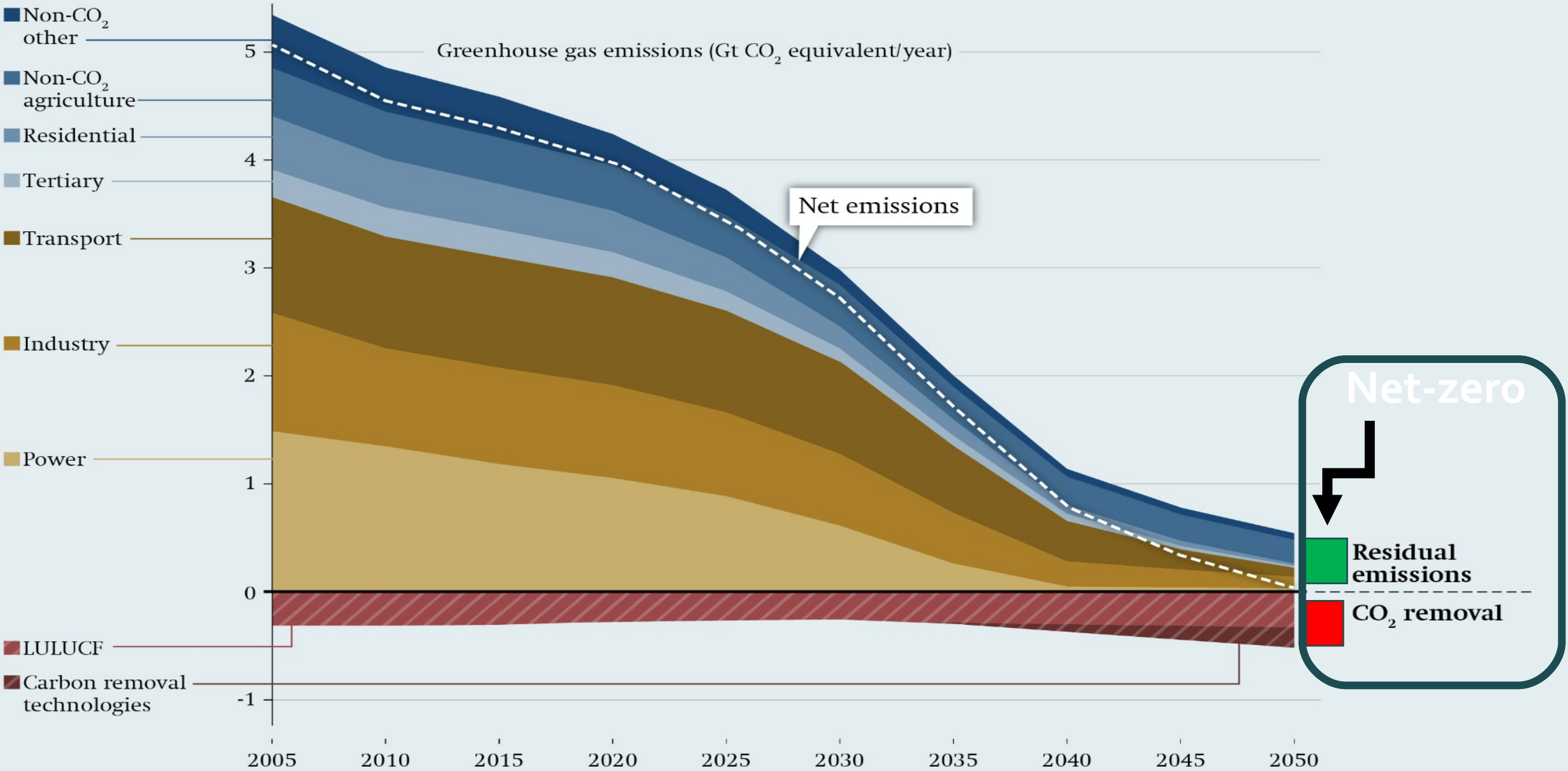
EUROPEAN CLIMATE LAW

2050

CO₂ ↓

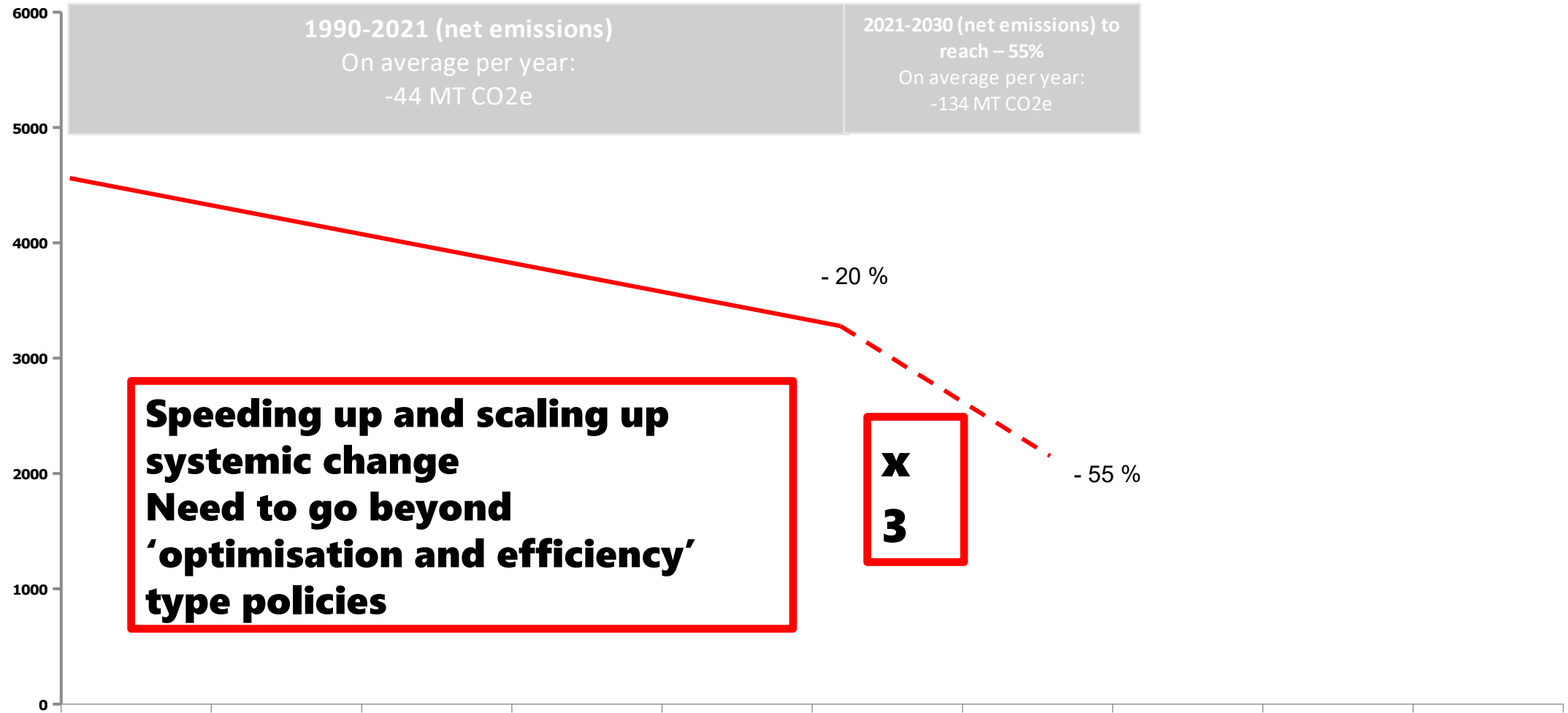


Illustrative emissions pathways to achieve a net-zero target in the EU



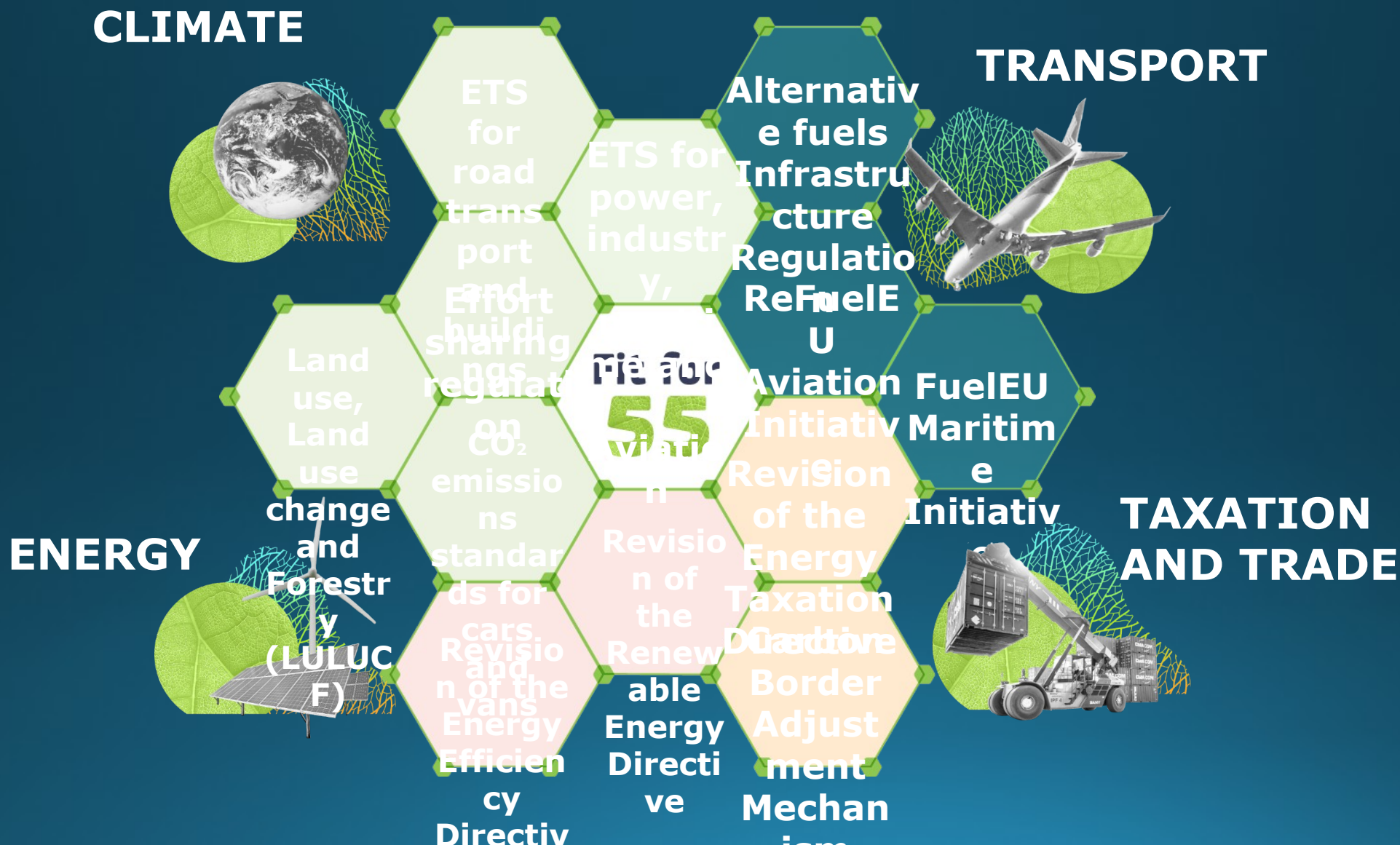
Translation and adaptation: 2020 Stiftung Wissenschaft und Politik (SWP)

Million tonnes of CO2-equivalent



Climate neutrality

“Fit for 55”: beleidspakket om 2030 mogelijk te maken



EU kicks off debate on 2040 climate goal on way to net-zero emissions

By Frédéric Simon | EURACTIV ⌚ Est. 8min

📅 Feb 6, 2024 (updated: 📅 Feb 9, 2024)

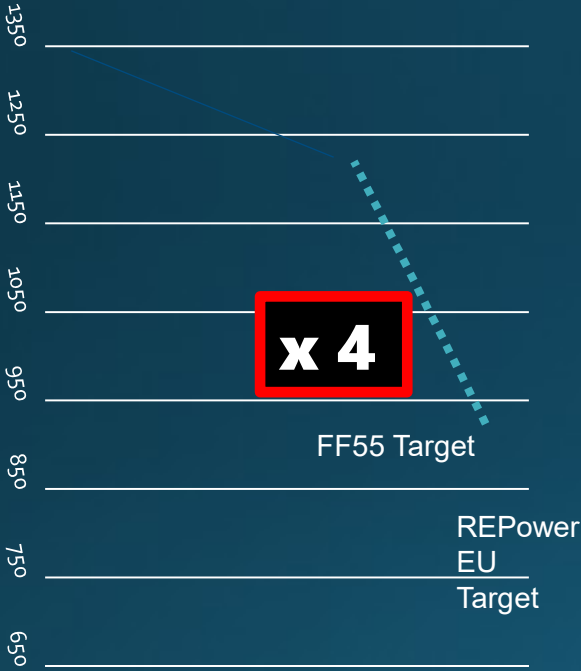
Content-Type: News



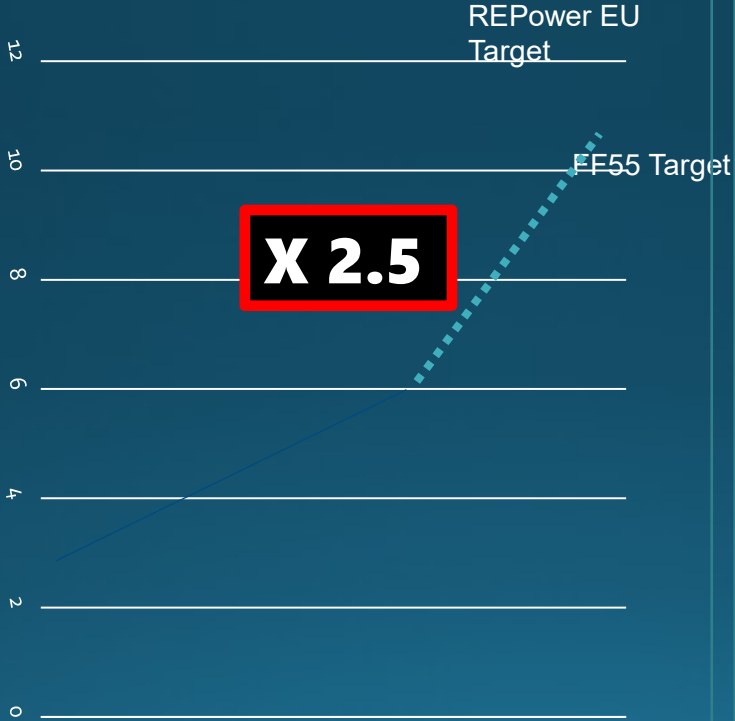
A 2040 climate target “will help European industry, investors, citizens and governments to make decisions in this decade that will keep the EU on track to meet its climate neutrality objective in 2050,” the European Commission said. [Copyright: © European Union 2023 - Source : EP]

Versnelling noodzakelijk

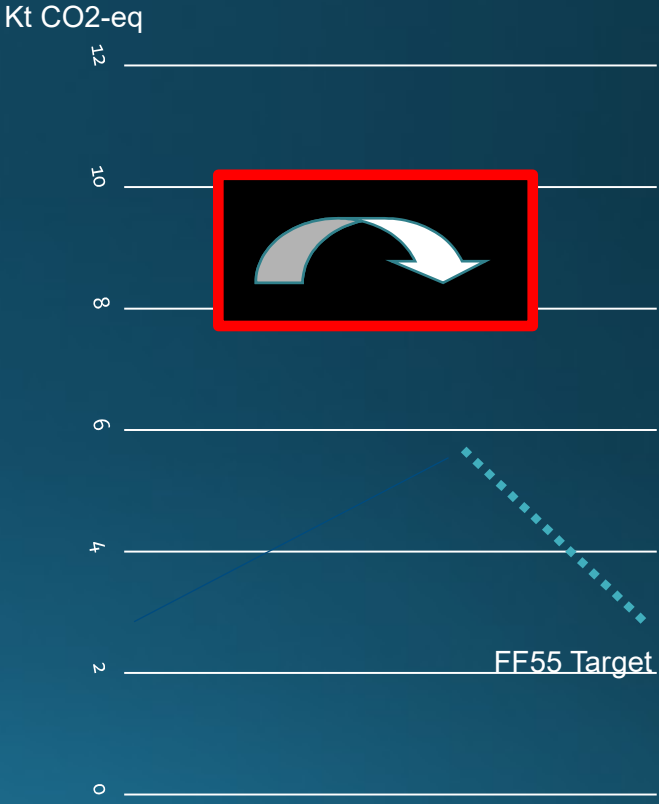
Reductie energieverbruik



Toename hernieuwbare energie



Natuurlijke koolstofopslag (LULUCF)





European
Commission

Nature Restoration Law

For people, climate, and planet

22 June 2022
#EUGreenDeal

Landgebruik en ecosysteemdiensten: in de verkeerde richting

Emissions and removals in agriculture, forestry and other land use (MtCO₂eq/year)



Emissions 2020: AFOLU sector 152 MtCO₂eq from carbon neutral (2035 target)

Removals 2020: LULUCF 80 MtCO₂eq short of 2030 target of -310 MtCO₂eq

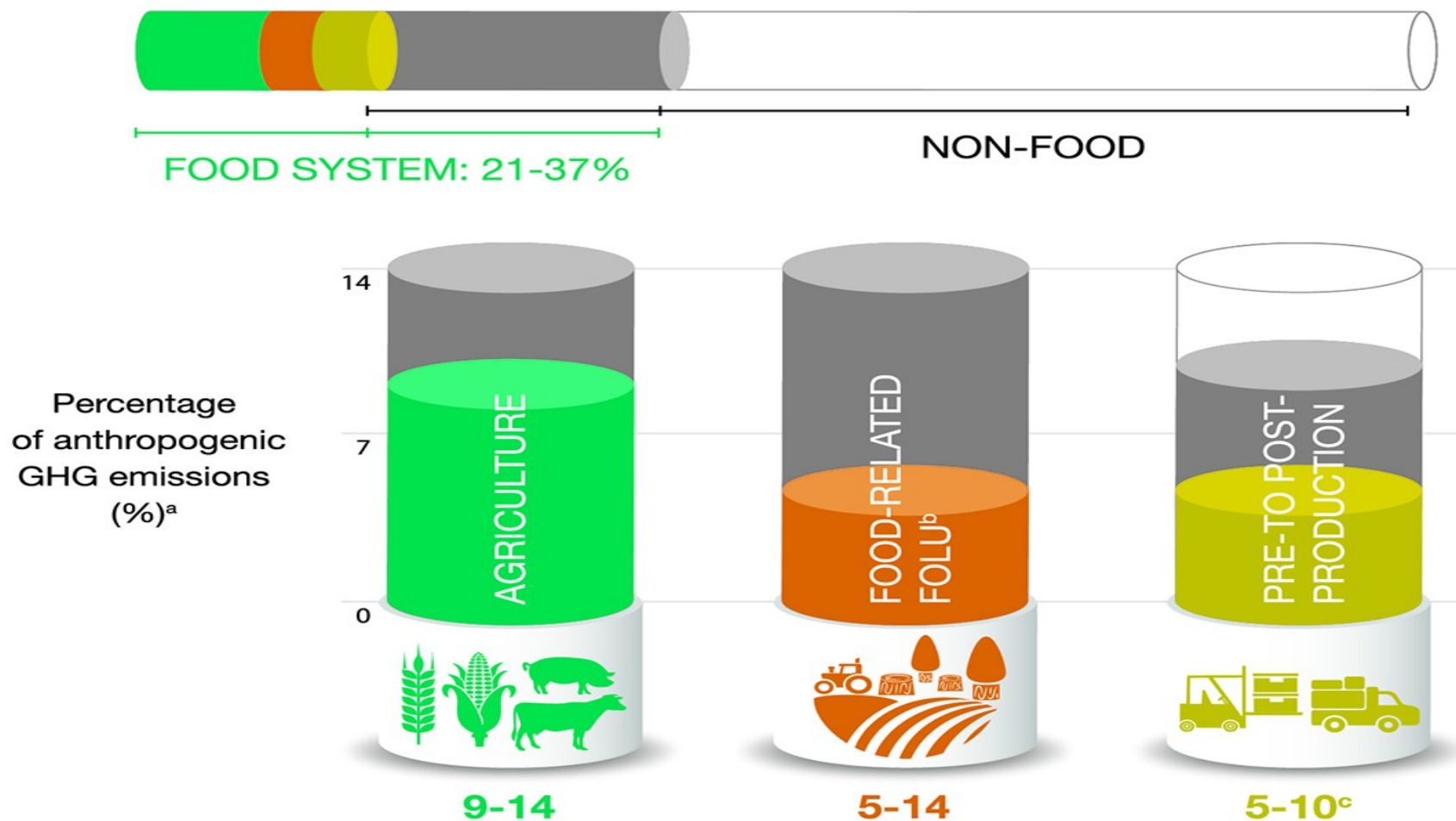
#EUGREENDEAL

FARM2FORK

A strategy for Sustainable food



Global greenhouse gas emissions from the food system



Data source: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*

^aComputed using a total emissions value for the period 2007–2016 of 52 GtCO₂-eq per year

^bForestry and Other Land Use

^cRounded to nearest fifth percentile due to assessed uncertainty in estimates

European parliament votes for watered-down law to restore nature

EU target aims to restore at least 20% of land and sea ecosystems by 2030 despite farmers' protests and rightwing opposition



📷 Farmers burned tyres on Monday in a protest in the heart of the EU district in Brussels.
Photograph: Thierry Monasse/Getty Images

Le Monde

FRENCH POLITICS - ENVIRONMENT

Macron's call for 'pause' of EU environmental regulation causes controversy

The French President, who was presenting a bill on 'green industry,' said he wanted to safeguard companies that have to compete against less environmentally friendly countries.

By Audrey Tonnelier, Elsa Conesa and Virginie Malingre (Brussels, Europe bureau)

Published on May 12, 2023, at 12:55 pm (Paris), updated on May 12, 2023, at 6:11 pm - ⌚ 4 min. - [Lire en français](#)

Circulaire economie gaat traag vooruit

Trends in the circular material use rate, % in EU-27



EU Chemicals Strategy: 'Safe and sustainable by design'



- The **financial system** as a partner in the **radical transition**?



#SusFinEU

Sustainable finance



European
Commission



EU TECHNICAL EXPERT GROUP ON
SUSTAINABLE FINANCE

FINANCING A SUSTAINABLE
EUROPEAN ECONOMY

TAXONOMY

Technical Report

Taxonomy Technical Report

De toekomst van de Europese industrie: 'green technology' and production



EU NET-ZERO
INDUSTRY ACT:
MAKING THE EU THE HOME
OF CLEAN TECH INDUSTRIES

March 2023



FIGURE C

Global risks ranked by severity over the short and long term

"Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period."

Risk categories

- Economic
- Environmental
- Geopolitical
- Societal
- Technological

2 years



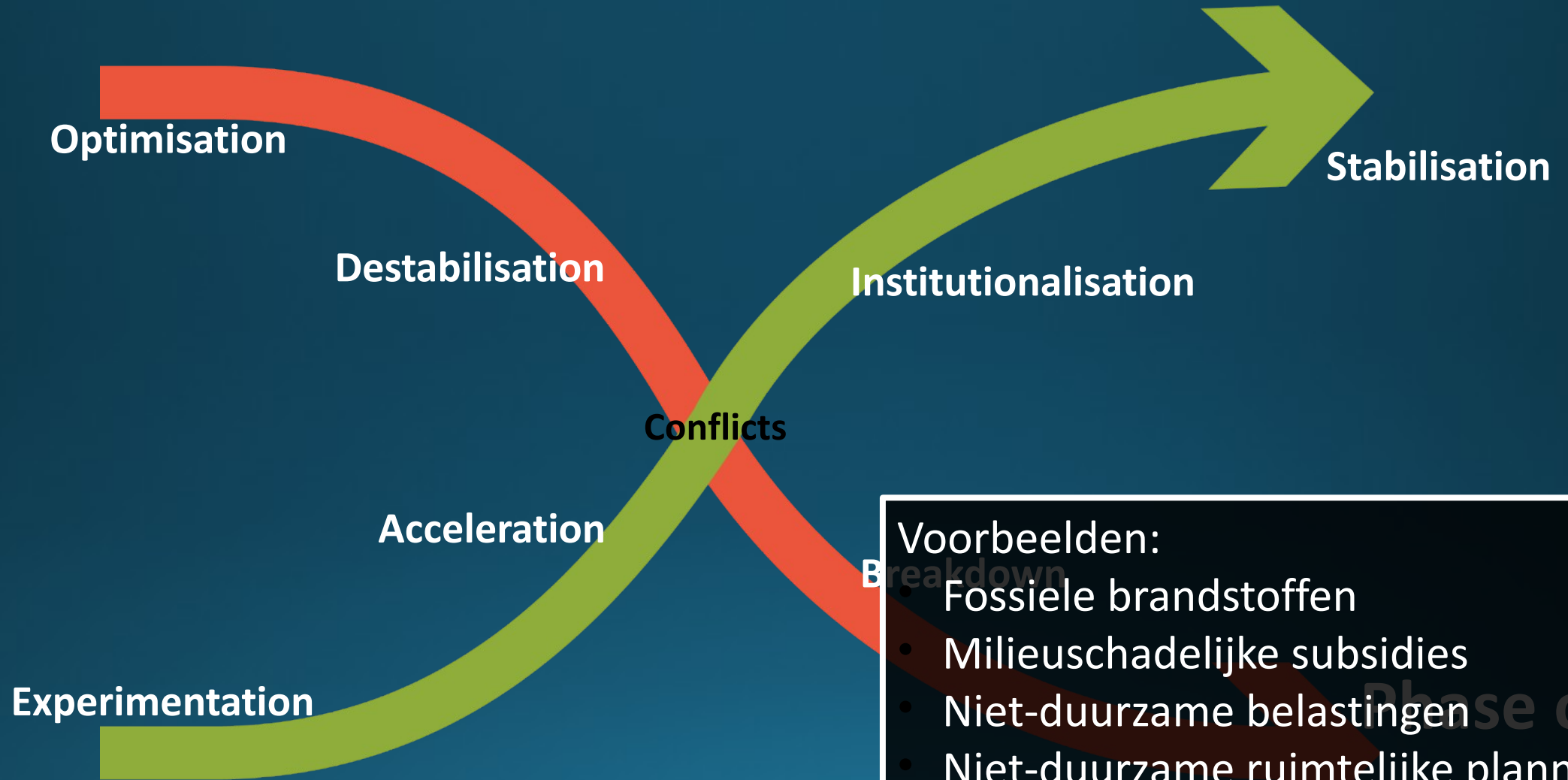
10 years



Source

World Economic Forum Global Risks Perception Survey 2023-2024.

De moed voor de moeilijke weg?



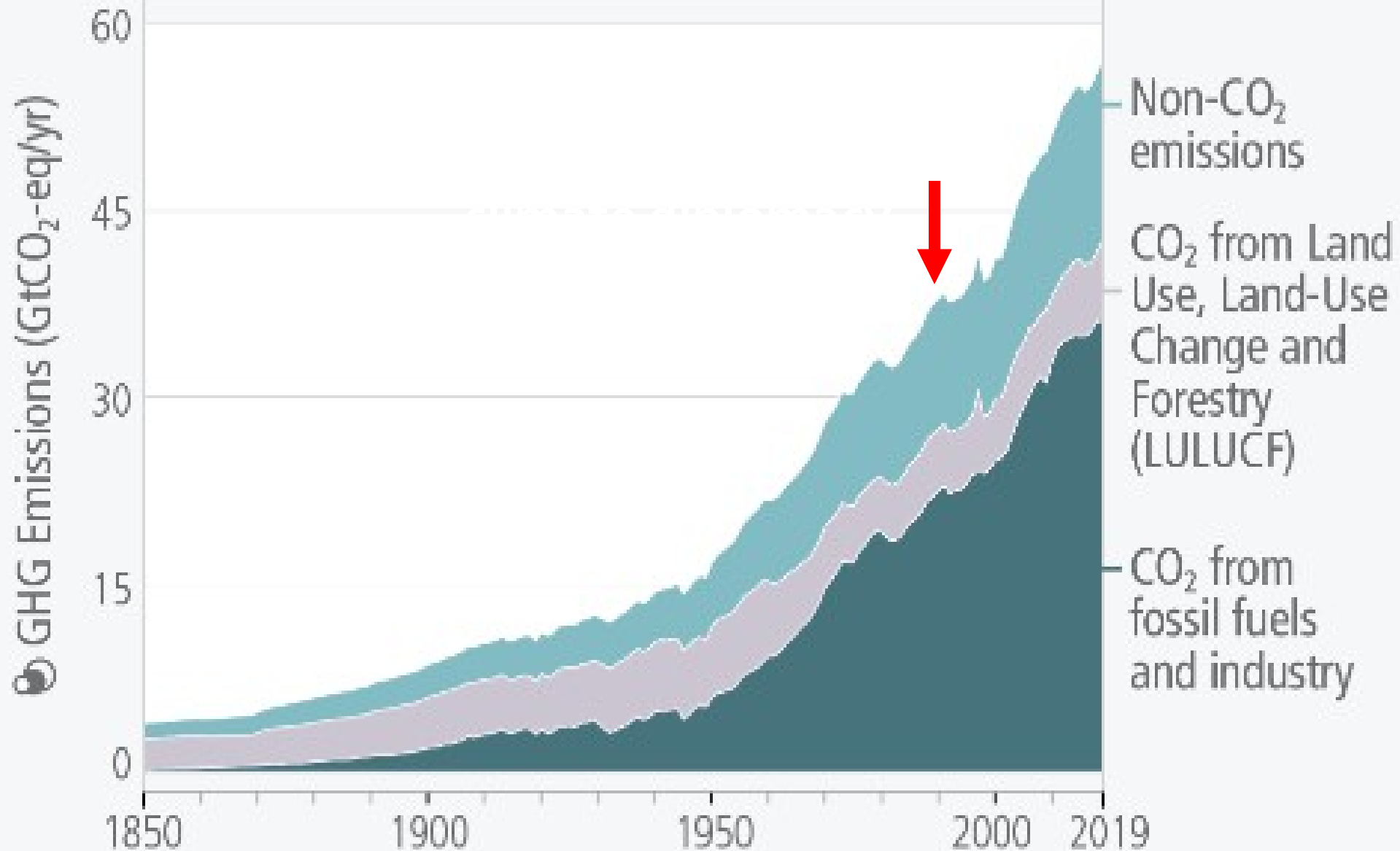
Voorbeelden:

- Fossiele brandstoffen
- Milieuschadelijke subsidies
- Niet-duurzame belastingen
- Niet-duurzame ruimtelijke planning
- Ongelijkheid en armoede

En de rest van de wereld dan?

Greenhouse gas (GHG) emissions resulting from human activities continue to increase

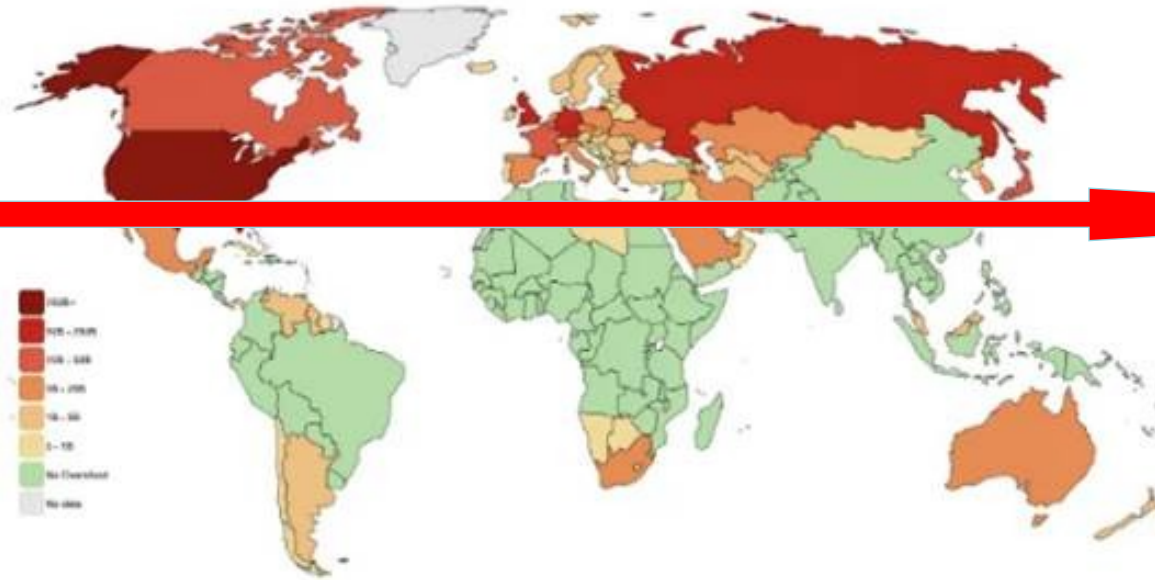
From IPCC, AR6



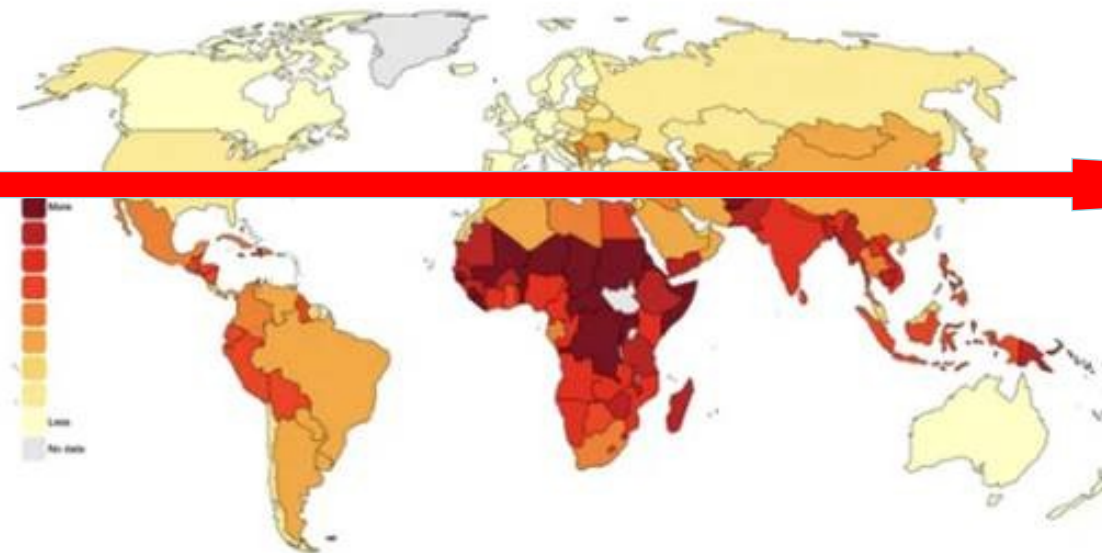
Equity, justice and ethical considerations



Overshoot emissions
(Lancet Planetary Health)

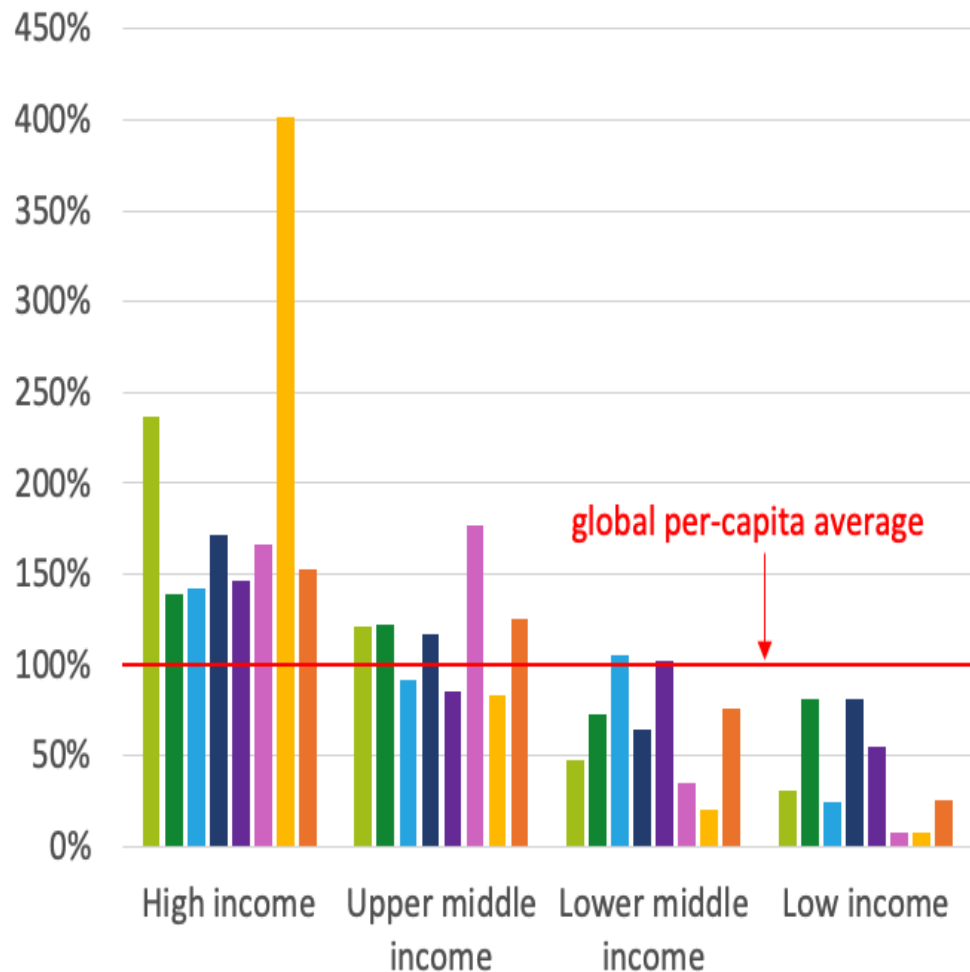


Multi-dimensional climate
vulnerability
(ND-GAIN)

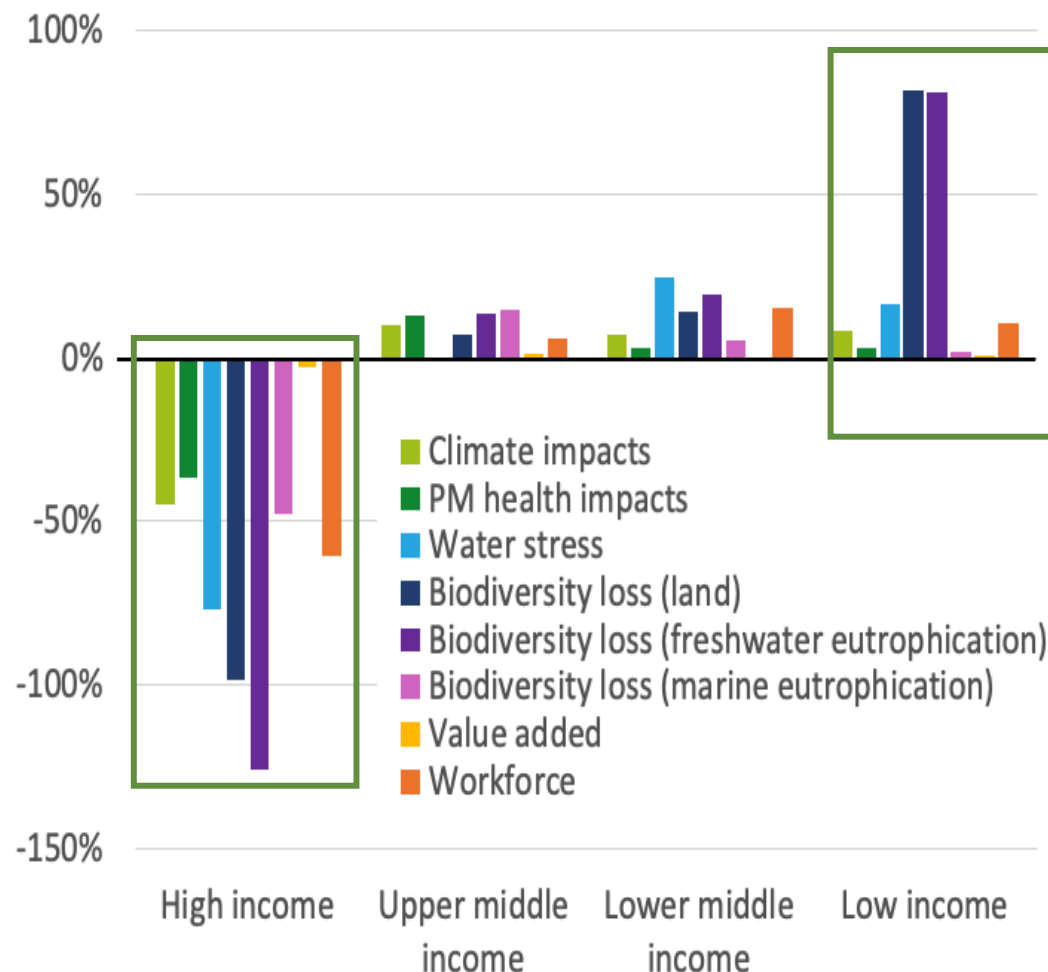


Zeer grote afwenteling op arme landen van ons economisch model en onze welvaart

Per-capita footprints

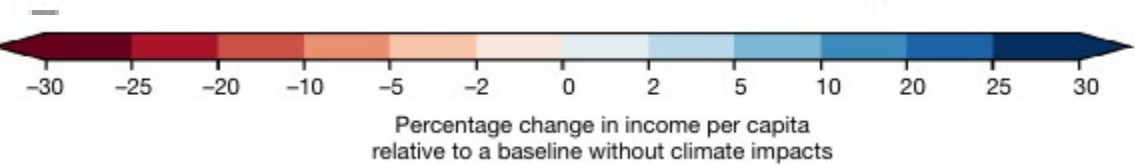
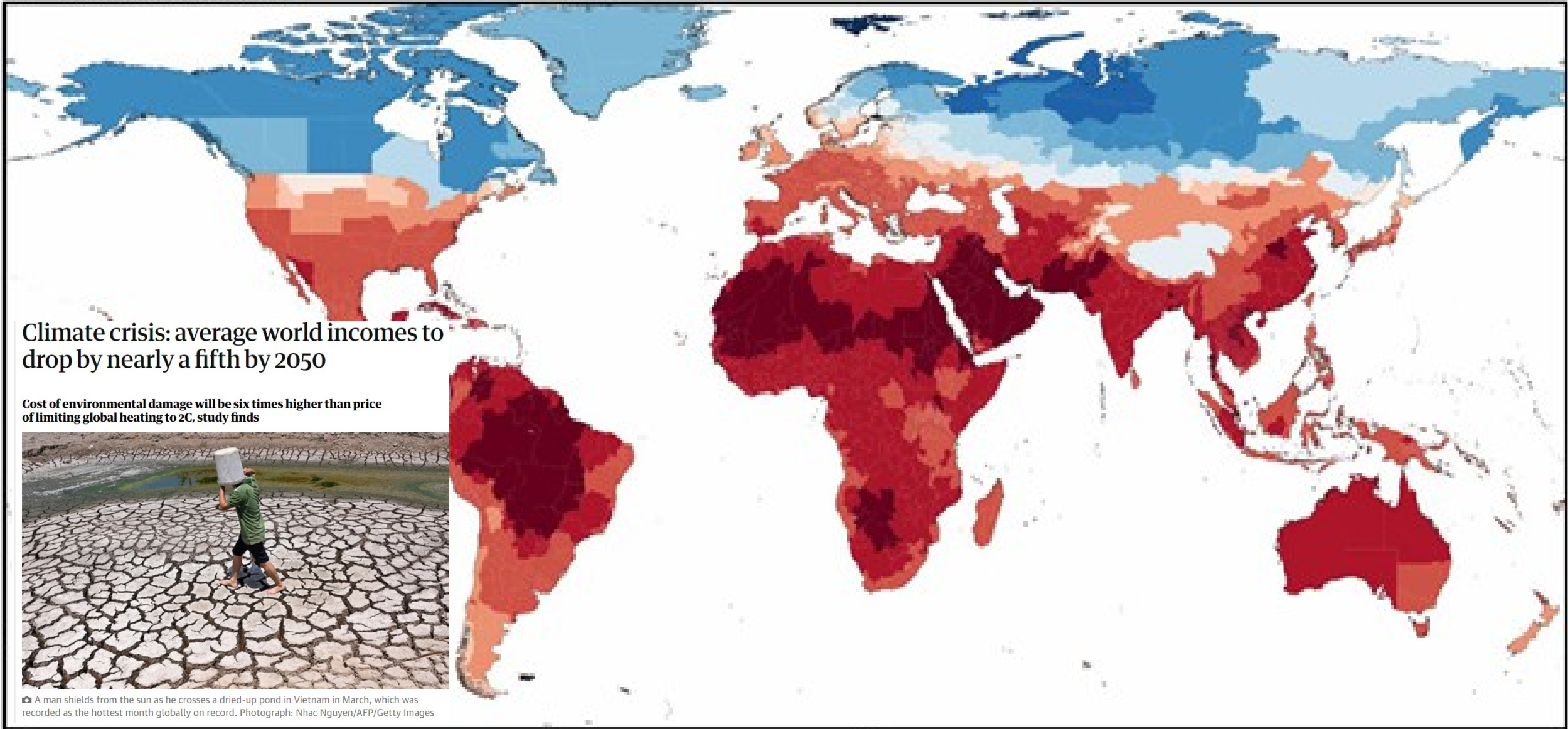


Net displaced impacts



Low-income countries are experiencing high levels of biodiversity loss due to high-income countries consumption

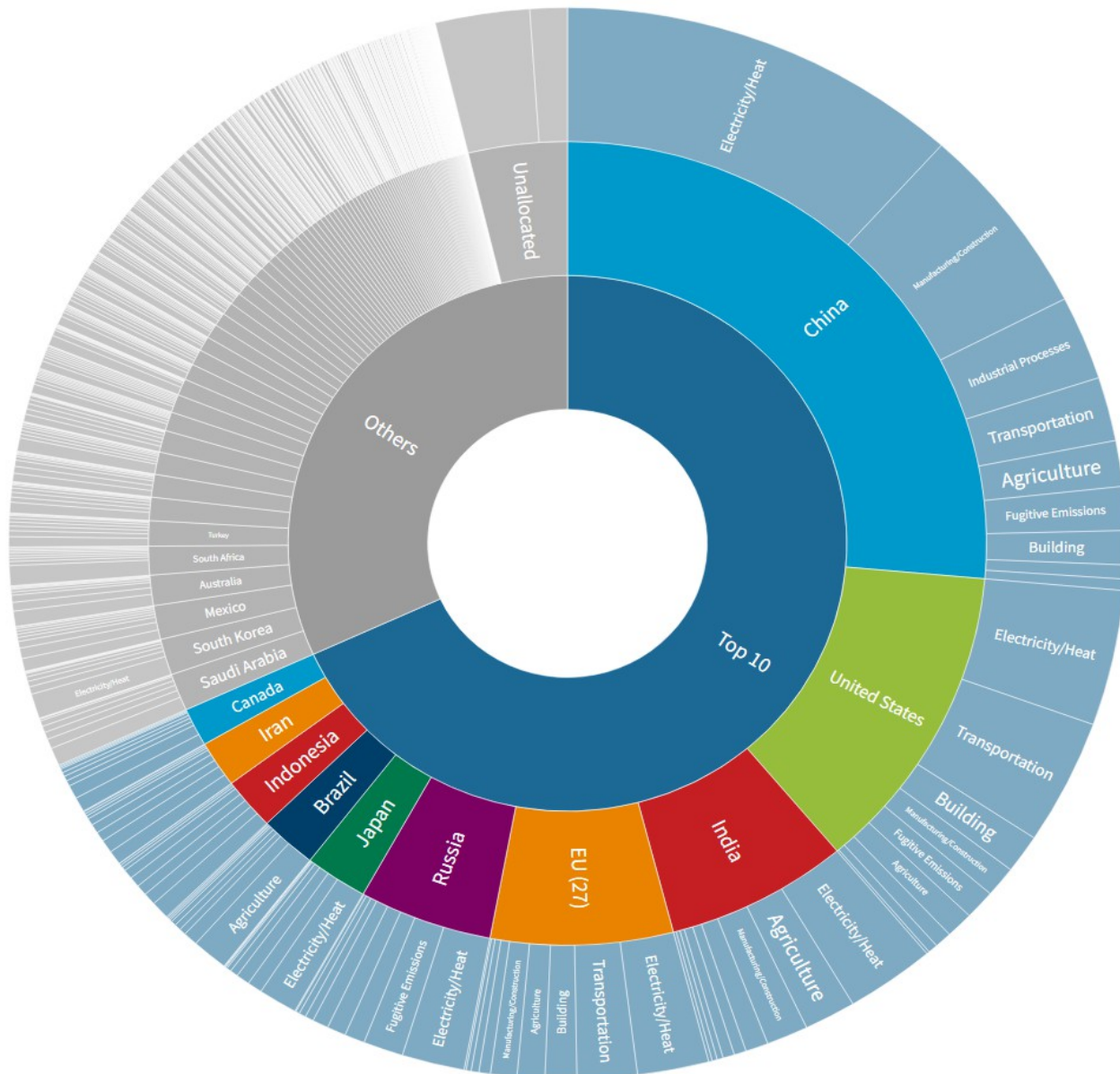
a All climate variables





The Top 10 GHG Emitters Contribute Over Two-Thirds of Global Emissions

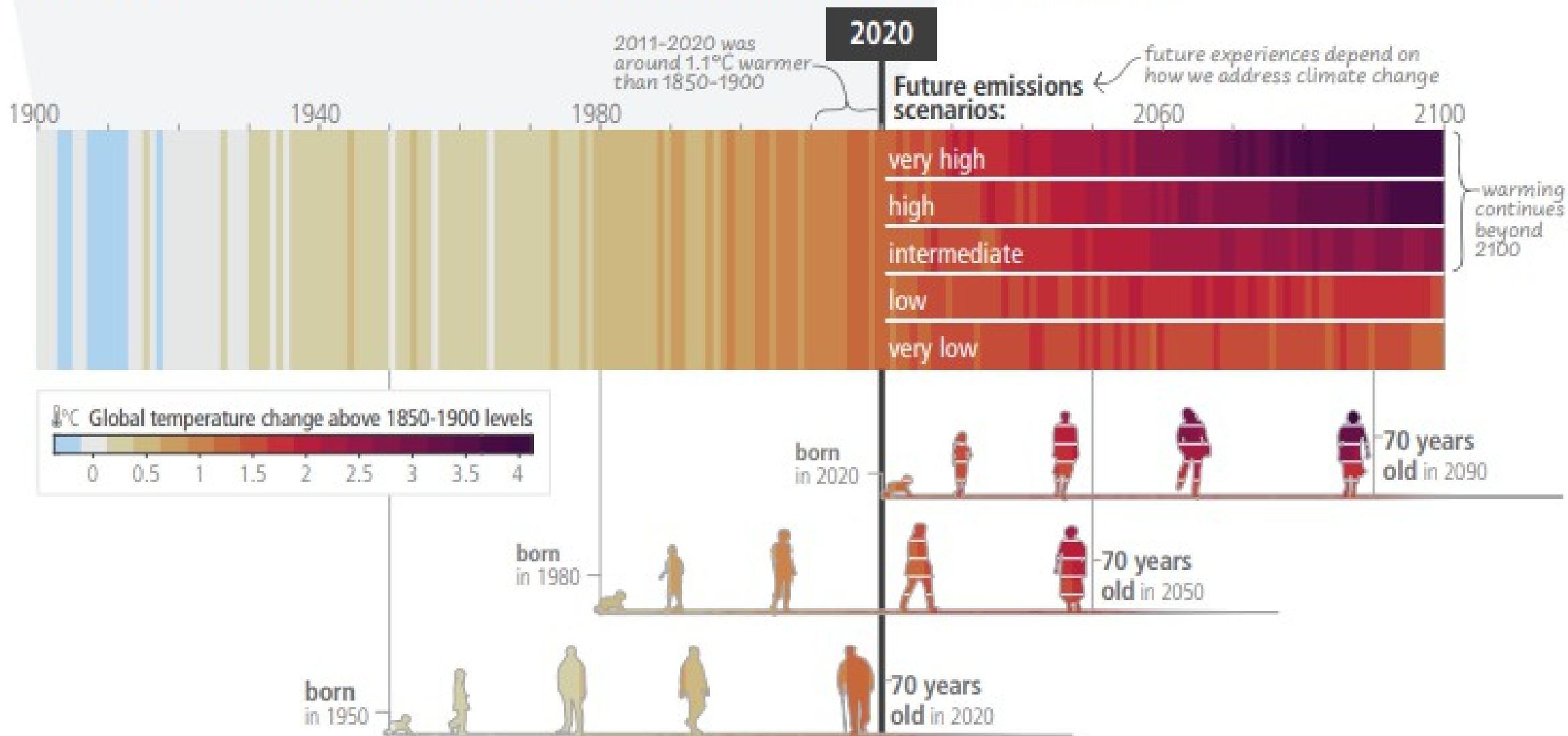
Explore the Latest Global Greenhouse Gas Emissions Data on Climate Watch



Source: Global GHG Emissions 2019 excluding LUCF. [Climate Watch](#) • The EU 27 is considered a country. *Bunker fuels include international aviation and shipping that are not included in country totals. Other territories include regions not covered by Climate Watch country data. See Climate Watch for country level land-use change and forestry and bunker fuel emissions.

- Grootste uitstoters
- Per capita emissies
- Gelijke per capita rechten
- Consumptie emissies
- Historische verantwoordelijkheid
- Verantwoordelijkheid sinds 1990
- Capaciteit om te betalen
- ...
- Centraal in discussies op wereldniveau (in een dysfunctioneel VN systeem)

c) The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near term



Stijl en smal pad naar duurzaamheid



• Ambities onder druk! De illusie van de pauzeknop...

• Duurzaamheid als
'luxe beleid'

• Veiligheid:

Ukrajïne; Gaza;

Redenen voor optimisme?

- Techno-optimisme: “yes, but no”
- ‘Niche’ optimisme: “no, but yes”
- EU-bubble optimisme: “yes, but no”
- Bottom-up optimisme: “yes, but no”

- Optimism gebaseerd op positieve macro-evoluties: energie (IEA; EU), mobiliteit (E-Mobility; CPH), materialen (bio-based), kostenevolutie

- Optimisten leven langer

Conclusie

- Er is geen alternatief voor de moeilijke weg van systeemtransities
- Vlaanderen heeft een uitstekende kennispositie, maar ...o
- Vertrek van de sociale realiteit!

Dank U

Hans Bruyninckx | Turnhouts Wetenschapscafé | 22 april 2024