



Long-Term Risk Thinking: Using Foresight for Climate Resilience

Prof. PhD Sanja Kalambura

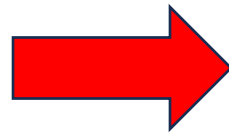
University of Applied Sciences
Velika Gorica
Velika Gorica, 13.11.2025.

Disaster Risk Management online training
seminar series 2025
“Integration of foresight into risk assessment”



CLIMATE THREATS ARE
INCREASINGLY PRESENT, AND
SHORT-TERM APPROACHES ARE
OFTEN INSUFFICIENT.

HOW?



TO SHOW HOW WE CAN PLAN MORE
EFFECTIVELY FOR THE FUTURE
USING LONG-TERM STRATEGIES AND
FORESIGHT.

TODAY WE WILL DISCUSS
HOW LONG-TERM THINKING
ABOUT RISKS AND
PREDICTING FUTURE
SCENARIOS CAN HELP
STRENGTHEN RESILIENCE TO
CLIMATE CHANGE.

Introduction - Long-Term Risk Thinking



Focuses on long-term risks and uncertainties



Considers the complexity and interconnectedness of systems



Enables proactive planning

Introduction: Long-Term Risk Thinking

Long-term risk thinking involves considering not only current problems, but also those that may arise in the coming decades.

It takes into account the **complexity of social, economic, and environmental systems.**

For example, planning a city without considering future floods can result in significant losses in 20–30 years. **Long-term thinking supports proactive planning and risk reduction.**

Short-Term vs Long-Term Planning

Short-Term Planning



- Immediate goals
- Quick results
- Reactive

Long-Term Planning



- Future goals
- Sustainable outcomes
- Proactive

Introduction: Long-Term Risk Thinking

It involves the ability to recognise threats that do not appear immediately but can have a profound and lasting impact on society, the economy, and the environment.

Rather than focusing solely on immediate problems, enables us to identify structural trends – such as **climate change, ecosystem degradation, or demographic shifts** – **that are shaping future realities.**

This approach requires a **combination of data analysis, an understanding of complex systems,** and the ability to anticipate different risk development scenarios.

Long-term risk thinking is essential for building resilience, as it helps organisations make proactive rather than reactive decisions.

Introduction - Long-Term Risk Thinking

When risks are considered over decades, it becomes clearer which investments are most sustainable and where significant future costs can be avoided.

Long-term risk thinking requires a shift in mindset: from **short-term** crisis management **to strategically shaping** a more stable and resilient future.

Long-term planning enables the integration of climate and social uncertainties into policy development, reducing system vulnerability and increasing adaptive capacity.



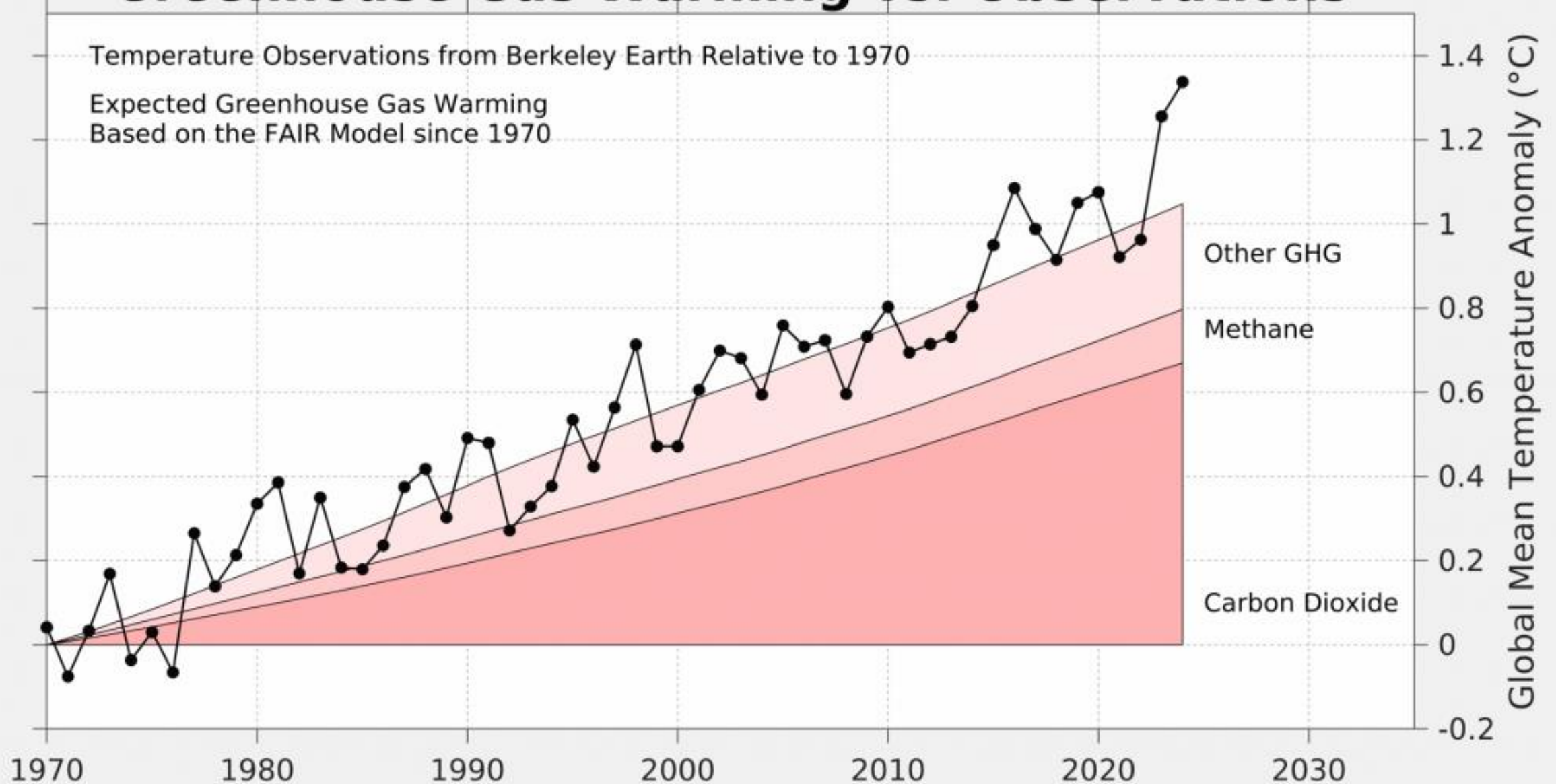
The *climate change!*

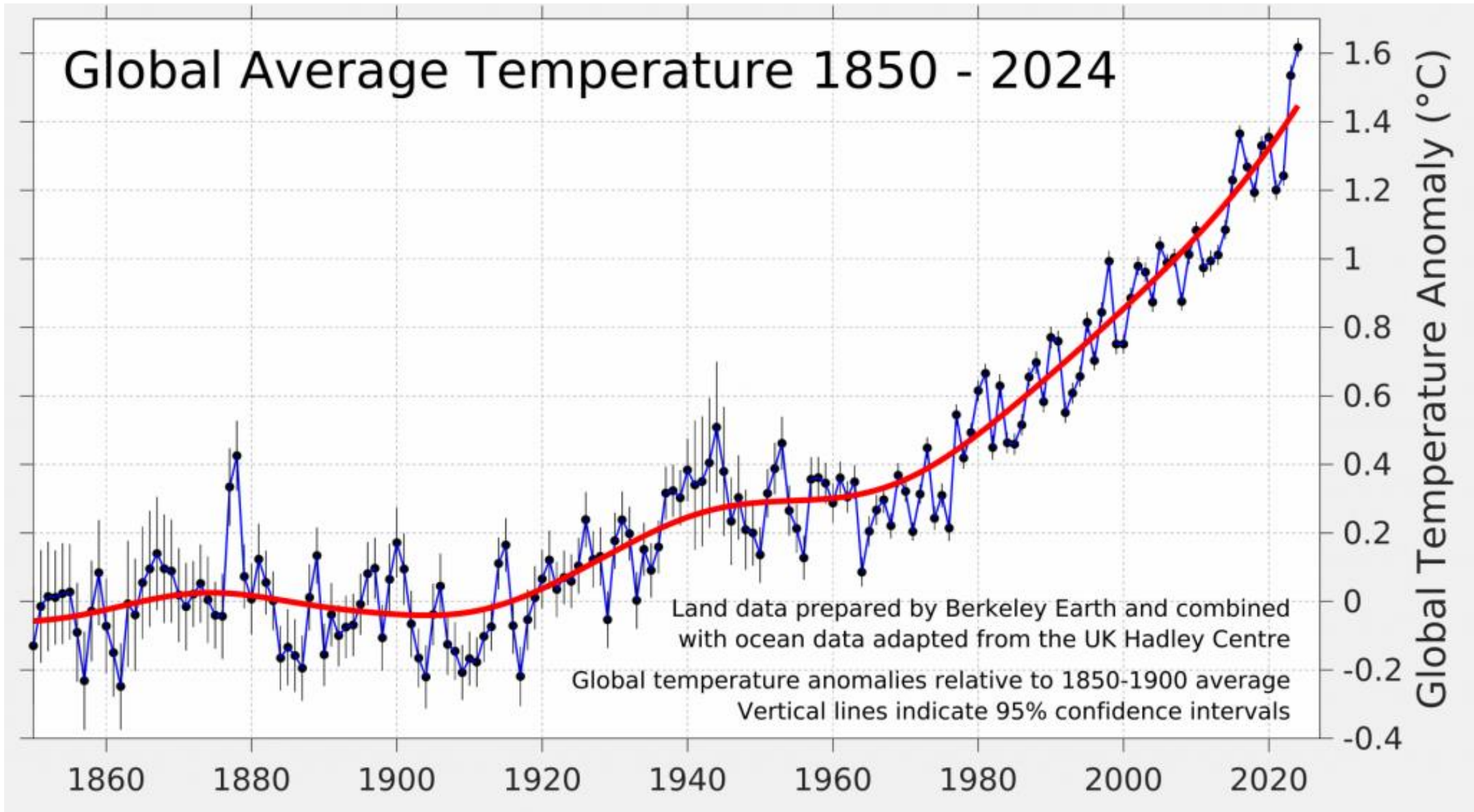
Facts – WMO report 2024

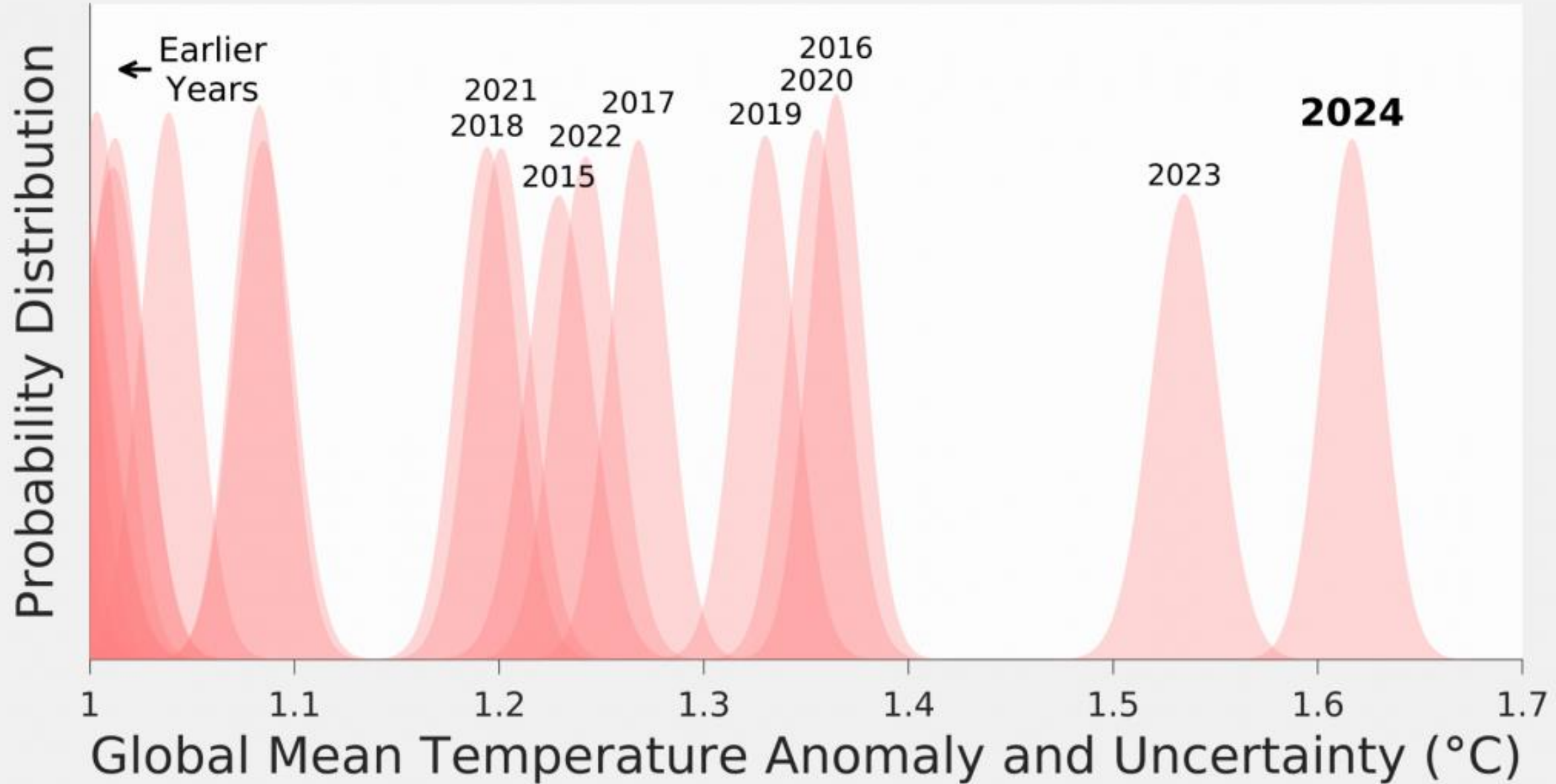
- In 2023, the atmospheric concentration of carbon dioxide, as well as those of methane and nitrous oxide, reached the highest levels in the last 800 000 years
- Real-time data from specific locations show that levels of these three main greenhouse gases continued to increase in 2024.



Greenhouse Gas Warming vs. Observations

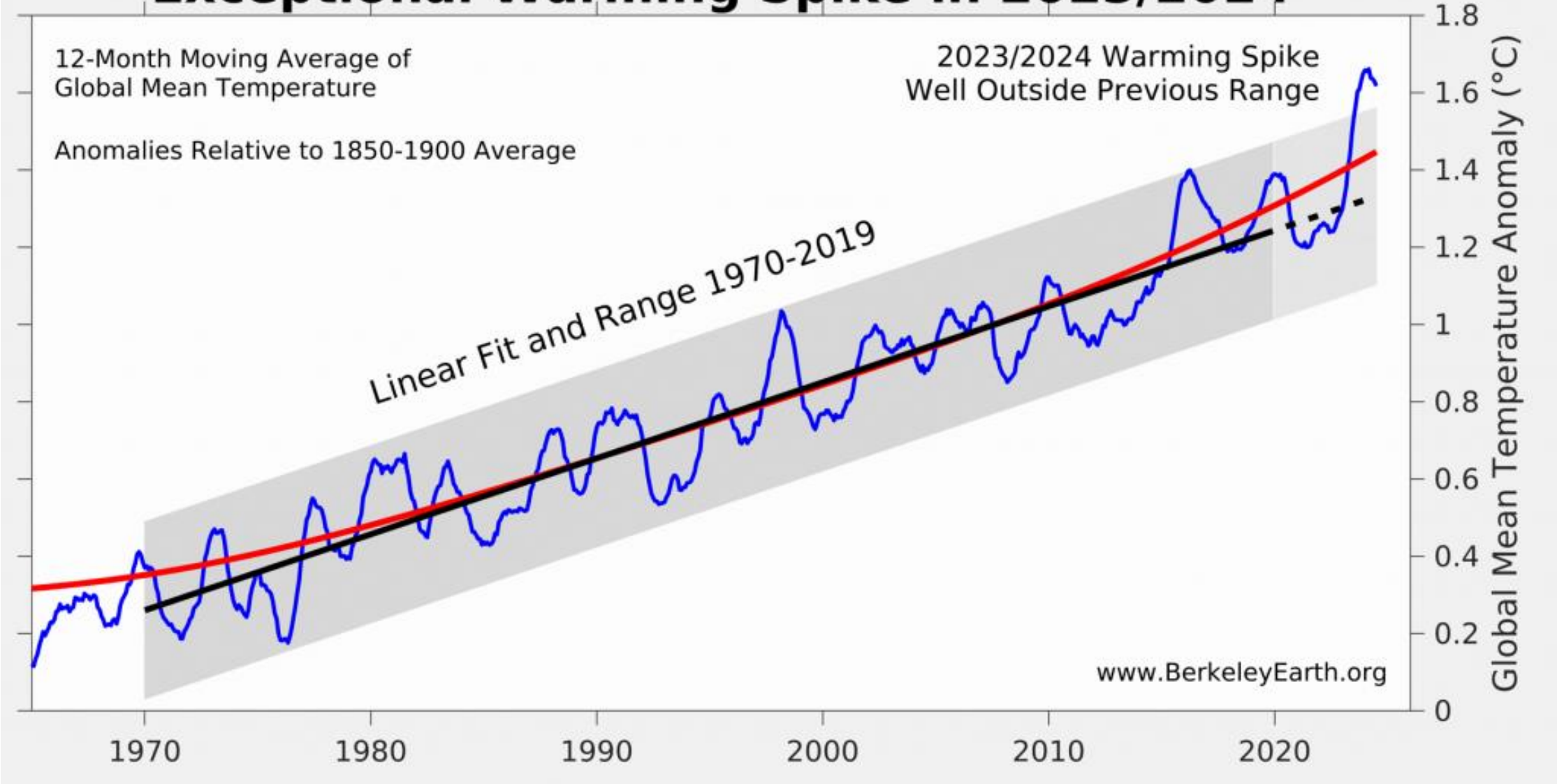




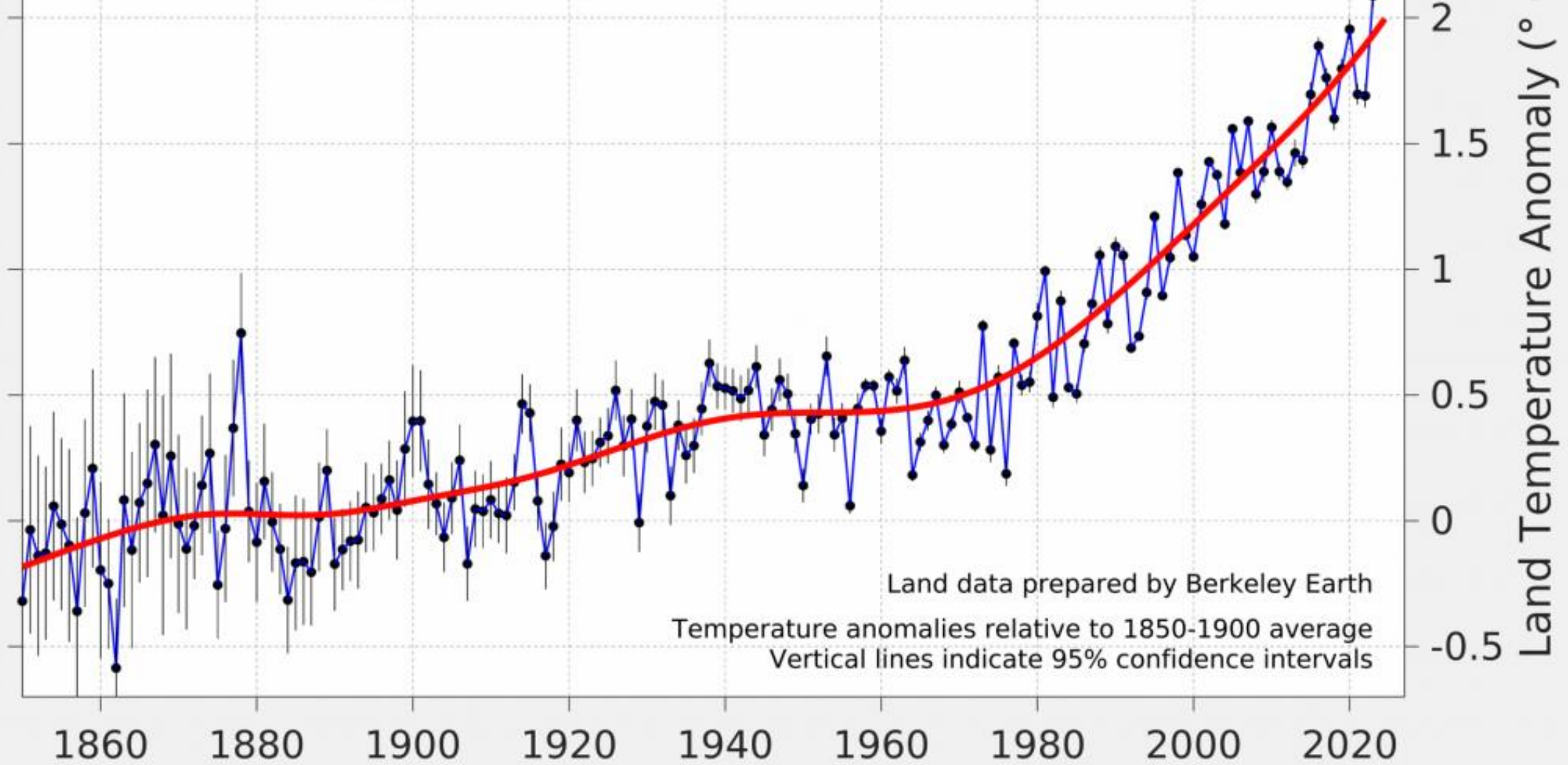


Based on Berkeley Earth's estimates of the global annual average temperature increase relative to 1850-1900. Each year's individual uncertainty is shown, but does not include the systematic uncertainty in the baseline.

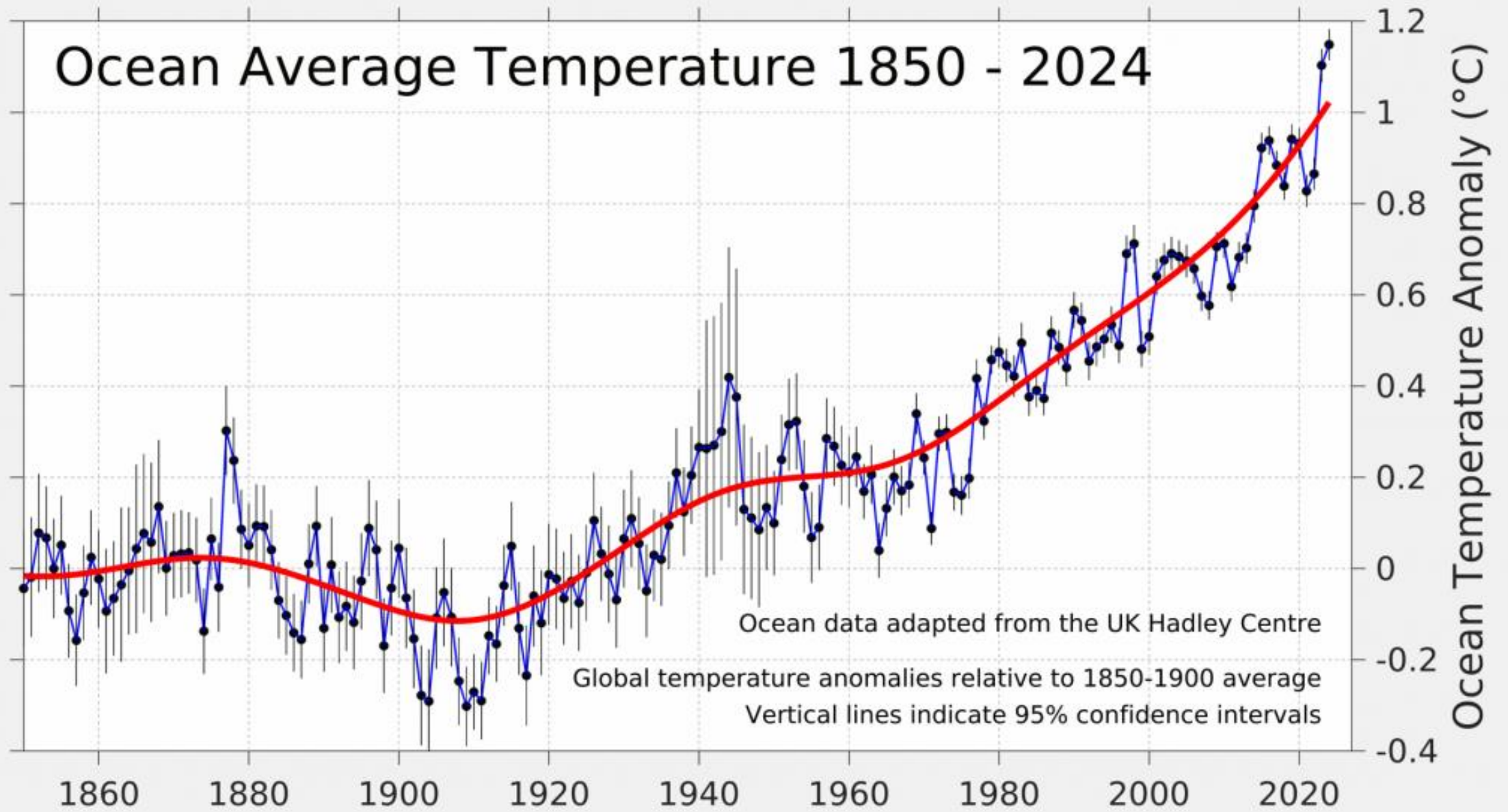
Exceptional Warming Spike in 2023/2024



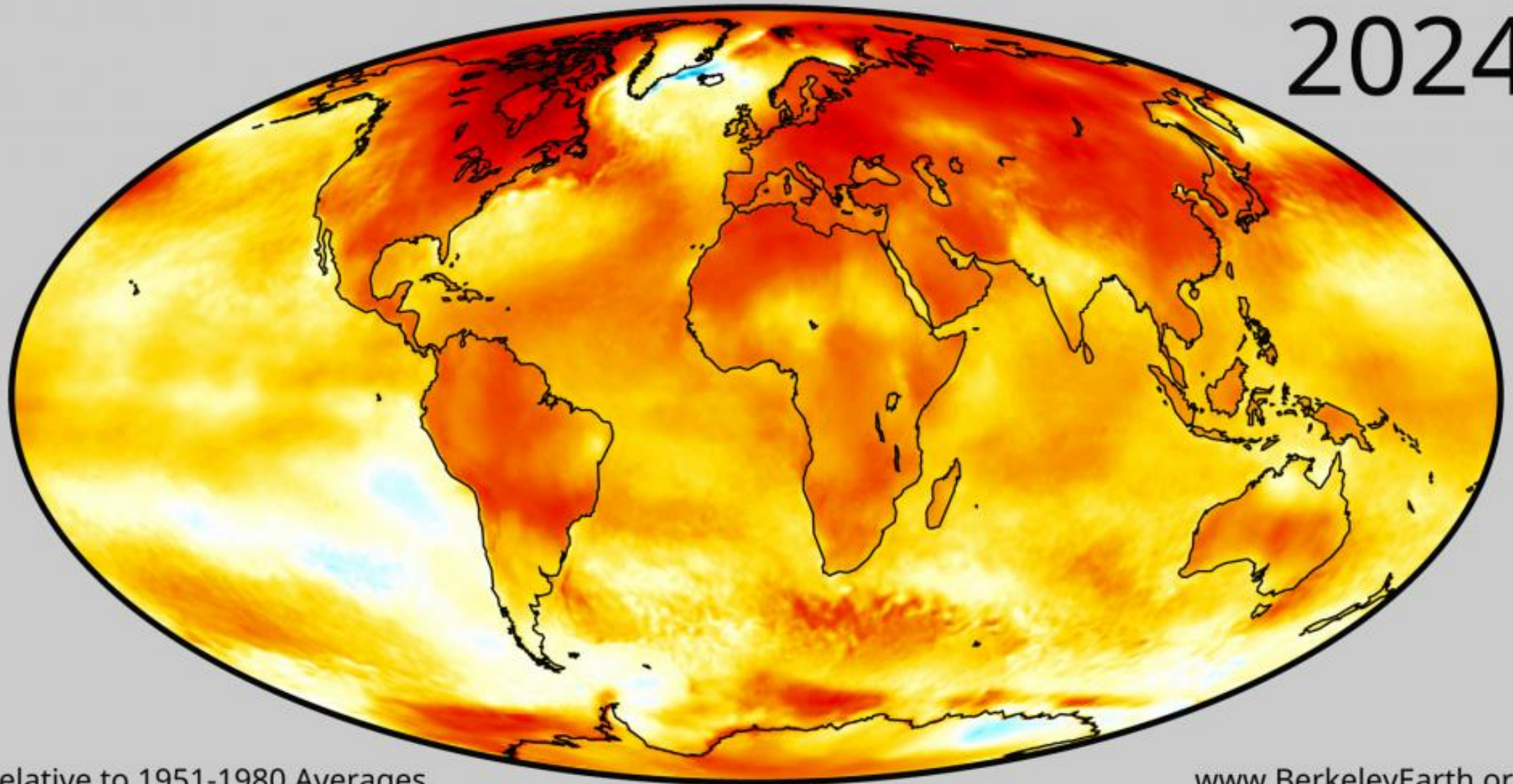
Land Average Temperature 1850 - 2024



Ocean Average Temperature 1850 - 2024

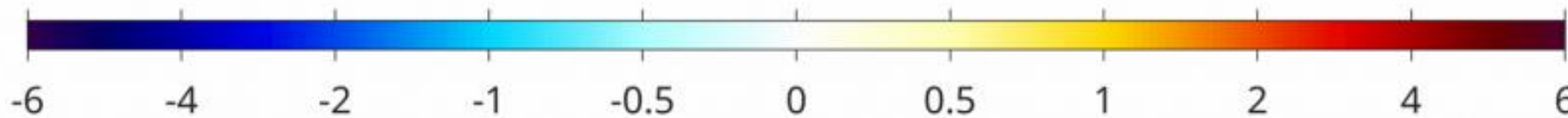


2024



Relative to 1951-1980 Averages

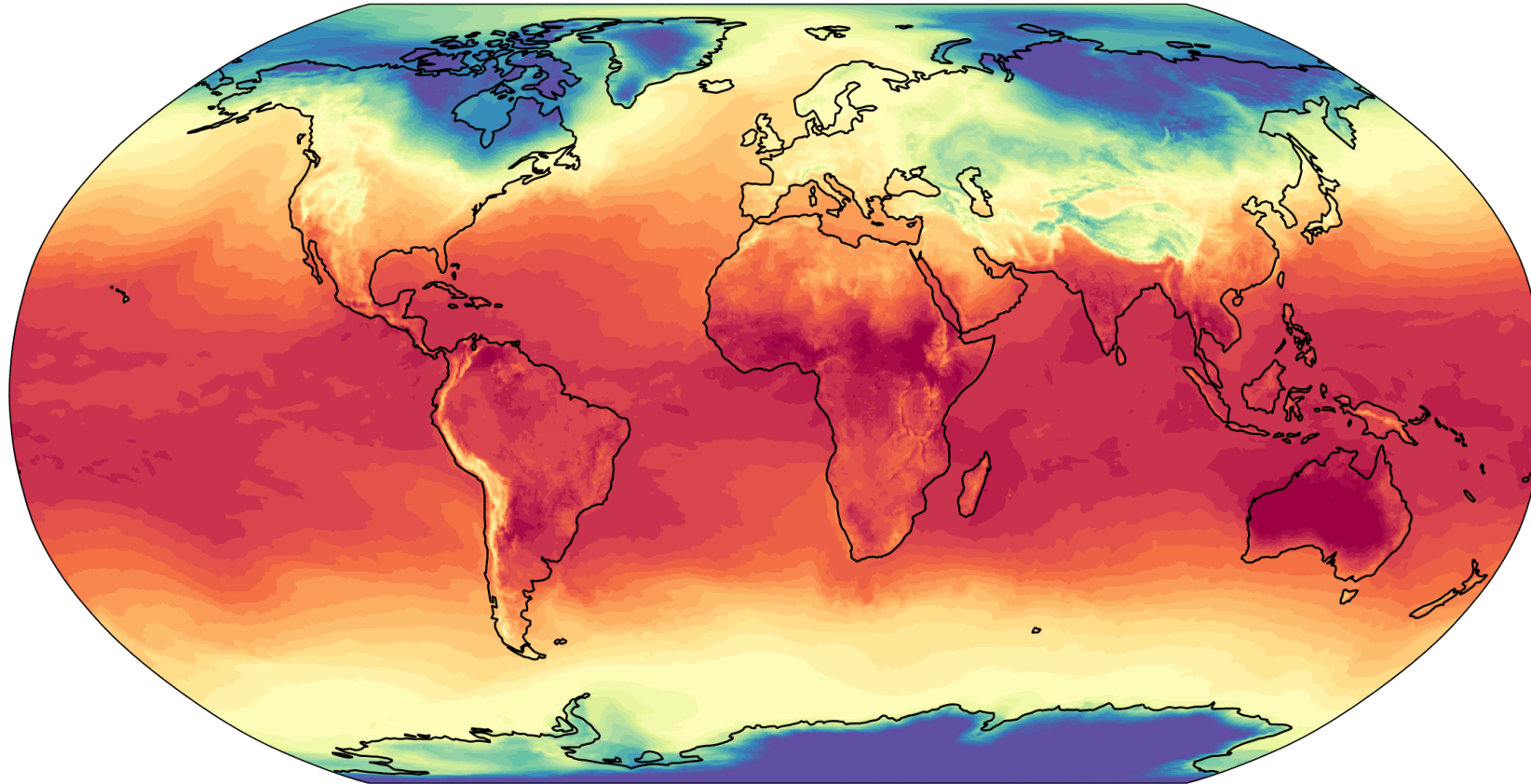
www.BerkeleyEarth.org



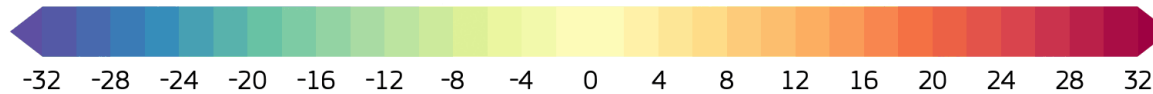
Temperature Anomaly (° C)

SURFACE AIR TEMPERATURE • 28 FEB 2025

Data: ERA5 • Credit: C3S/ECMWF



Temperature (°C)



PROGRAMME OF
THE EUROPEAN UNION

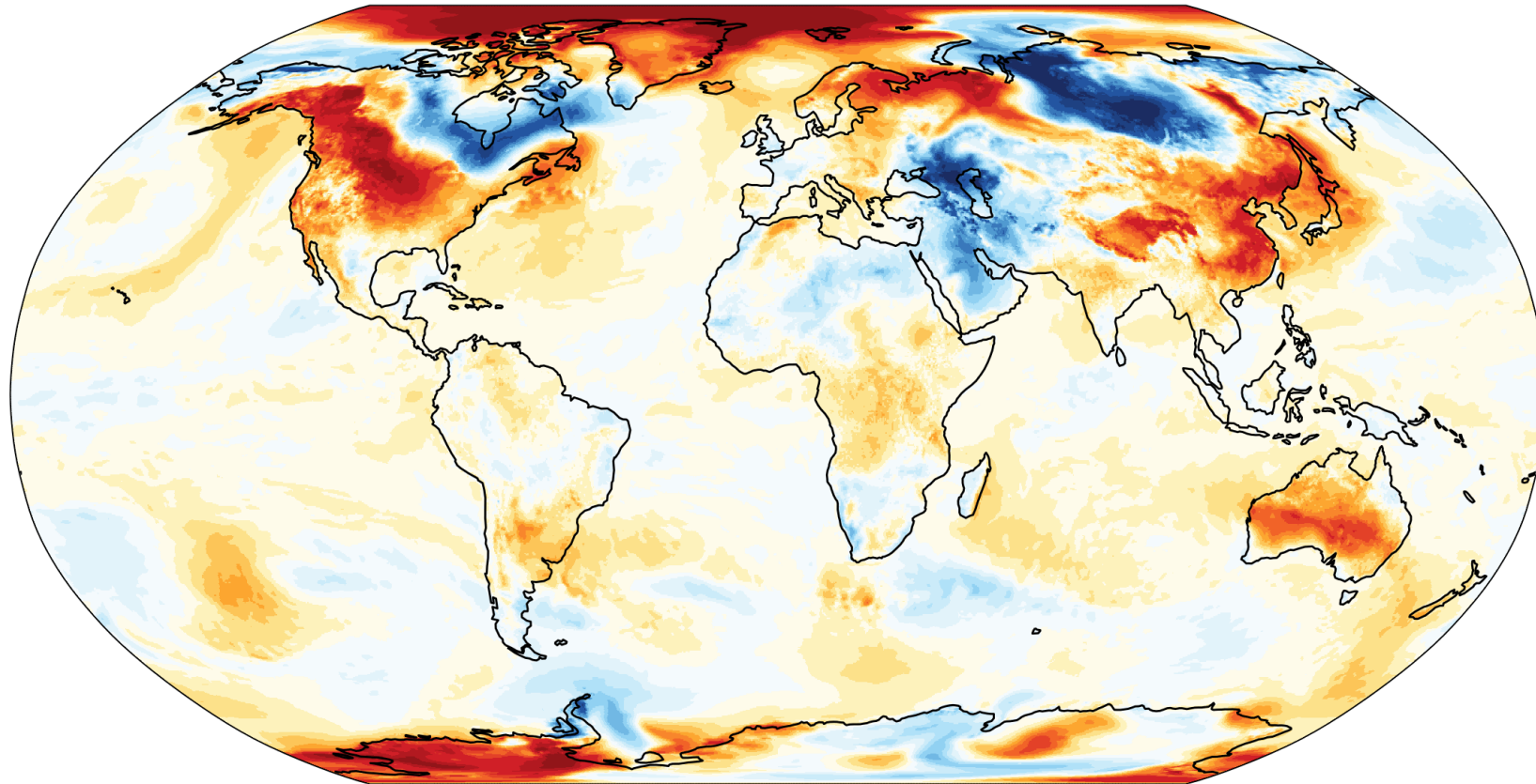


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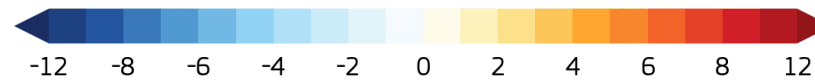


SURFACE AIR TEMPERATURE ANOMALY • 28 FEB 2025

Data: ERA5 • Reference period: 1991–2020 • Credit: C3S/ECMWF



Temperature anomaly (°C)



PROGRAMME OF
THE EUROPEAN UNION

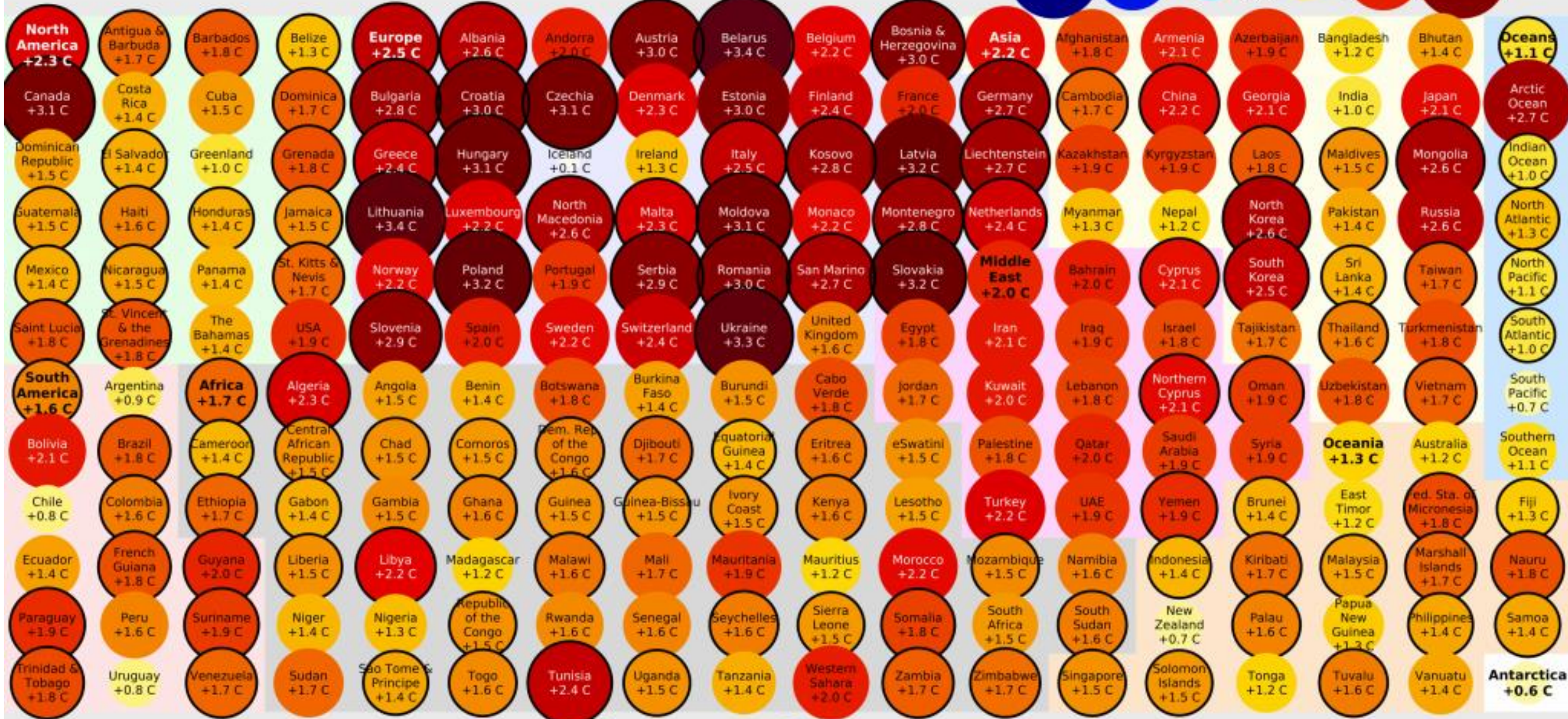


IMPLEMENTED BY
ECMWF



Global Warming by Country & Region

2024



Based on Berkeley Earth's Land+Ocean Dataset

<http://www.berkeleyearth.org/data/>

Land Average
+1.83 C, +3.29 F

Global Average
+1.29 C, +2.33 F

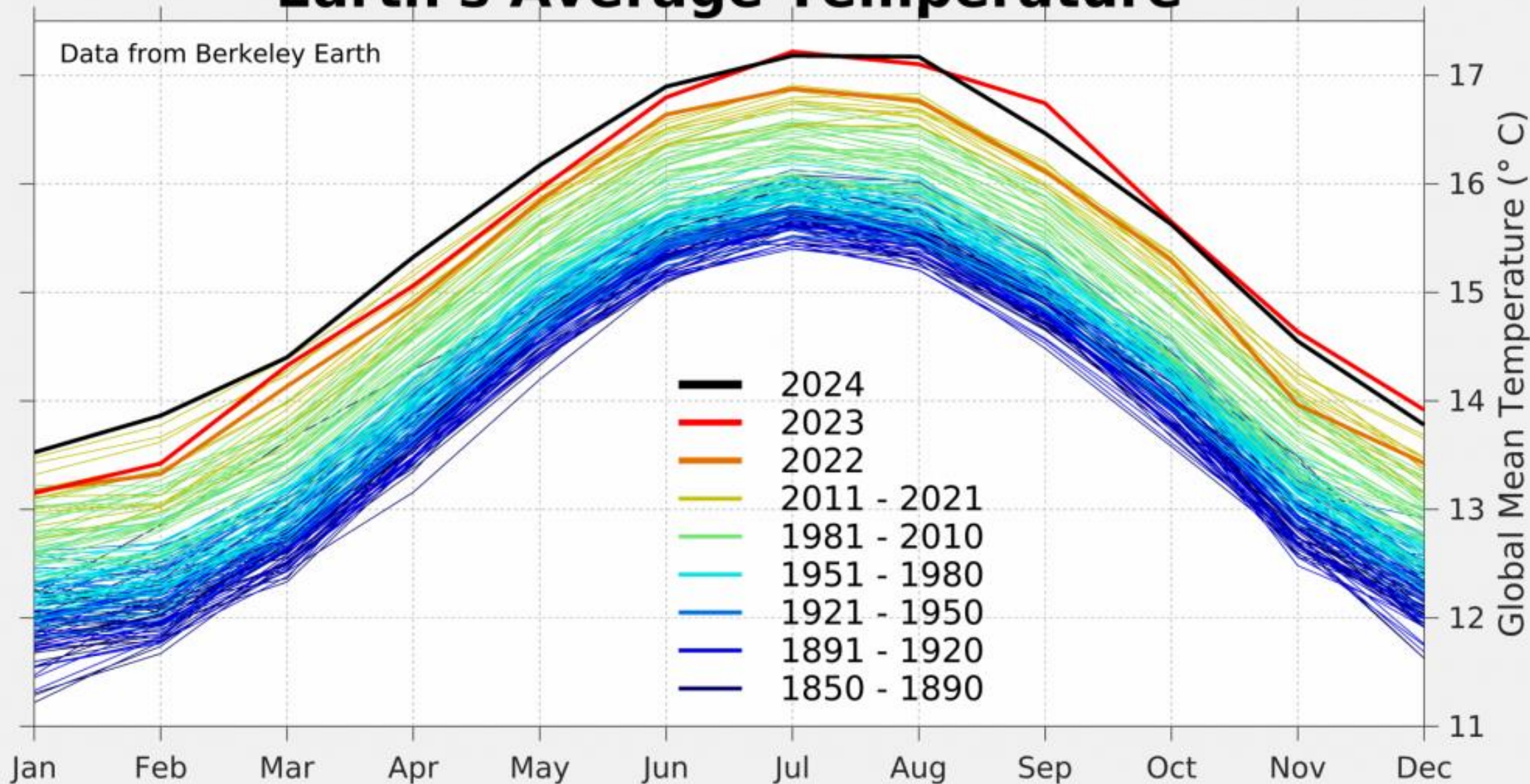
Ocean Average
+1.08 C, +1.94 F

Anomalies relative to the 1951-1980 climatology

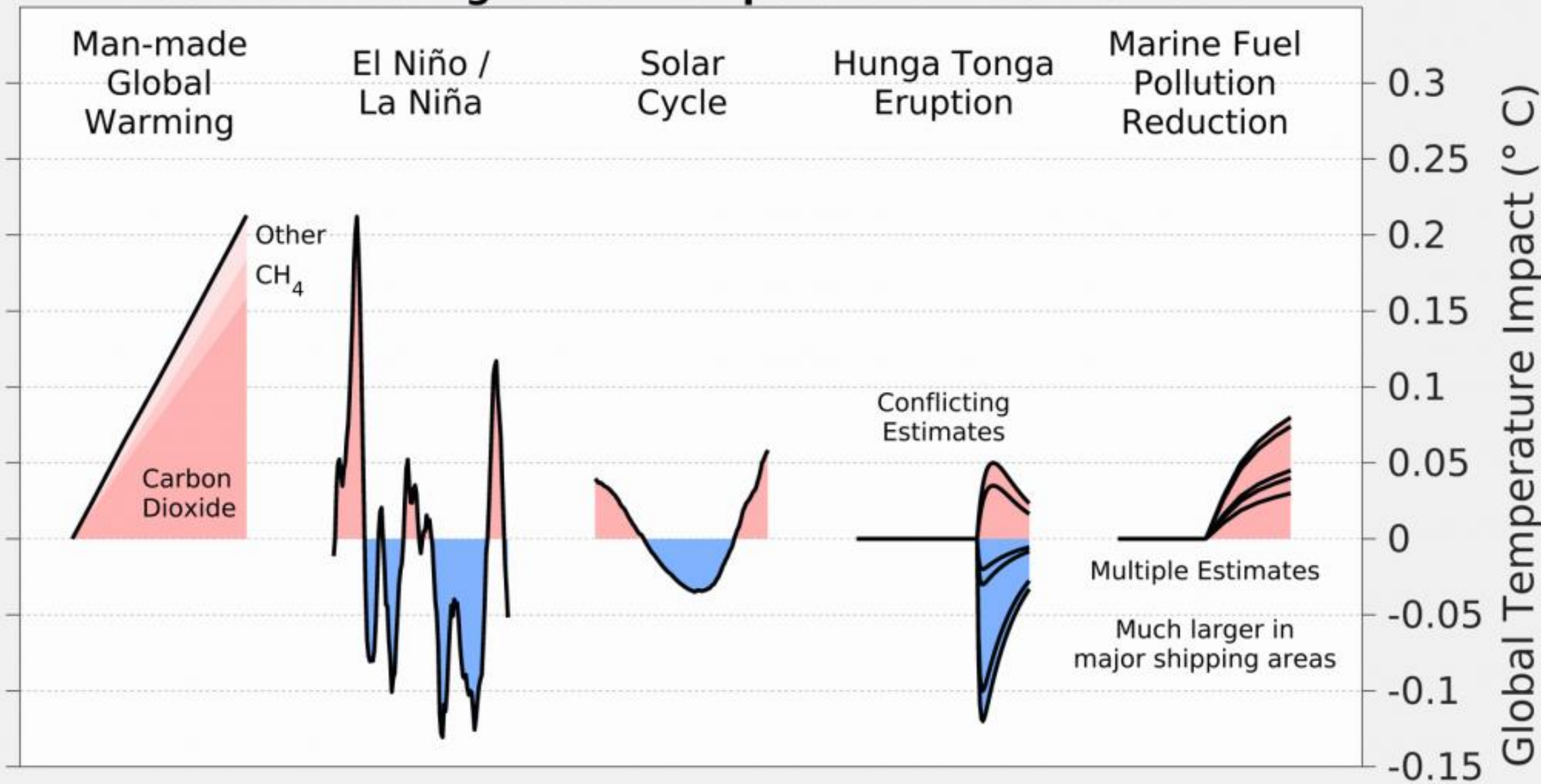
Black outlines indicate a new record year

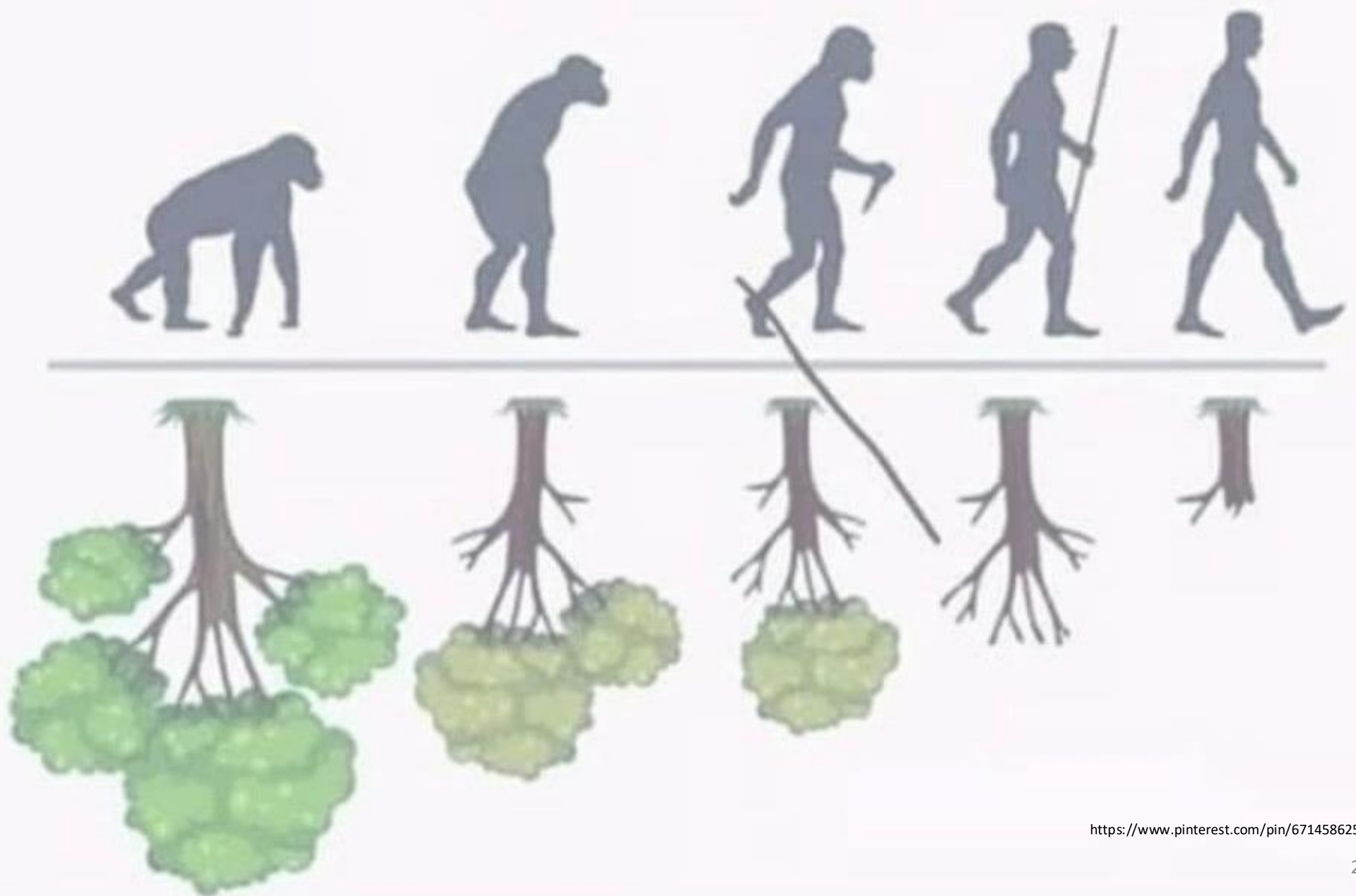
Earth's Average Temperature

Data from Berkeley Earth



Factors Affecting Global Temperature - Last 10 Years





Climate Facts

Record-Breaking Heat

- **2024** was the **warmest year** in the past 175 years
- **The last decade** was the hottest on record

 **“We are living through the hottest years in human history.”**

Climate Facts

Greenhouse Gases

- Levels of carbon dioxide and methane continue to rise
- They have now reached their highest levels in at least 800,000 years



“This shows how rapidly human activity is changing the atmosphere.”

Ocean Changes

- The oceans are warmer than ever
- Sea levels are rising twice as fast as when satellite tracking began
- Ocean acidification is also increasing



**“Our oceans are absorbing most of the heat
– but at a great cost.”**

Climate Facts

Climate Facts

Melting Ice and Glaciers

- Glaciers are **melting faster** than ever
- The past three years have seen the largest glacier loss on record
- Antarctic sea ice reached its second-lowest extent ever recorded



“The cryosphere – Earth’s frozen parts – is shrinking rapidly”

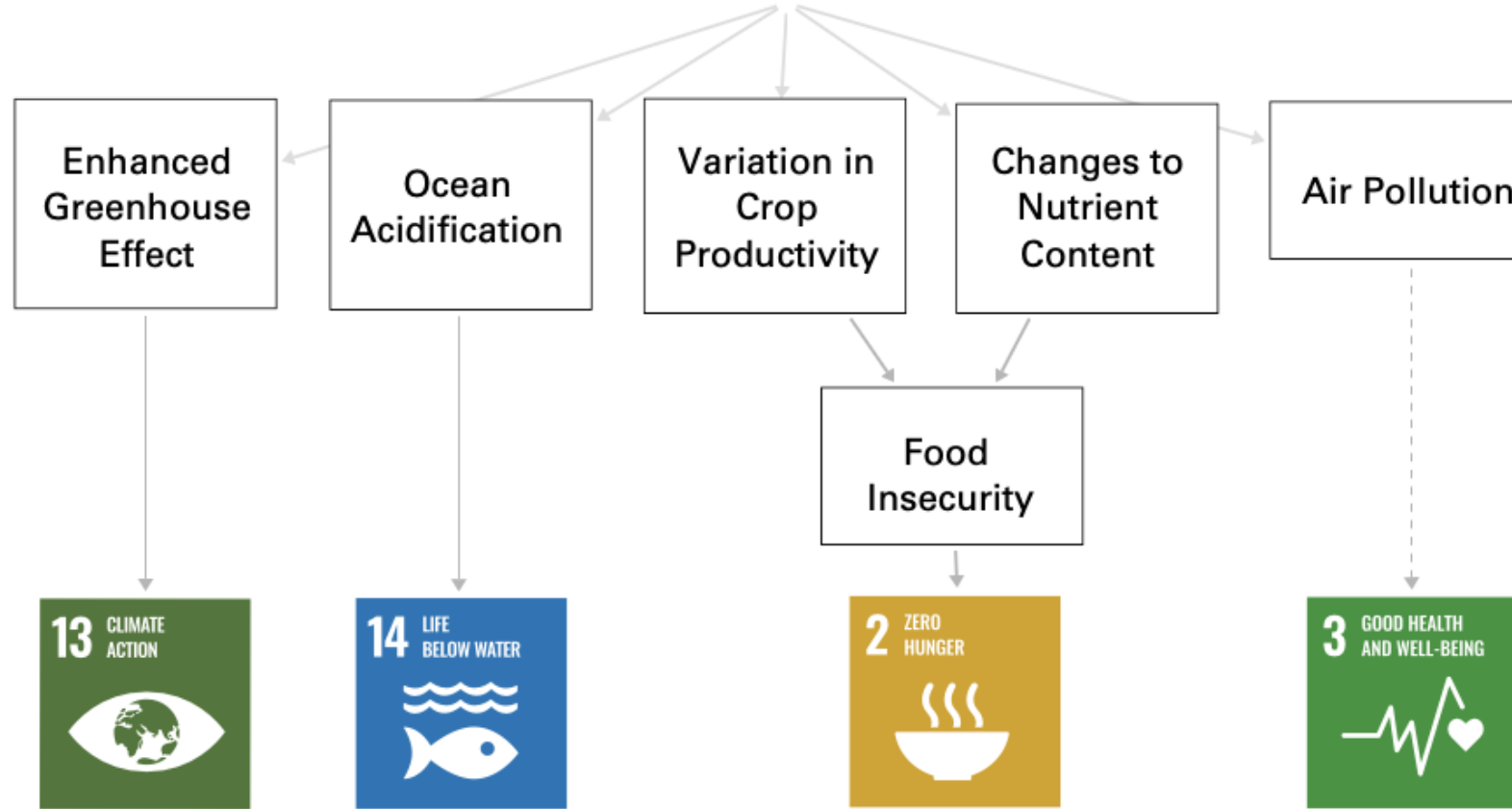
Climate Facts

Extreme Weather Events

- In 2024, there was a surge in devastating weather disasters
- These included tropical cyclones, floods, and droughts across the world
- They caused the highest number of new displacements in 16 years

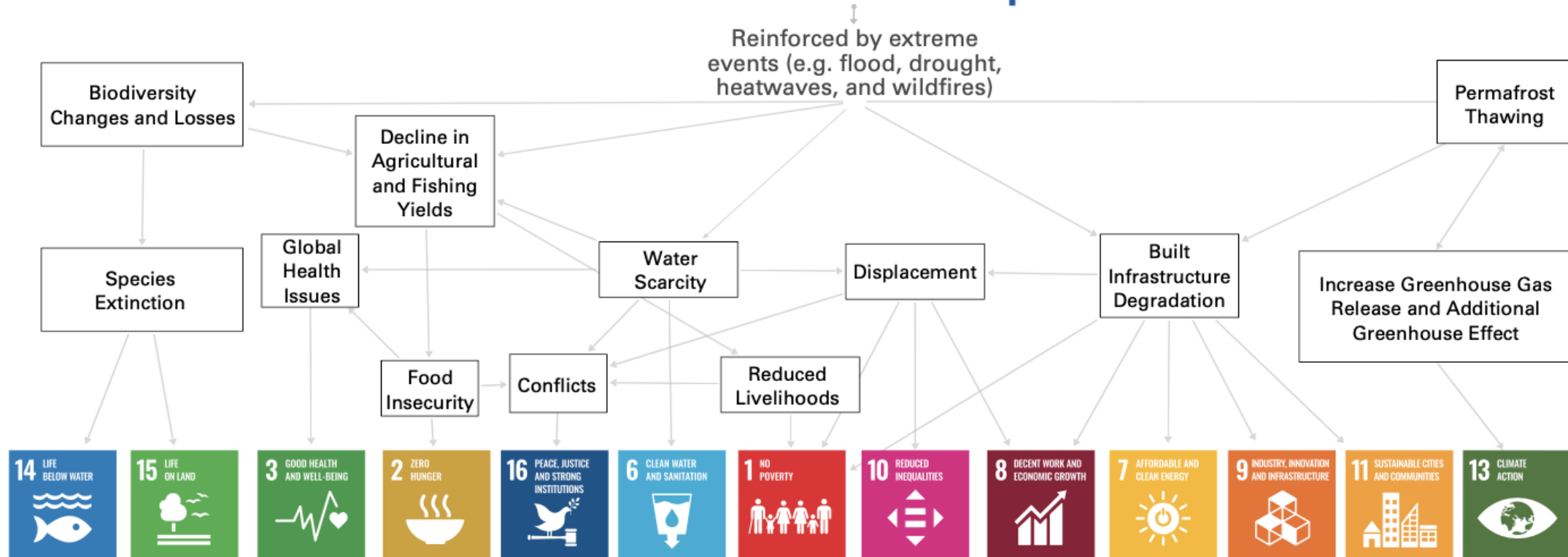
 **“More people than ever are being forced to move because of extreme weather”**

Atmospheric CO₂



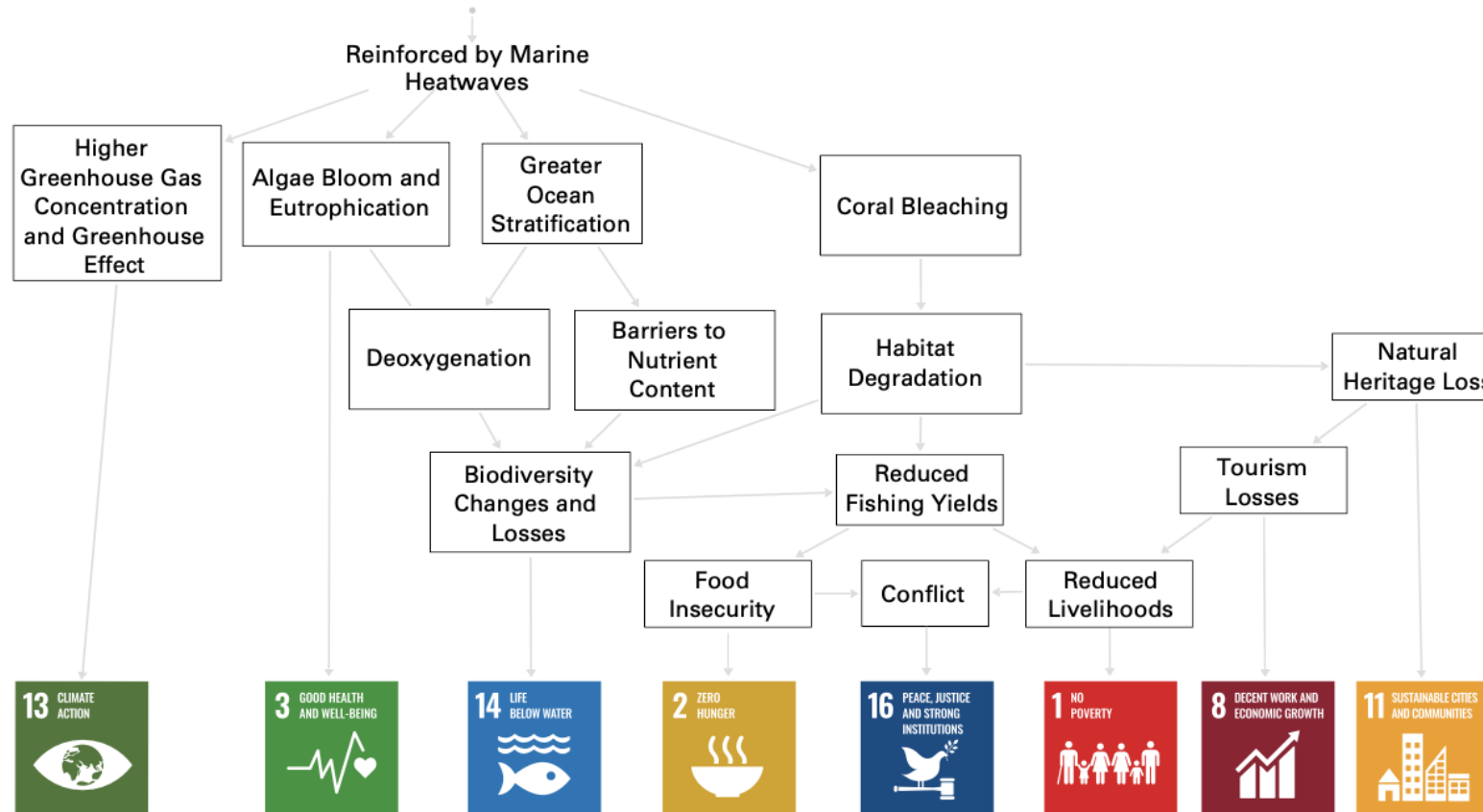
Associated risks of atmospheric CO₂ and the Sustainable Development Goals

Global Mean Surface Temperature



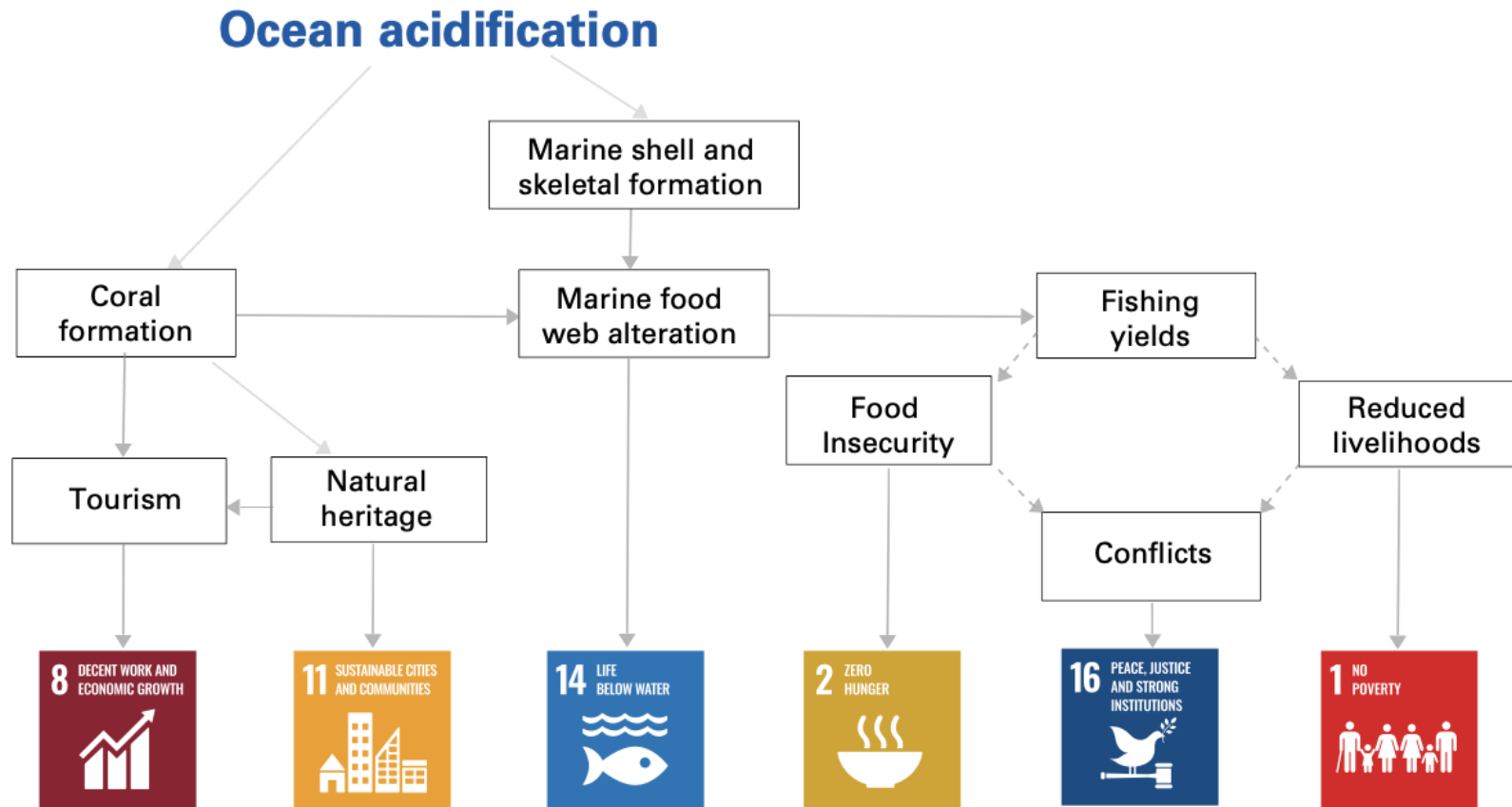
Associated risks of increased global mean surface temperature and the Sustainable Development Goals

Ocean Heat Content



Associated risks of increased ocean heat content and the Sustainable Development Goals

Source: State of the Global Climate 2024, WMO (2025)



Associated risks of ocean acidification and the Sustainable Development Goals

Source: State of the Global Climate 2024, WMO (2025)



Climate change presents long-term and unpredictable threats.

Traditional approaches often respond too late.

Long-term thinking helps prepare systems and communities.

A small green seedling with two leaves is growing out of a crack in dry, cracked earth. The background is a vast expanse of cracked, parched soil, symbolizing resilience and hope in the face of climate change.

Climate Risk Foresight essentially involves anticipating how changing climate patterns may affect us.

Long-term risk thinking and climate

Long-term risk thinking **uses foresight to build climate resilience** by anticipating future climate challenges and developing **proactive strategies** that extend beyond short-term planning.

It involves methods such as **scenario planning and horizon scanning** to explore multiple future possibilities, enabling businesses, governments, and communities to prepare for uncertainty by adapting infrastructure, informing policy, and creating more robust and resilient plans.

Understanding Climate Risk Foresight



It begins with grasping its fundamental as a process designed to anticipate and prepare for the potential negative impacts stemming from [climate change](#).



It represents a **forward-looking approach**, moving beyond historical data to project future climate scenarios and their likely consequences in various domains



This begins with acknowledging that past performance does not indicate future climate-related outcomes, necessitating a proactive stance against escalating environmental changes.

Key foresight methods for climate resilience

Long-term risk thinking uses foresight to build climate resilience by:

1. **Scenario planning**: Creates different future scenarios to explore their implications and test strategies against a range of possibilities.
2. **Horizon scanning**: Detects early signals of change in the present to anticipate potential future impacts.
3. **Megatrends analysis**: Examines large-scale, long-term changes in society, the economy, and technology to understand complex, multidimensional impacts.
4. **Visioning and back-casting**: Defines a desired future state and then works backward to identify the necessary steps to achieve it.
5. **The Futures Wheel**: helps identify the ripple effects of trends or events, enabling exploration of multiple future scenarios and the development of proactive strategies for climate resilience.



1. Scenario planning – what is scenario?

- A scenario is a coherent, internally consistent and plausible description of a possible future state of the world. It is not a forecast; rather, each scenario is one alternative image of how the future can unfold (**IPCC, 2011**)
- Scenarios are plausible alternative futures—each an example of what might happen under particular assumptions. Scenarios are not specific predictions or forecasts. Rather, scenarios provide a starting point for examining questions about an uncertain future and can help us visualize alternative futures in concrete and human terms. (**USGCRP, 2011**) - The United States Global Climate Research Program

1. Scenario planning – what is scenario?

- Scenarios are stories about how the future might unfold for our organizations, our communities and our world. Scenarios are not predictions. Rather, they are provocative and plausible accounts of how relevant external forces—such as the future political environment, scientific and technological developments, social dynamics, and economic conditions—might interact and evolve, providing our organizations with different challenges and opportunities (**GBN, 2011**) - The Global Business Network
- A scenario is a story that describes a possible future. It identifies some significant events, the main actors and their motivations, and it conveys how the world functions. Building and using scenarios can help people to explore what the future might look like and the challenges of living in it. (**Parson et al. 2007**)



1. Scenario planning

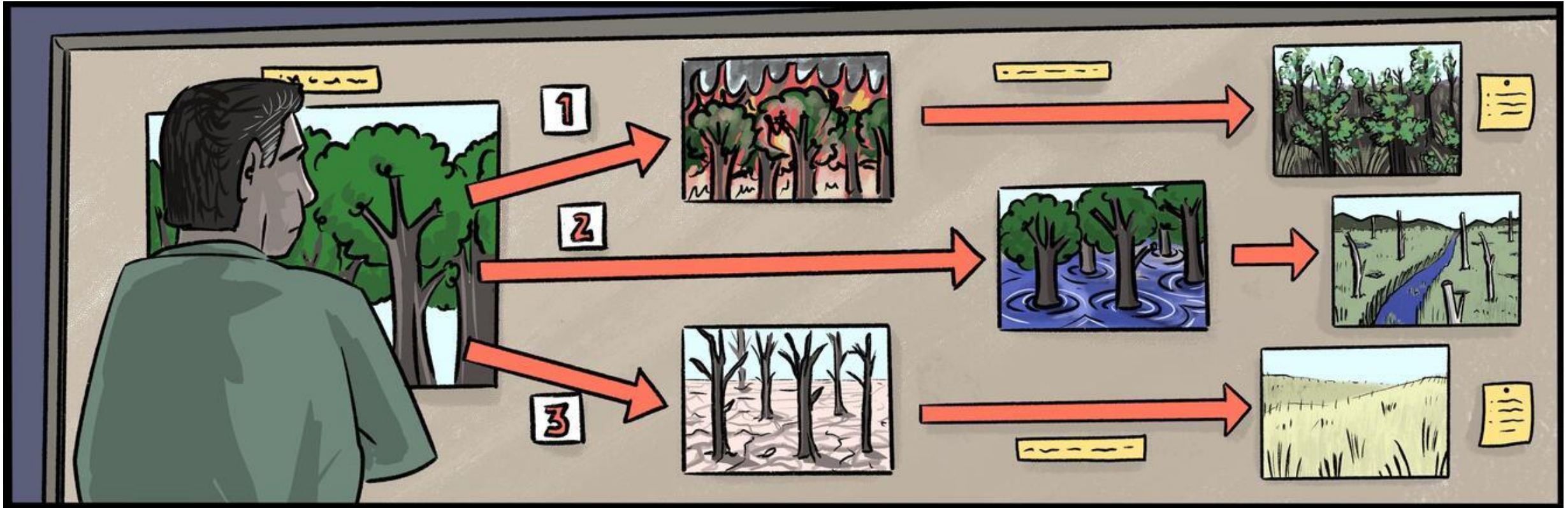
- Scenario planning is a strategic thinking method that involves creating multiple possible futures to understand how different trends, uncertainties, and risks might shape future conditions.
- Instead of predicting a single “most likely” future, **this approach develops three to five alternative scenarios** – ranging from optimistic to stressful – that help organisations explore what might happen, what the impacts would be, and how their strategies would perform under different conditions
- Scenario planning is a tool for grappling with the uncertainties of tomorrow by asking a simple question: **What might happen?**
- By using scenarios, organisations can test which strategies are resilient, adaptable, or likely to fail, preparing for both expected and extreme climate or economic changes



1. Scenario planning

- Scenario planning **helps identify “blind spots”** in thinking, encourages creativity, and creates space for considering risks that might otherwise go unnoticed.
- This method is particularly useful for climate resilience, as it allows simulation of different levels of warming, intensities of extreme events, and socioeconomic changes.





[Source: Deep Dive: Climate Change Scenario Planning | U.S. Geological Survey](#)

1. Scenario planning

- <https://www.nps.gov/subjects/climatechange/scenarioplanning.htm>



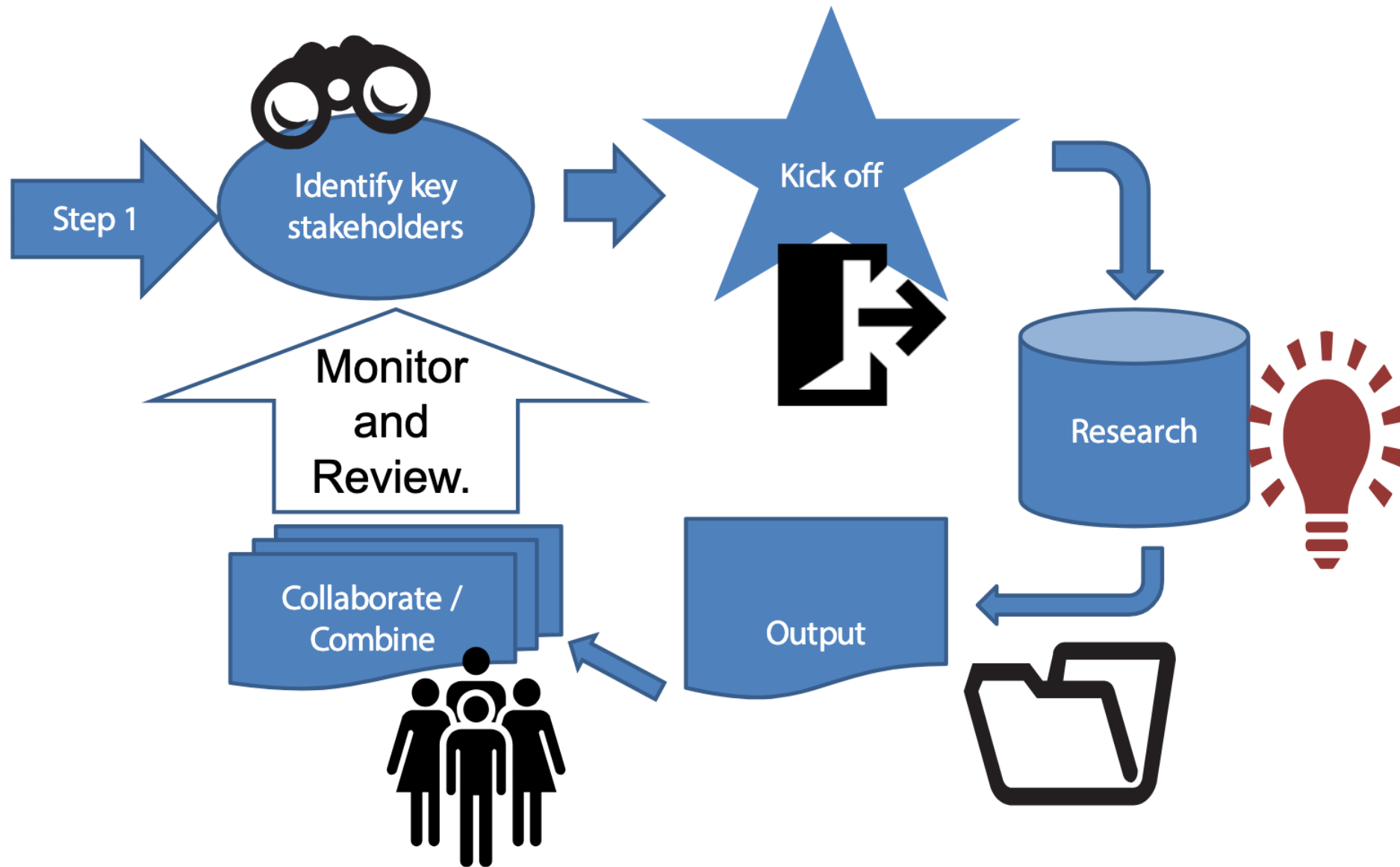
How Scenario planning builds resilience?

- **Extends the planning horizon:** Moves decision-making from a 2-3 year timeframe to 10, 20, or 50 years into the future.
- **Goes beyond forecasting:** Prepares for uncertainty by planning for multiple possible futures rather than a single forecast.
- **Informs infrastructure and policy:** Allows for proactive adaptation, such as building coastal defenses or raised housing, and helps shape long-term, sustainable development policies.
- **Fosters adaptive capacity:** Helps organizations and communities build the internal flexibility to manage unexpected conditions.
- **Encourages holistic thinking:** Promotes a better understanding of the interconnected nature of risks across different domains, such as climate, technology, and economics.

2. Horizon scanning

- Horizon scanning is a systematic method for searching, monitoring, and analysing early signals of change, future trends, and potential threats. The aim is to identify issues not yet in the public or political focus, but which could have a significant impact in the future, especially regarding climate change.
- In other words, horizon scanning enables us to anticipate developments before they become problems.
- In the climate context, this involves identifying new forms of risk, social change, technological innovation, and environmental instability that could shape future scenarios.





Horizon scanning in climate policy and risk management



Monitor new climate trends (unexpected temperature increases, accelerated glacier melting, changes in precipitation patterns, increased frequency of extreme events)



Identify new risks and “weak signals” (emerging climate migration, emergence of new pests due to climate change, increased health risks (e.g. the spread of tropical diseases to more northern regions))

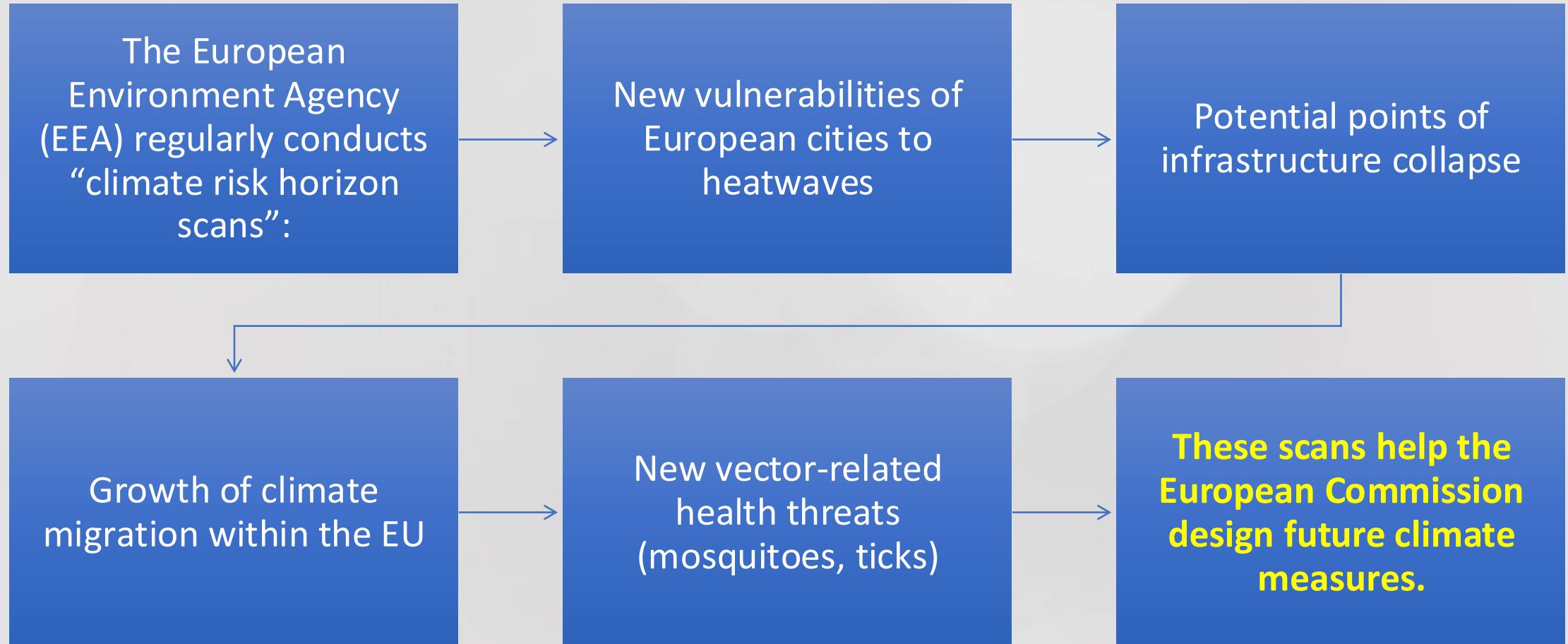


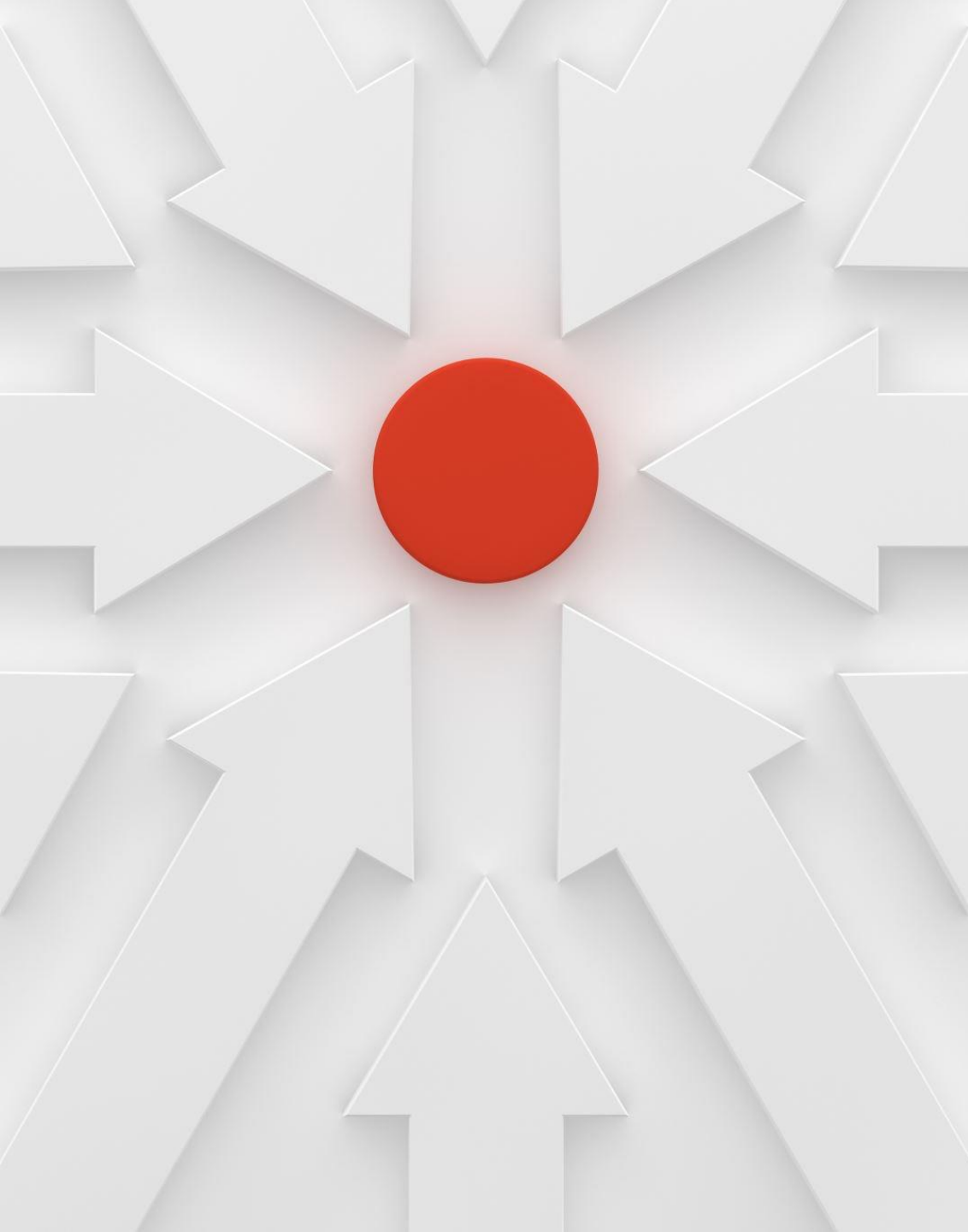
Identifying new opportunities (developing more resilient crops in agriculture, new CO₂ capture technologies, innovations in renewable energy)



Supporting decision-makers (helps governments, cities, organisations and companies adapt strategies, policies and plans in a timely manner)

Horizon scanning in climate policy and risk management





Why is Horizon Scanning essential for climate resilience?

- It provides **early warning**, giving organisations a head start.
- It **reduces costs**, as early action is always cheaper than late intervention.
- It helps plan for long-term resilience, as the signals collected inform scenarios, strategies, and plans.
- It supports transformational **adaptation**, enabling not just patching holes but strategic reorientation of the system.

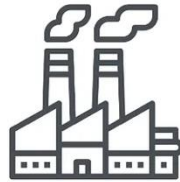
3. Megatrends analysis

- Megatrends analysis is a method for studying the major, long-term global forces that shape the future of societies, economies, technologies, and the environment.
- Megatrends are broad, structural, slow-moving processes of change, but with enormous and lasting impacts.
- **In the climate context**, megatrends analysis helps to understand **how global climate risks will interact with demographics, urbanisation, technology, economics, and geopolitics.**
- **Provides the “big picture”, showing which profound changes are already shaping the climate future.**

TEN MEGATRENDS



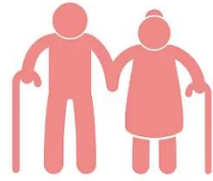
Climate-change



Ecocrisis



Population-growth



Population-structural change



City turmeric



Globalization



Growth in wealth and consumption



Inequality-growth



Digitalization



Technological development

Well, there they were:
megatrends at a
glance!



© futurist Elina Hiltunen

<https://elinafuturist.medium.com/our-future-in-pictures-75c5830d2b11>

How is it used in climate change?

- Megatrends analysis identifies the structural forces that determine societies' ability to cope with climate risks. It is used for:
- **Identifying global forces that increase or decrease vulnerability** (population growth and urbanisation → greater pressure on resources; population ageing → changes in health risks, economic uncertainty → reduced investment in resilience)
- **Analysing long-term interactions between climate and society** (how digitisation will boost or slow climate policies, how global trade chains will react to climate shocks, how geopolitical tensions will affect the energy transition)
- **Climate resilience planning 20–50 years ahead**
- **Megatrends enable the development of strategies** that transcend election cycles, short-term goals, and current policies.
- **Supporting strategic foresight and scenario planning**
- Megatrends serve as the **foundation for creating credible climate scenarios**

The most common megatrends related to climate change

- **Climate change and environmental degradation** (rising temperatures, extreme events, sea level rise and biodiversity loss)
- **Urbanisation and expansion of megacities** (70% of people will live in cities, leading to increased energy consumption, air pollution, and a greater need for green infrastructure)
- **Technological transformation and digitalisation** (AI in climate analytics, digital factories and smart grids, renewable energy sources)
- **Demographic changes** (population ageing, climate-induced migration, changes in the workforce)
- **Geopolitical instability and resource tensions** (water and food scarcity, energy security, climate diplomacy)



Megatrends and OECD

The OECD uses megatrend analysis to link climate risks to long-term socio-economic trends, including:

- the growth of urbanisation in Asia
- future migration flows
- changes in energy consumption

This helps shape recommendations for the governments of over 30 countries.

IPCC – Megatrends in Risk and Adaptation Reports

The IPCC often uses megatrends as the basis for articles on "risk futures:

- global increase in extreme climate events
- population growth in high-risk areas (e.g. coastal regions)
- socioeconomic differences that deepen vulnerability

These analyses help countries plan for adaptation in 2050–2100.

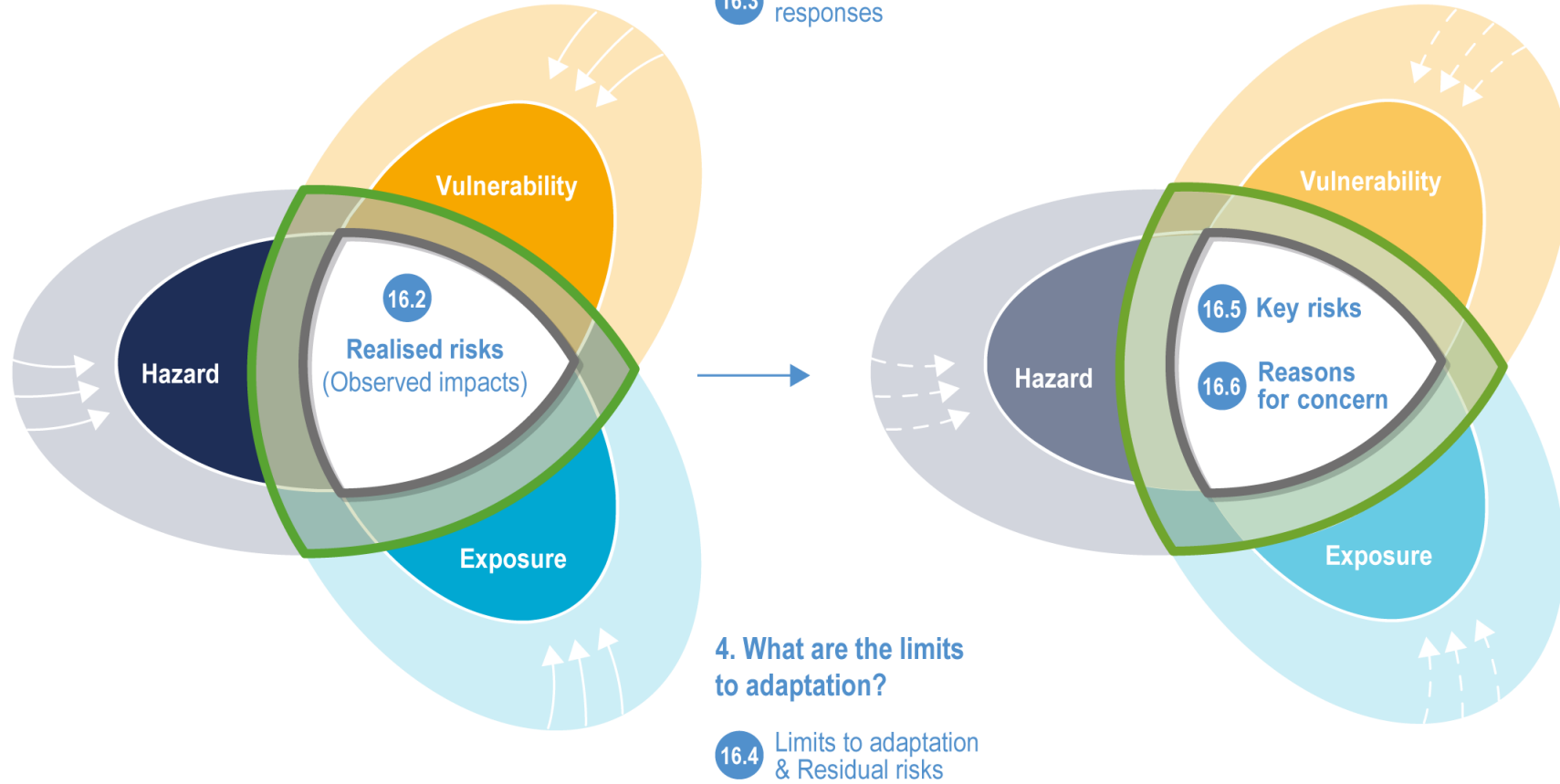
TODAY

IN THE FUTURE

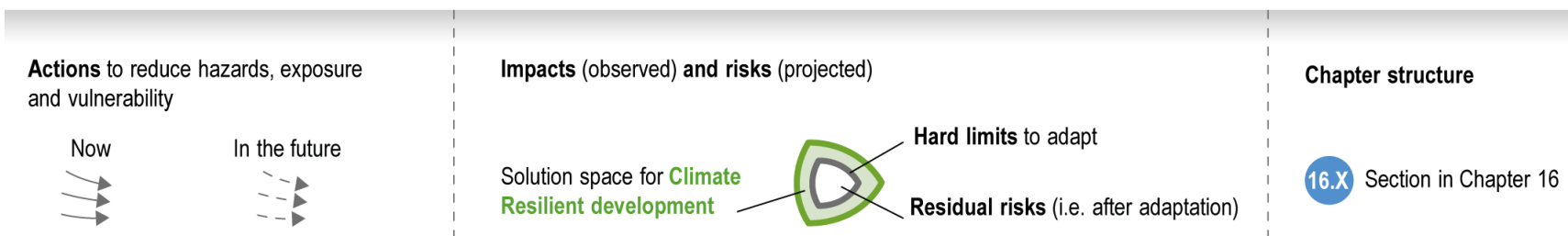
1. What impacts are being experienced?

2. What responses are being undertaken?

3. What future risks are of greatest concern?



<https://www.ipcc.ch/report/ar6/wg2/figures/chapter-16/figure-16-001>



Megatrends and UNDP

- UNDP integrates megatrends into resilience planning in developing countries, focusing on:
 - climatic migration
 - digital transformation
 - climate-related economic shocks

Megatrends inform investment and development policy recommendations.

EU Joint Research Centre – Megatrends Atlas

The JRC has produced an interactive atlas of megatrends that shows:

- climate risks
- global economic flows
- critical resources
- security threats

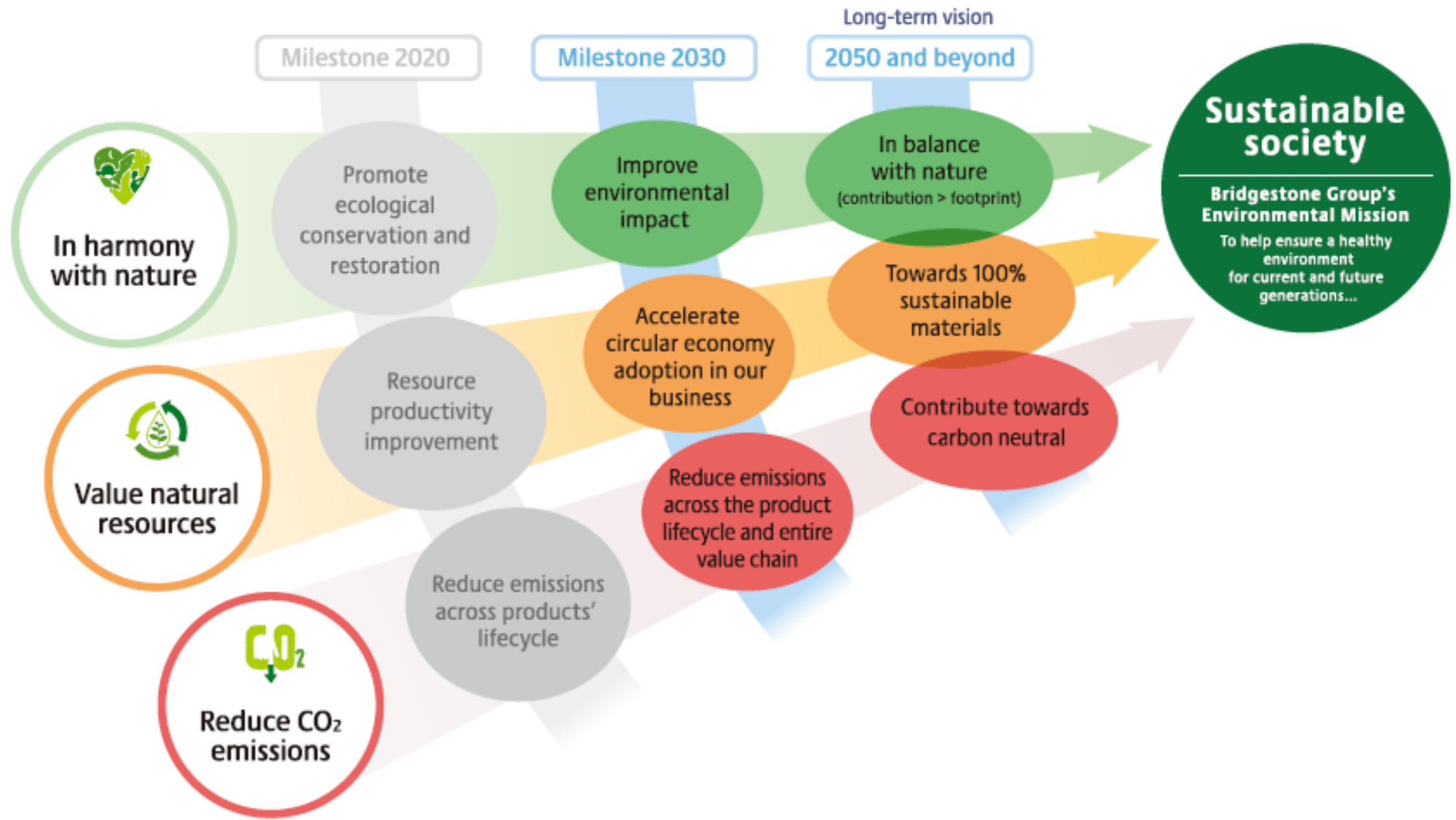
It is used to shape the European Climate Change Adaptation Strategy.

4. Visioning

Visioning means collectively imagining a desirable future. It is a process in which people, organisations or communities ask themselves:

- **What do we want our city, country or economy to look like in 20 to 30 years?**
- **What would be the ideal climate-sustainable future?**
 - ◆ In visioning, we are not constrained by current problems.
 - ◆ The focus is on the ideal state – for example, "a city with zero CO₂ emissions, abundant greenery, energy efficiency, and climate resilience"



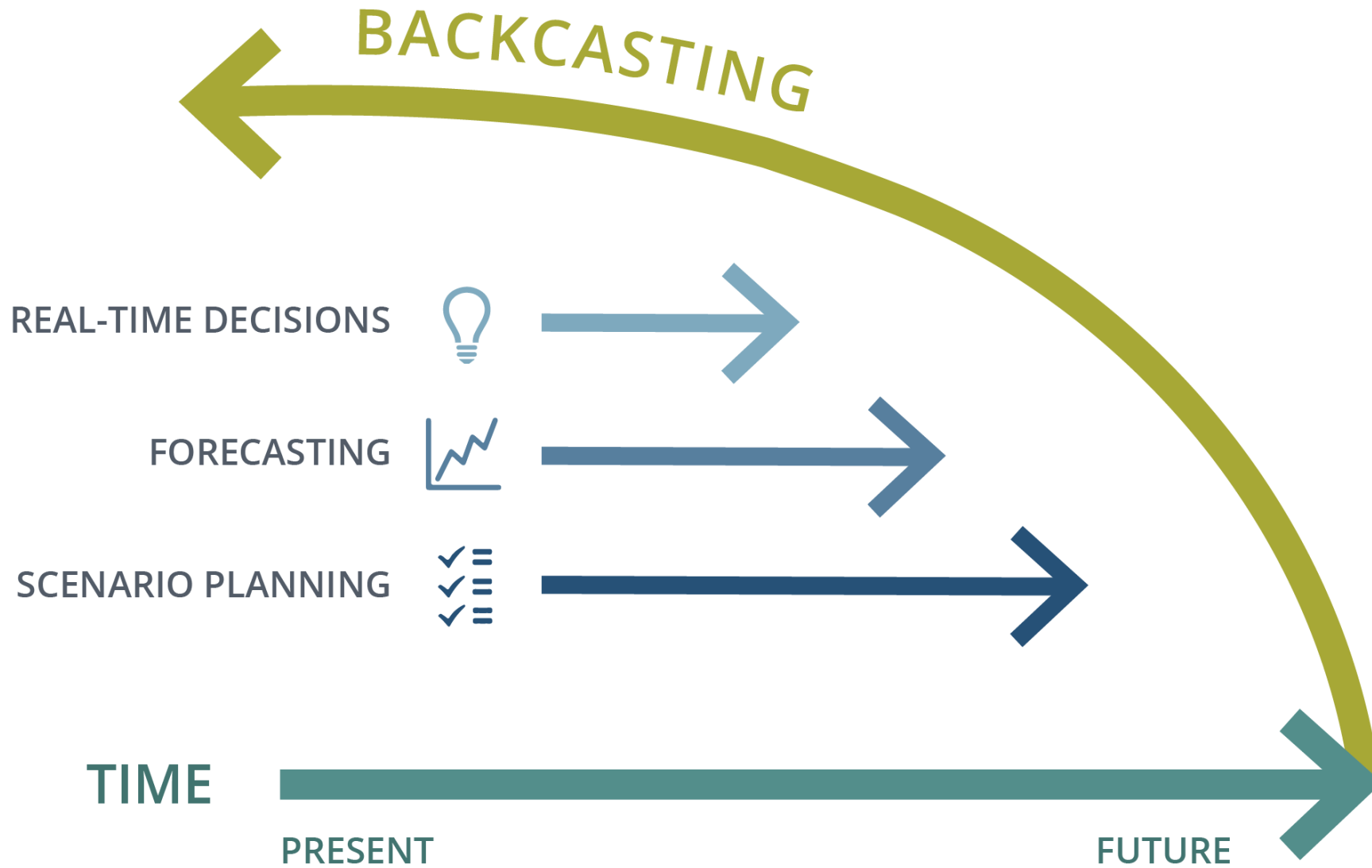


4. Back-casting

Back-casting (starting in the future and returning to the present) is a method in which:

- First, the desired future is defined (the result of visioning)
- Then, we "rewind the film" and consider: What steps must we take today to reach that future?
- This is the opposite of "forecasting", which starts from the present and predicts what is likely to happen
- Back-casting asks:

What must we change to achieve the desired goal, regardless of current limitations?



Examples - climate visions

- “A net-zero emissions world by 2050.”
- “100% renewable energy in Croatia by 2040.”
- “Cities resilient to floods and heatwaves.”

These visions provide a motivational and strategic framework.

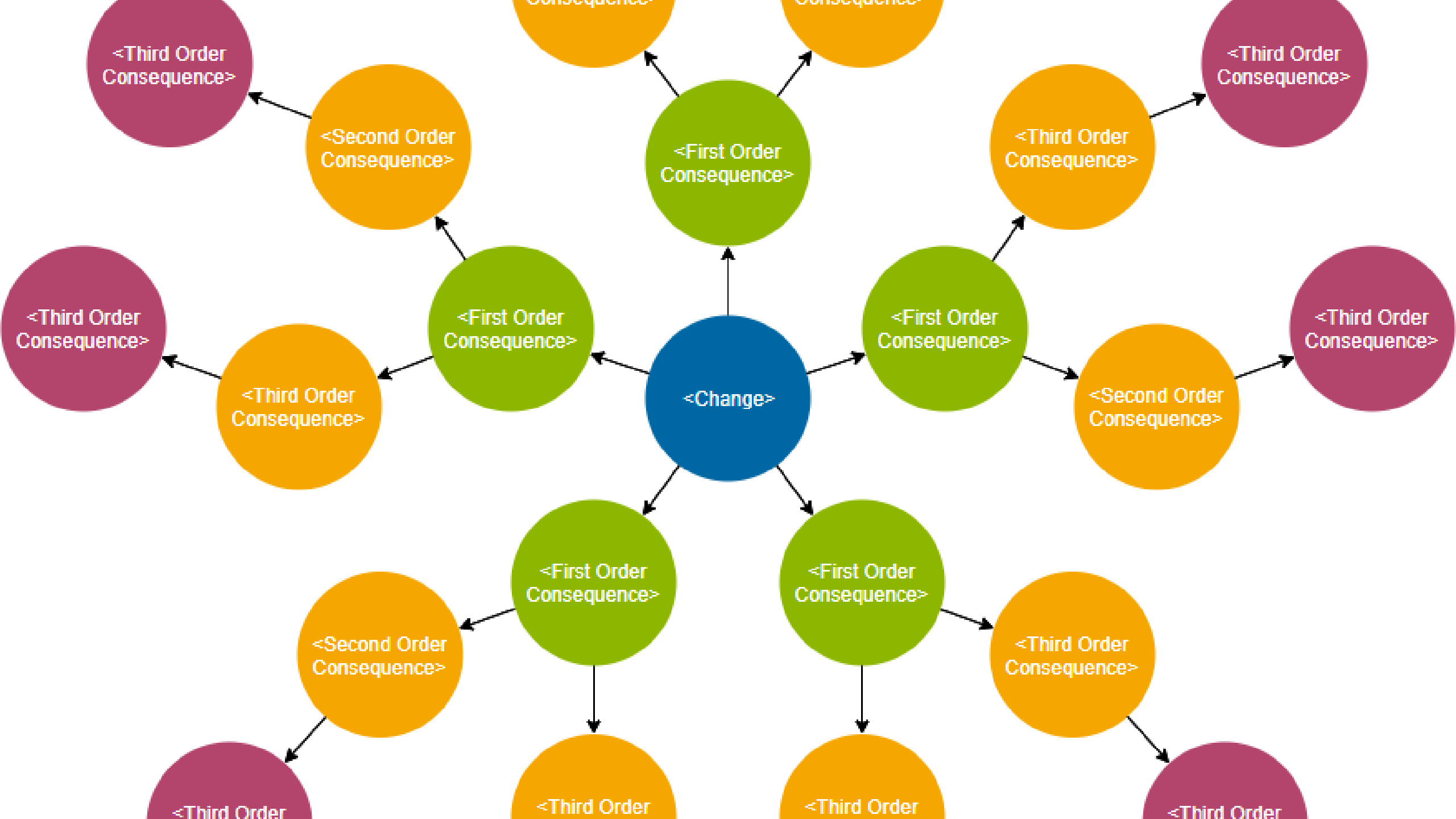
Climate policy planning (Back-casting)

- Once the vision is established, back-casting helps to create a plan
- If we want zero CO₂ emissions by 2050, what must we do by:
 - 2040?
 - 2030?
 - 2025?
- Example steps: Transition to renewable energy sources, Introduction of low-carbon industries, Mass electrification of transport, More efficient heating and cooling systems, Adaptation of agriculture to climate change

5. Futures Wheel

- The Futures Wheel is a visual and systematic method for analysing the potential consequences of a future change or event.
- **It is particularly useful in the context of climate change, as it helps to identify the direct and indirect effects of policies, technologies, or climate events.**
- It was developed by Jerome C. Glenn in 1971.
- The goal is to map the chain of consequences of a decision, trend, or event.
- The method uses a central event in the middle of a circle with branches that show the consequences.
- Each consequence can have its own sub-consequences, forming a tree or dotted network.





5. Futures Wheel

Provides a holistic view of chain effects

Helps identify unforeseen consequences of climate actions or events

Can be used with scenario planning or back-casting for long-term planning

It is a visual tool, which facilitates the communication of complex climate issues to a wider audience



Conclusion

- Long-term thinking about risks and the **use of foresight** methodologies are **essential for building resilience to climate change**.
- Given the complexity and unpredictability of climate threats, **short-term strategies are no longer sufficient**.
- Proactively identifying potential risks, scenario planning, and integrating innovative approaches enable better adaptation of communities, infrastructure, and economic systems.
- Long-term thinking not only reduces vulnerability but also promotes sustainable policies and investments that contribute to lasting security and stability.

Adopting a foresight approach is a strategic imperative for all those seeking to respond effectively to the challenges of climate change and ensure resilience for future generations.



sanja.kalambura@vvg.hr

EVERY MOMENT HAS
THE POWER TO CREATE
CHANGE, EVEN THESE
ONE HOUR WE SPENT
TOGETHER.

GET INVOLVED,
BE ACTIVE,
BE THE VOICE THAT
KEEPS HISTORY ALIVE!

Thank you!



Additional literature:

- Strategic Foresight Toolkit for Resilient Public Policy (OECD), published 2025
https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/01/foresight-toolkit-for-resilient-public-policy_9ad1cd60/bcdd9304-en.pdf
- Foresight Report 2025 – (European Commission)