



# Climate Change Science, Climate Crisis Solutions, and Worker Education

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# Learning objectives

- Assess climate science concepts such as temperature and CO2 pathways, tipping points, planetary boundaries.
- Assess problems of climate injustice and exponential economic growth.
- Evaluate participants' fears of climate change.
- Evaluate and create climate change solutions such as Green New Deals.

# Intro questions

- What do you know about climate change science and climate solutions?
- What do you want to know?

# The Science is dire



- Tipping points are close
- Climate models are too conservative → Climate change is happening faster than the models predicted, which have not considered tipping points and feedback loops
- Projected pathways are based on negative emissions (carbon capture) which is not feasible now or in near future
- An uninhabitable planet, a “Hothouse Earth” (e.g., can’t work outdoors, agriculture collapses) by 2070?
- All current governmental policy prescriptions are not enough

# Intergovernmental Panel on Climate Change (IPCC)

- Small UN agency
- 1000s of climate scientists
- Informs governments about state of knowledge about climate change
- 6 Assessment reports since 1990
- Generally conservative assessments due to tempering of the science and policy by governments
- Assessment Reports have become ever more alarming
- Most recent assessment, 6<sup>th</sup> Assessment Report, characterized as a “**code red for humanity**”

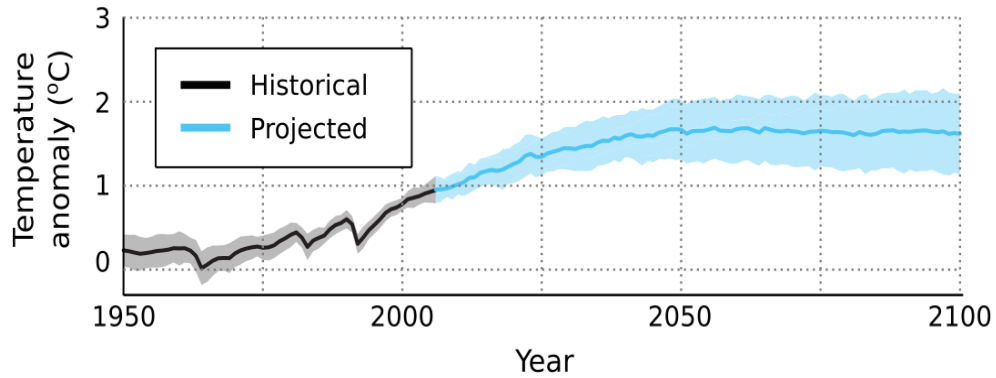


# GLOBAL TEMPERATURES

AR5, 2013

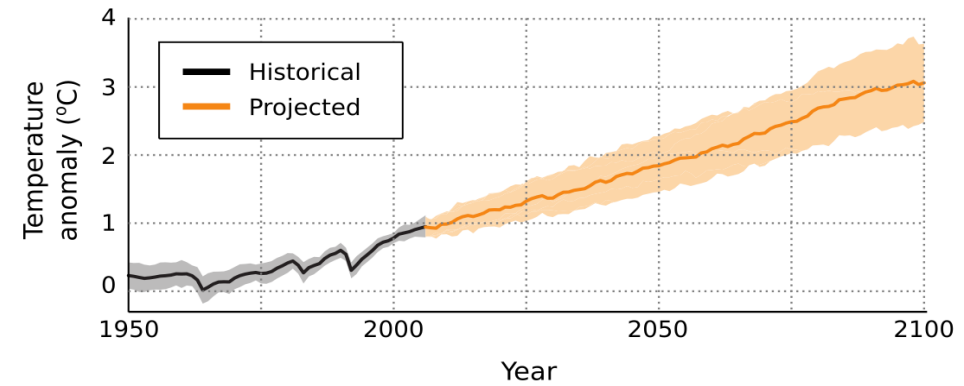
RCP 2.6

Very optimistic



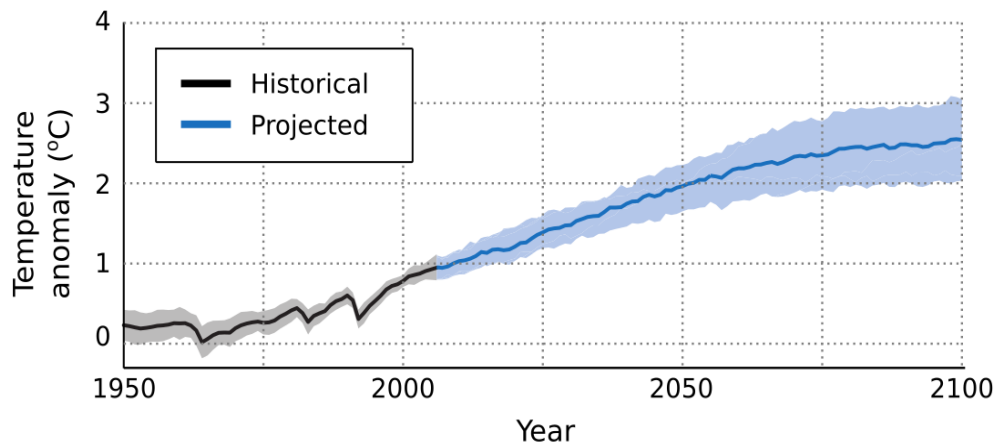
RCP 6.0

Pessimistic



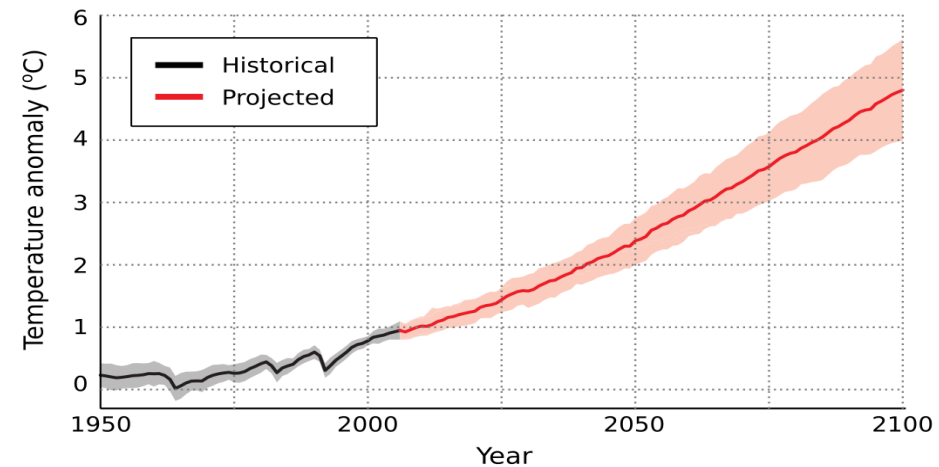
RCP 4.5

Optimistic



RCP 8.5

Very pessimistic



# Climate change: IPCC report is 'code red for humanity'

By [Matt McGrath](#)  
Environment correspondent

🕒 55 minutes ago



UK climate change protests



Energy & Science

## Top Scientists Just Ruled Out Best-Case Global Warming Scenarios

A new research paper narrows a key range for future heating. We ask one of the authors what it means.

By [Eric Roston](#)

July 22, 2020, 10:00 AM EDT

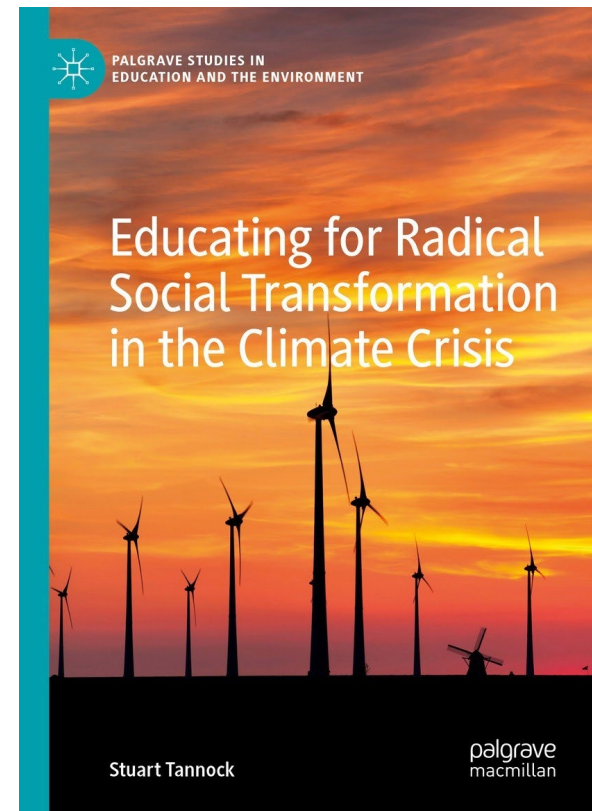
📄 Copy Link

“ We can't rule out really, really, really wildcard catastrophic, very dangerous outcomes. That's something to keep in mind as policymakers move forward. There's a tendency to try to put the perfect numbers on things, to say we have 12 years to save the planet. Honestly, we have, like, negative 30 years to save the planet.”

-Kate Marvel, Climate Scientist, Associate Research Scientist at NASA Goddard Institute

# What Earth Systems science acknowledges: radical transformations are necessary

- Hothouse Earth paper (*Trajectories of the Earth System in the Anthropocene*, 2018) –
  - “Incremental linear changes to the present socioeconomic system are not enough to stabilize the Earth System.”
  - “To avoid crossing a planetary threshold...a deep transformation based on a fundamental reorientation of human values, equity, behavior, institutions, economies and technologies is required.”
- Similarly, IPCC Special Report (2018) – a radical transformation in socio-economic system is necessary; a “rapid and far reaching” transformation of human civilization that has never happened before.



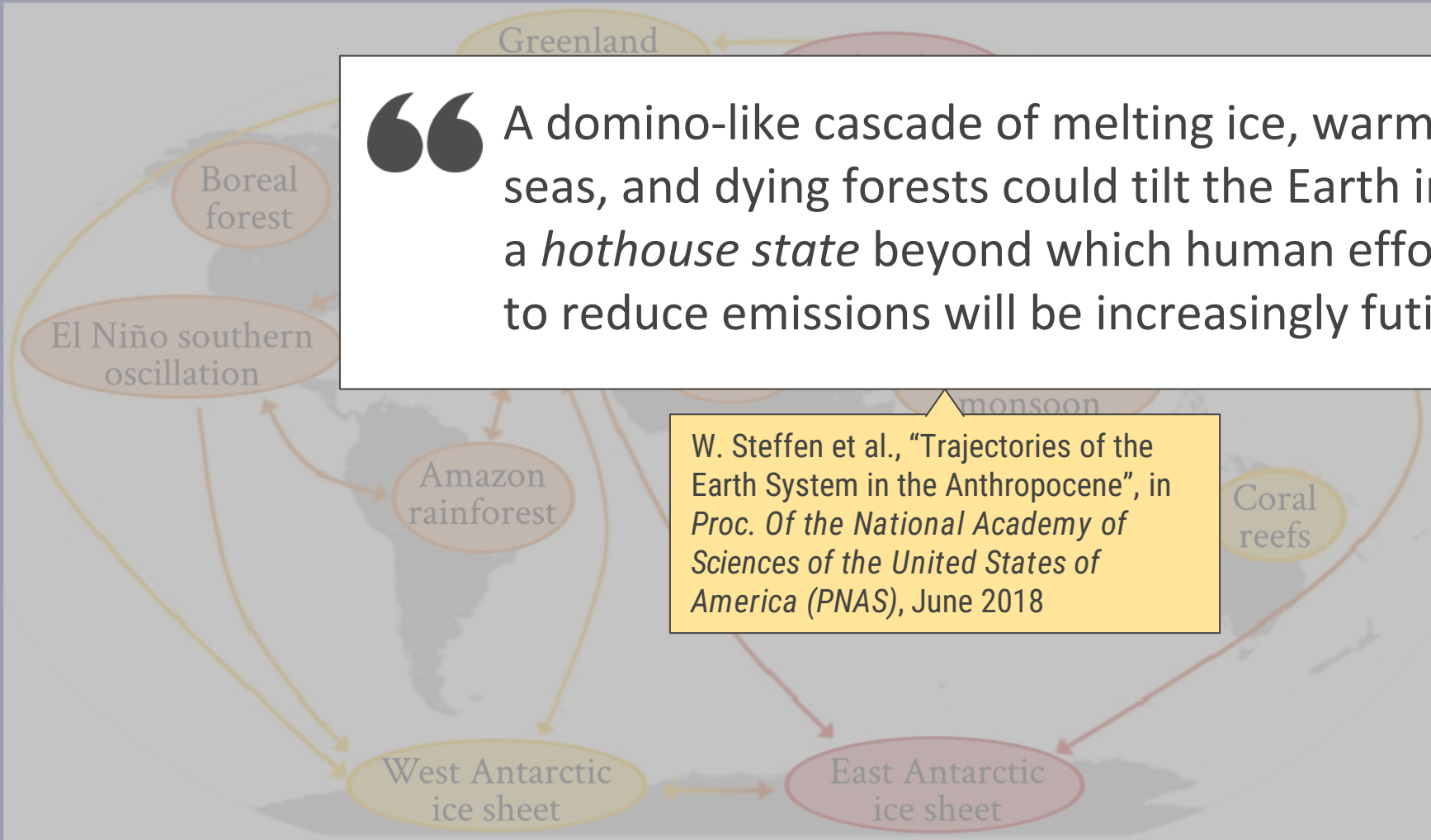


# TIPPING CASCADES

“ A domino-like cascade of melting ice, warming seas, and dying forests could tilt the Earth into a *hothouse state* beyond which human efforts to reduce emissions will be increasingly futile.

W. Steffen et al., “Trajectories of the Earth System in the Anthropocene”, in *Proc. Of the National Academy of Sciences of the United States of America (PNAS)*, June 2018

Steffen et al., “Trajectories of the Earth System in the Anthropocene”, in *Proc. Of the National Academy of Sciences of the United States of America (PNAS)*, June 2018



Sixth Assessment Report

**WORKING GROUP I**

The Physical Science Basis

ipcc

INTERGOVERNMENTAL PANEL ON climate change



# Climate change widespread, rapid, and intensifying – IPCC

**#IPCC**

**#ClimateReport**



Photo by Saikiran Kesari Unsplash

Sixth Assessment Report

**WORKING GROUP III**

Mitigation of Climate Change

ipcc

INTERGOVERNMENTAL PANEL ON climate change



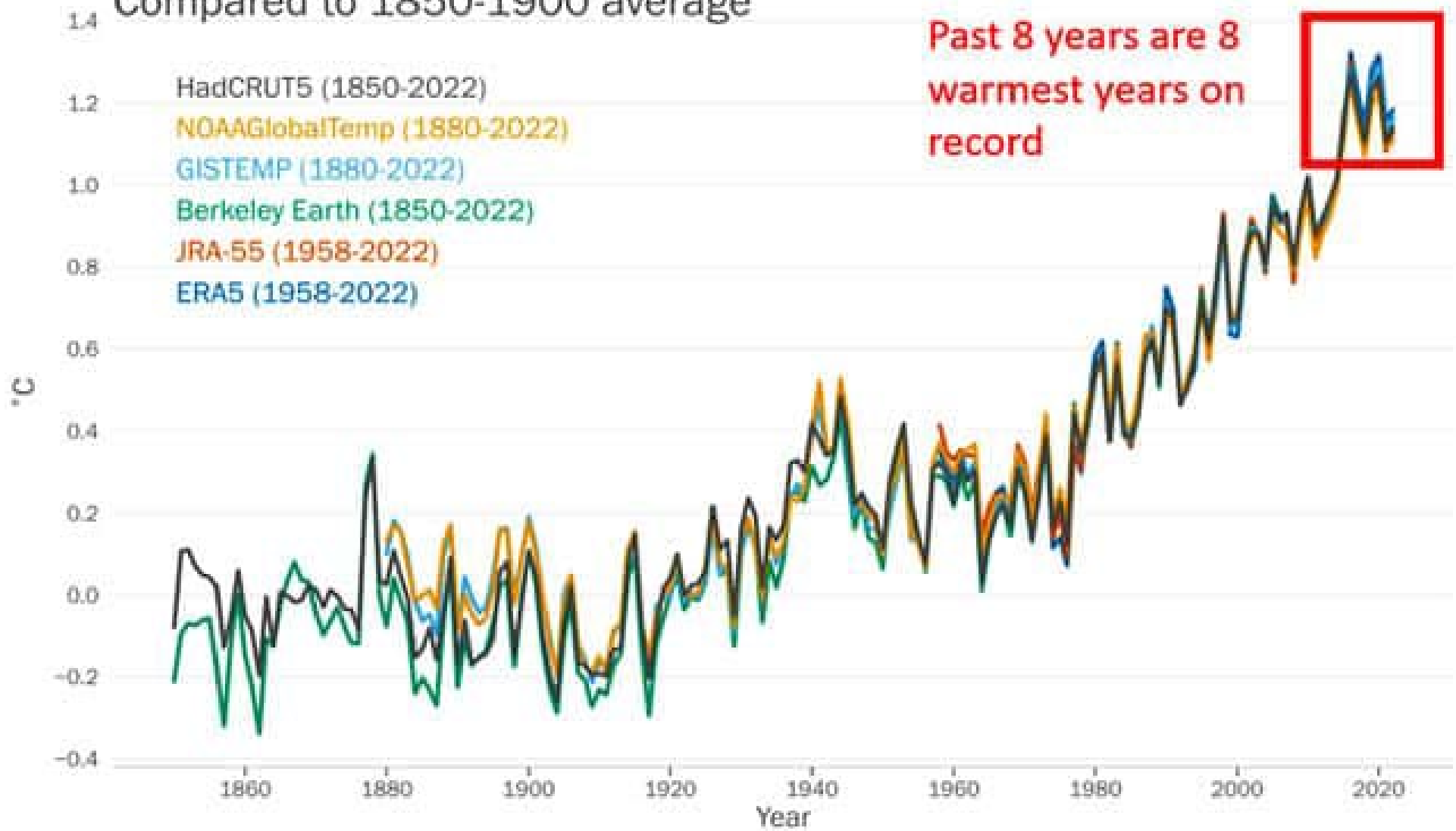
The evidence is clear:  
The time for action is now. We can  
halve emissions by 2030.

#IPCC

#ClimateReport

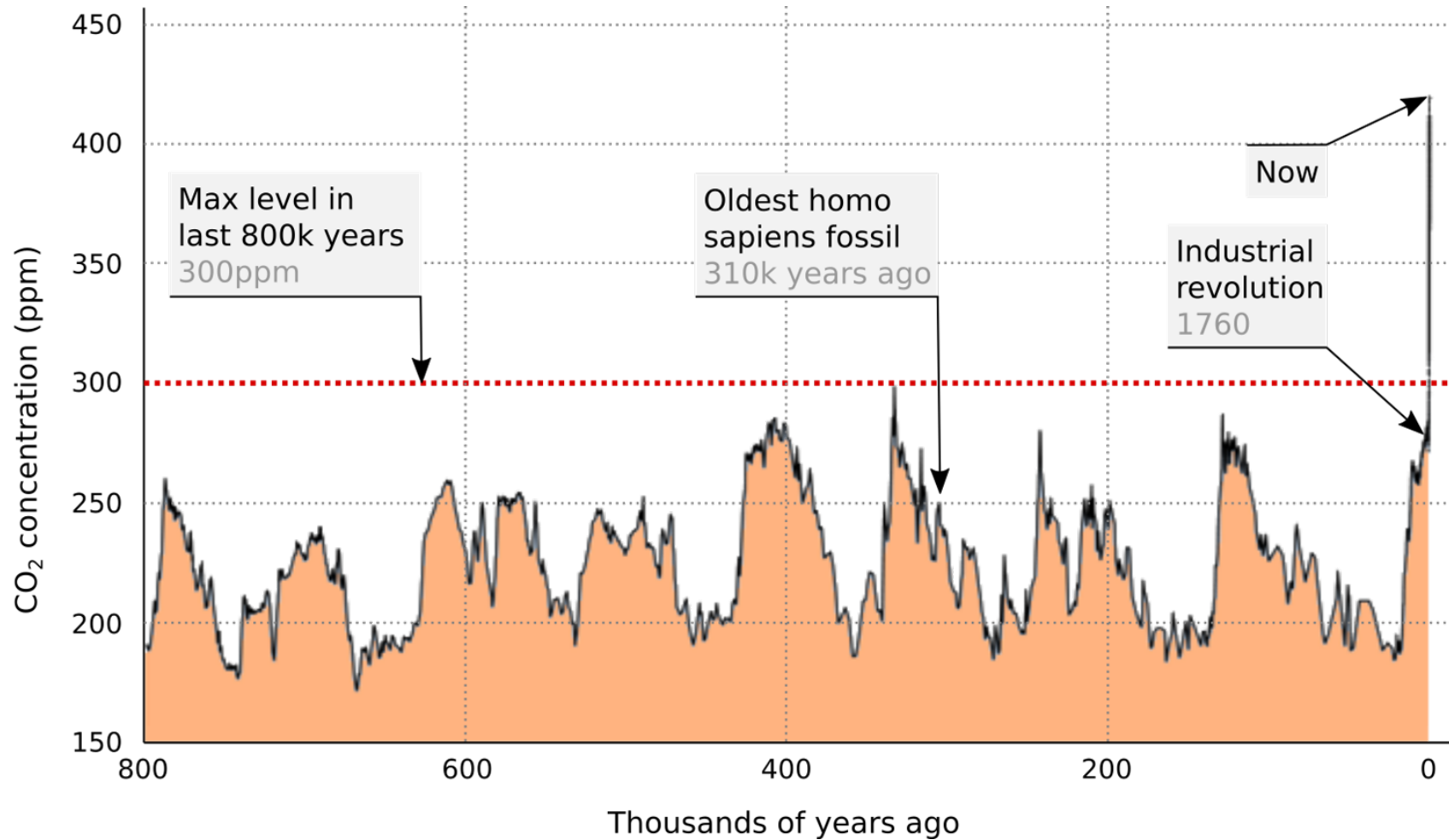


# Global mean temperature Compared to 1850-1900 average



# CO<sub>2</sub> CONCENTRATION

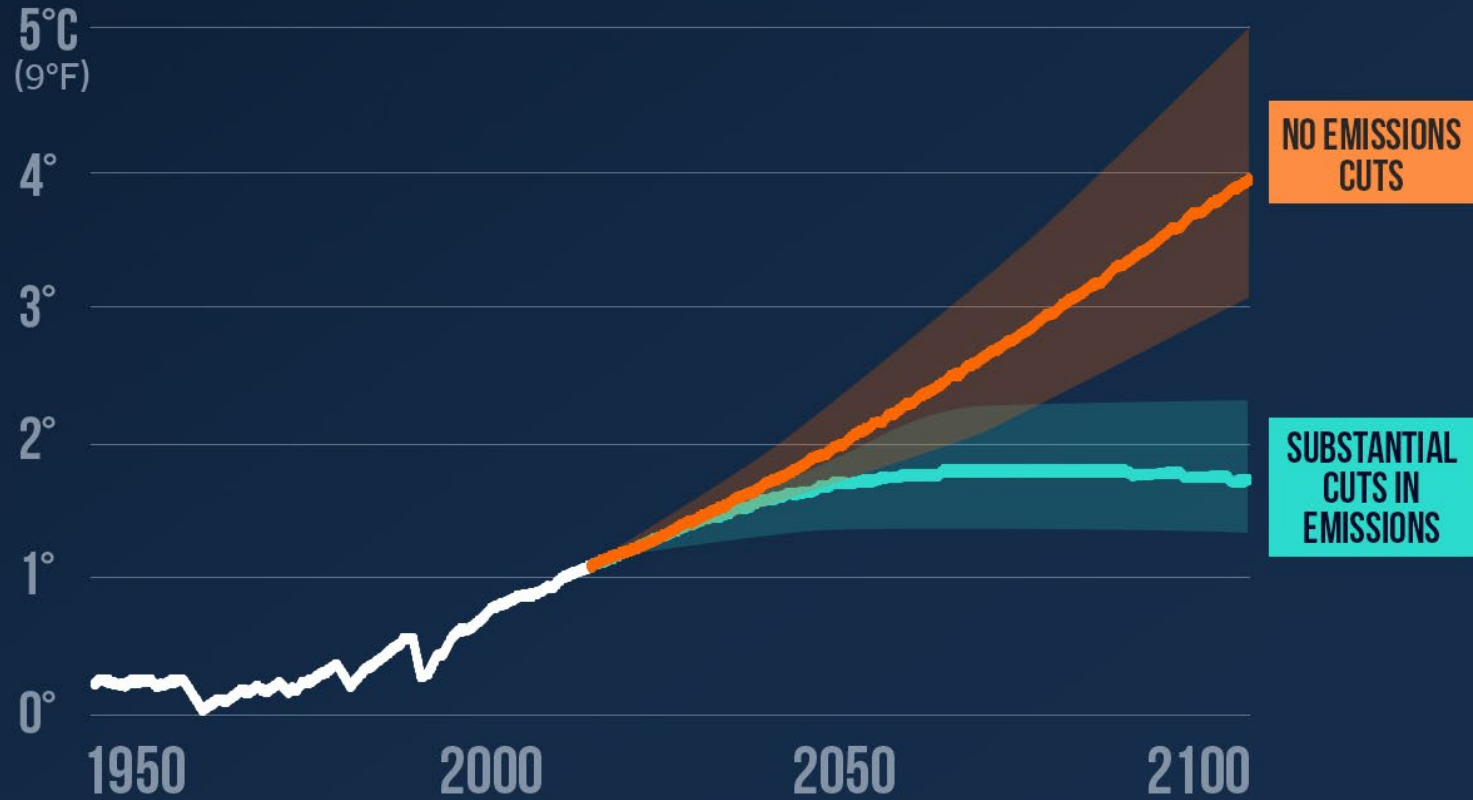
Last 800,000 years



Source: Scripps Institution of Oceanography

# FUTURE TEMPERATURES

## WARMING DEPENDS ON CHOICES TODAY



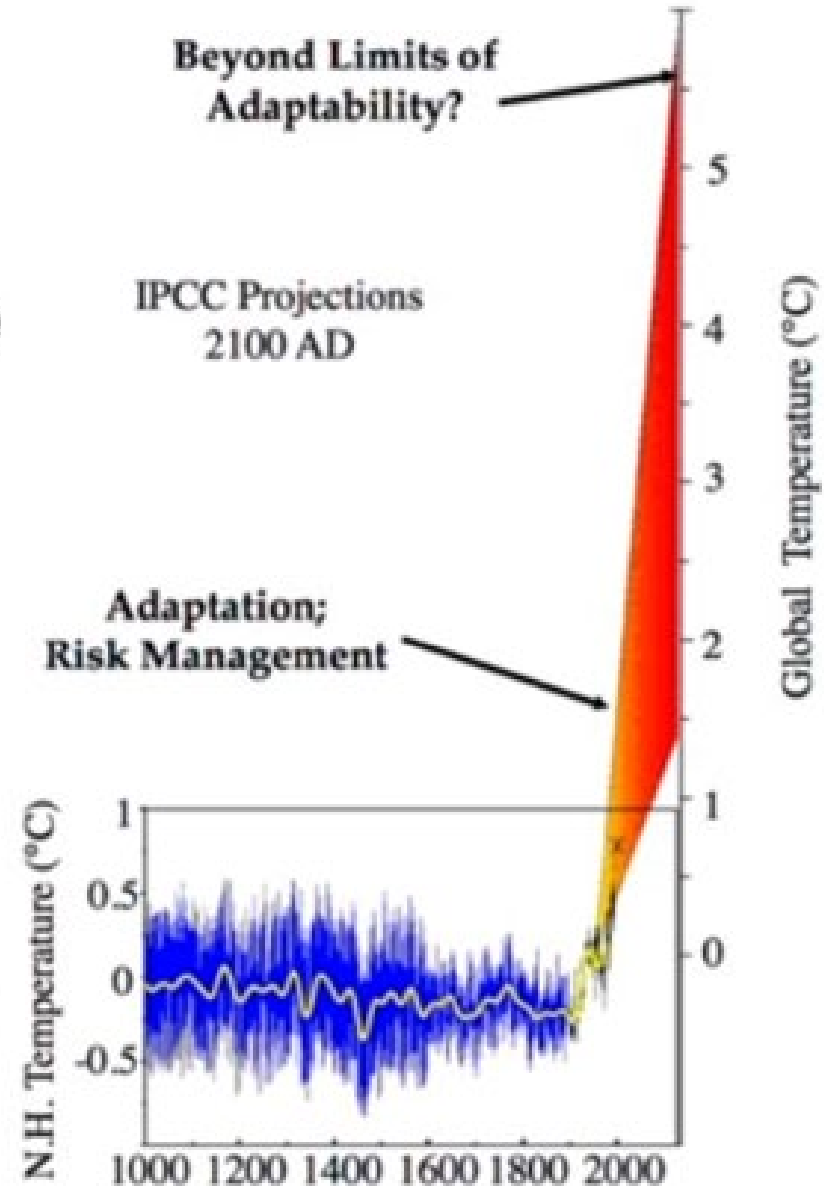
Global surface temperature (°C) anomaly relative to 1850-1900  
High warming scenario: SSP3-7, Low warming scenario from SSP1-2.6.  
Source: IPCC AR6 WG1

# How High?

There has been a **1 degree** increase in global temperature to date.

Business as usual will eventually result in a **6 degree** increase.

**5.5 degrees** is considered beyond the limits of human adaptability!



# If global temperature rise above 1.5°C above pre-industrial levels

- IPCC (4<sup>th</sup> Assessment Report) suggests that 20-30% of plant and animal species may go extinct.
- Catastrophic for the food chain for humans





# CLOSING IN ON 1.5°C

OBSERVED GLOBAL TEMPERATURE CHANGE



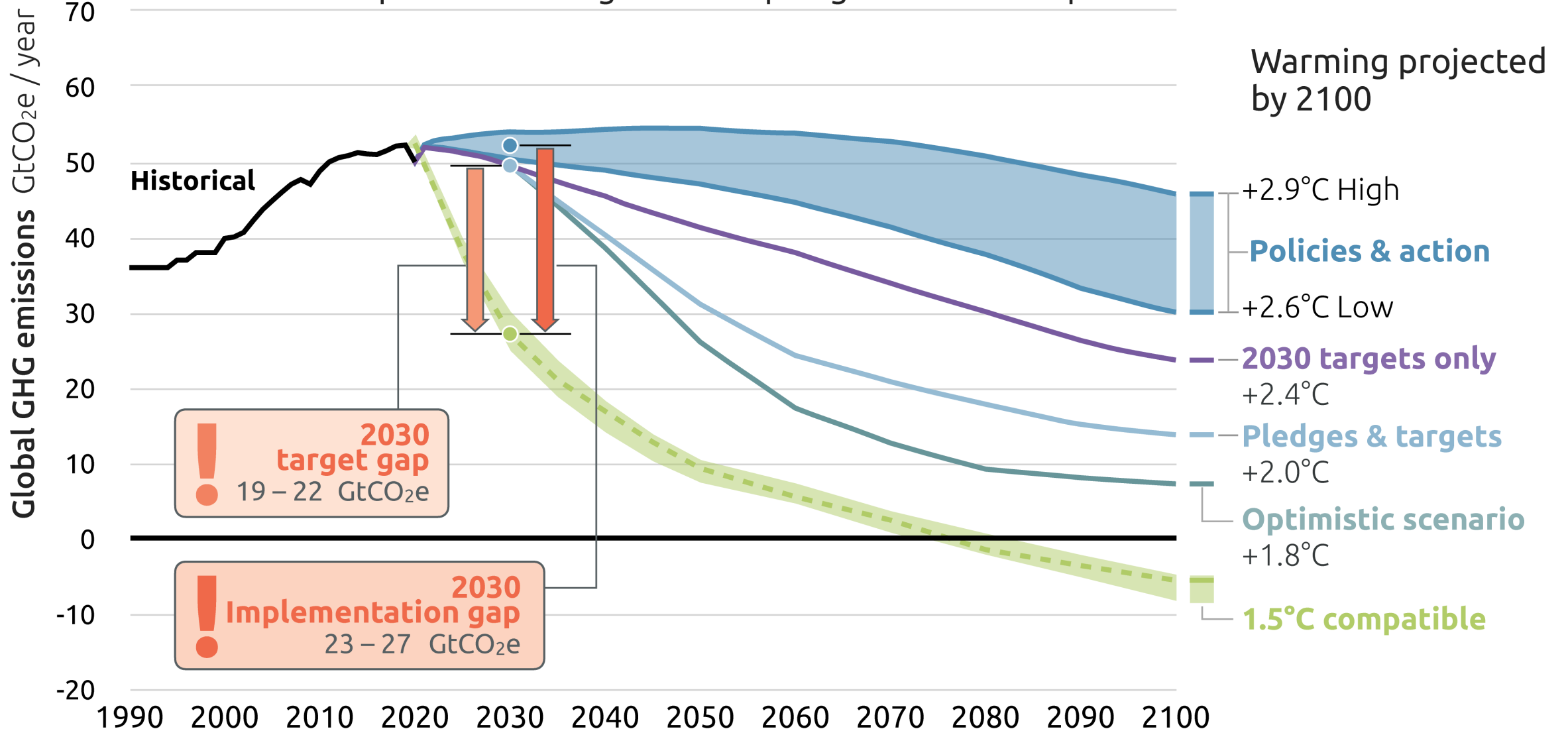
Global mean temperature relative to 1850-1900 average.  
Source: UK Met Office Hadley Centre

CLIMATE CENTRAL

# 2100 WARMING PROJECTIONS

Emissions and expected warming based on pledges and current policies

Climate Action Tracker **Nov 2022 Update**



# IPCC 6<sup>th</sup> Assessment Report Process

Working Group III  
Mitigation Report  
(written by  
Scientists)



Draft Summary for  
Policymakers (SPM)  
(written by  
scientists)



Revised Summary  
for Policymakers  
(SPM) (revised by  
governments)



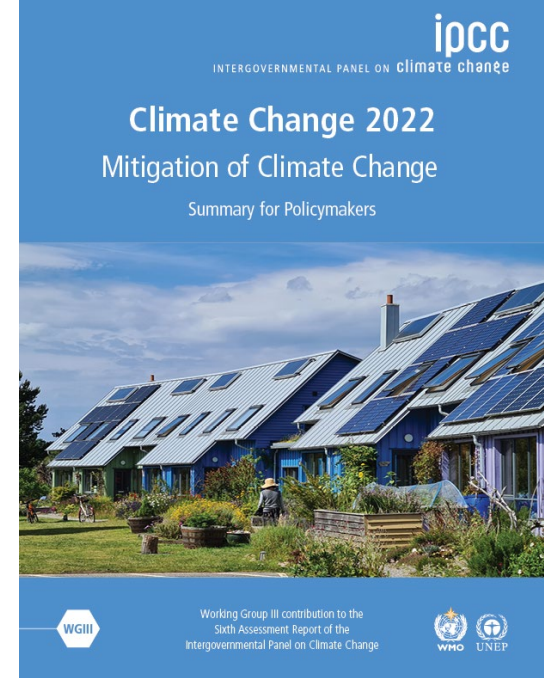
Leaked by Scientists  
to public



Input by governments  
and corporate  
lobbyists

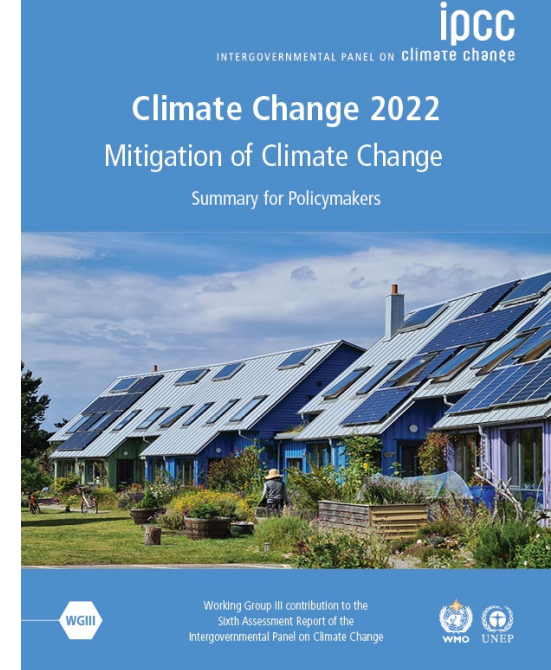
# Leaked *Summary for Policymakers* of Part 3 (Mitigation) of IPCC 6<sup>th</sup> Assessment Report, 2021

- Global greenhouse gas **emissions must peak in the next four years**
- **Coal and gas-fired power plants must close** in the next decade
- **Lifestyle and behavioral changes needed** to avoid climate breakdown
- **Unprecedented changes to the climate**, some irreversible
- **Need to cut in half emissions in the next decade** to stay within 1.5C and reach net zero emissions by 2050.



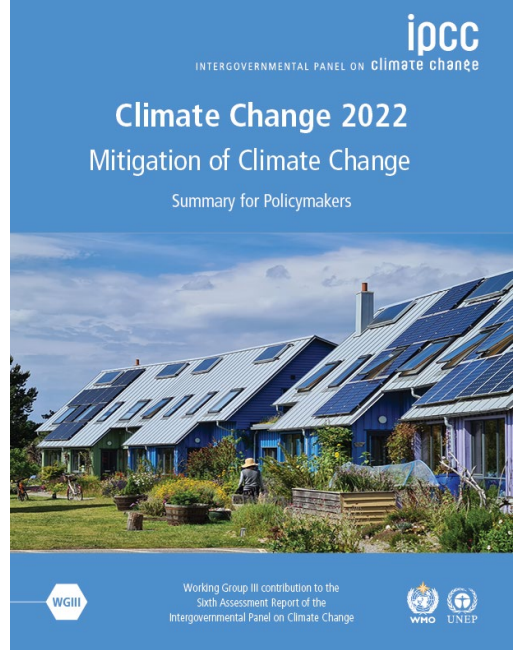
# Leaked IPCC Report (cont.)

- **Current investment falls below what is needed “by a factor of five”**, even to hold warming to the higher limit of 2°C .
- **“Existing and planned infrastructure** and investments, institutional inertia and a **social bias towards the status quo** are leading to a risk of locking in future emissions that may be costly or difficult to abate.”
- **No new fossil fuel development** can take place if the world is to stay within 1.5°C of heating.
- CTXT, the Spanish publication that leaked the draft → showed that the **global economy must be shifted rapidly away from conventional GDP growth**, but that the IPCC report underplays this.



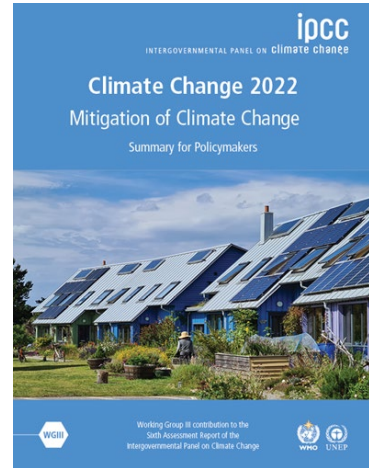
# Leaked IPCC Report (cont.)

- Even if a change of course is achieved, the scientists warn: **“transitions are not usually smooth and gradual, they can be sudden and disruptive.”** They also note **“the pace of transition can be impeded by ‘lock-in’ from existing capital, institutions, and social norms”**.
- The **drastic decrease in emissions which are essential, are impossible to achieve in the short term with the current model**, with its assumptions about growth in energy consumption and material use.
- For first time in the IPCC process, turn to cutbacks in energy use across all economic sectors → **what is required is “fundamental structural changes at the global level” in production and consumption systems.**



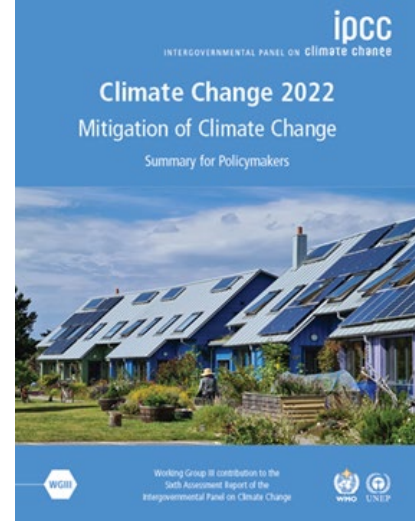
# Governments weaken the scientific consensus that transformation is necessary

- IPCC 6<sup>th</sup> Assessment Report – The full report and the leaked summary for policy makers stands in **stark contrast to the revised/published SPM**. There is **radical analysis in the Mitigation report**.
- *effective eradication of the entire scientific consensus in the published SPM of the April 2022 IPCC Mitigation report means the published SPM is in stark contradiction with various chapters of the Mitigation report*, which still convey the **underlying scientific consensus on mitigation**.
- Chap. 1 of Mitigation report: *“the character of social and economic development produced by the nature of capitalist society is ultimately unsustainable.”*
- The word **“degrowth”** appears **28 times** in Mitigation report but disappears from revised SPM.



# Changes between leaked SPM and final published SPM

- **No mention of closure of gas and coal plants** within a decade in final SPM.
- No mention that **wealthiest 10% pollute 10X more than poorest 10%**.
- Many **references to direct emissions from aviation, car industry, and meat consumption** have disappeared.
- First draft warned of “**vested interests**” as a factor in **hindering progress in energy transition**. Dropped in final summary.
- Final summary removed this: that “**rapid greenhouse gas emissions reductions and fundamental structural changes at global scale**” were required to meet climate goals and that “**accelerated policy development**” was therefore essential.





# Antonio Guterres, UN Secretary-General

The revised *Summary for Policymakers (SPM)* for the April 2022 Working Group III Report of the IPCC, addressing Mitigation, ***“a litany of broken climate promises... Simply put, they [the vested interests] are lying,”*** denying the science, present in the report as a whole but excluded or downplayed in the revised *SPM*.

***“Climate activists are sometimes portrayed as dangerous radicals, but the truly dangerous radicals are the countries that are increasing fossil fuel production.”***



# If we are serious about the climate emergency....

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- **We must rely primarily on the scientific report**—that is, the published chapters of the report plus the leaked SPM, representing the actual scientific consensus.
- In contrast, **the published, government (and corporation) redacted SPM should be entirely dismissed** as the consensus of business as usual (corporations and government), and the betrayal of science, reason, and humanity.
- The science is clear: ***without radical transformative social change that breaks with the logic of the existing mode of production*** and that points to a world of sustainable human development, there will be no future for humanity.
- **Why aren't we holding emergency meetings in every city, town and village every week?**



# 2022 BILLION-DOLLAR DISASTERS

WEATHER AND CLIMATE EVENTS



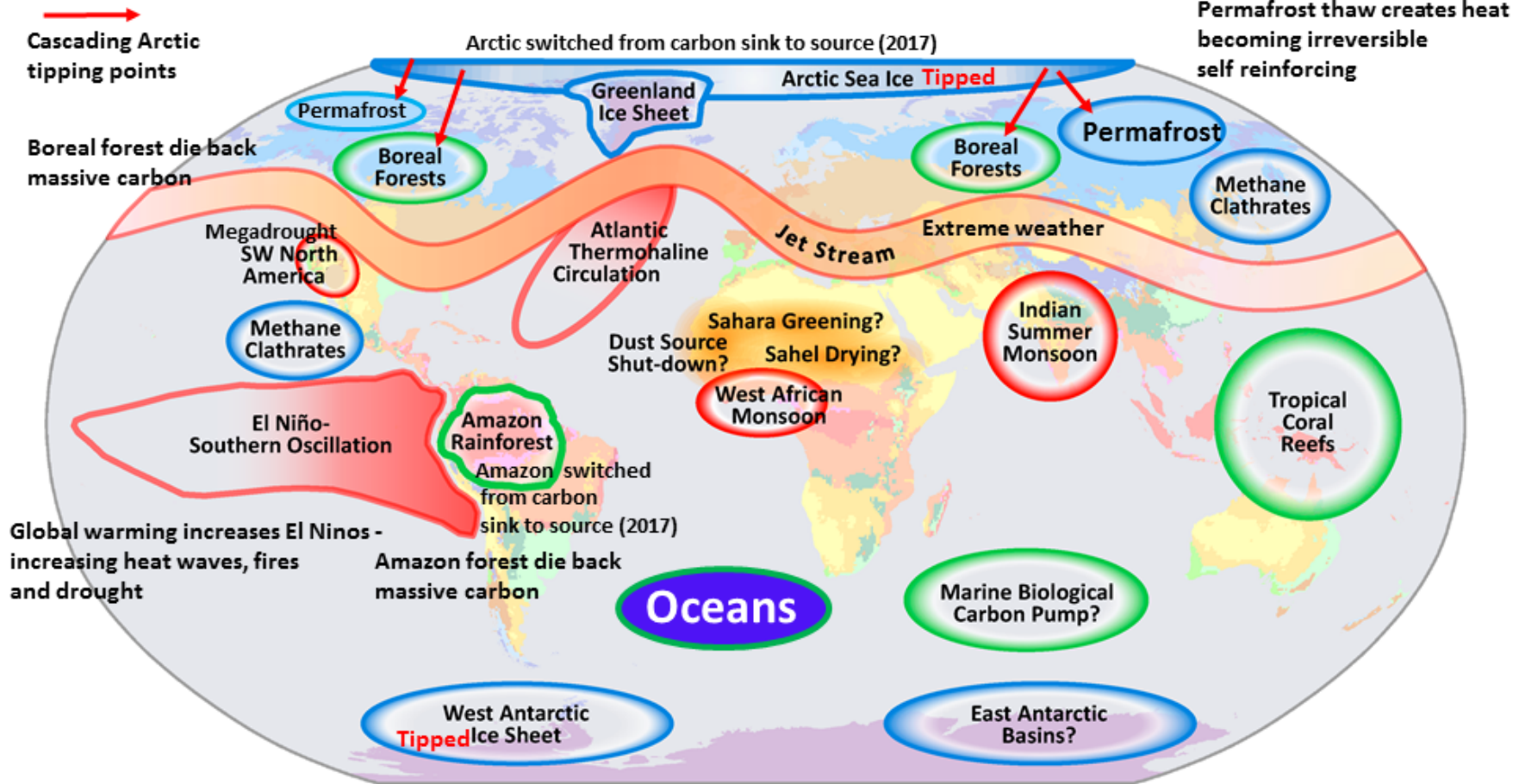
Cumulative billion-dollar disaster frequency, 1980-2022 average.  
Source: NOAA/NCEI

CLIMATE  CENTRAL

# Global Warming Vulnerable Tipping Points

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

- Cryosphere Entities
- Circulation Patterns
- Biosphere Components



Oceans: Heating, Acidification & Deoxygenation

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

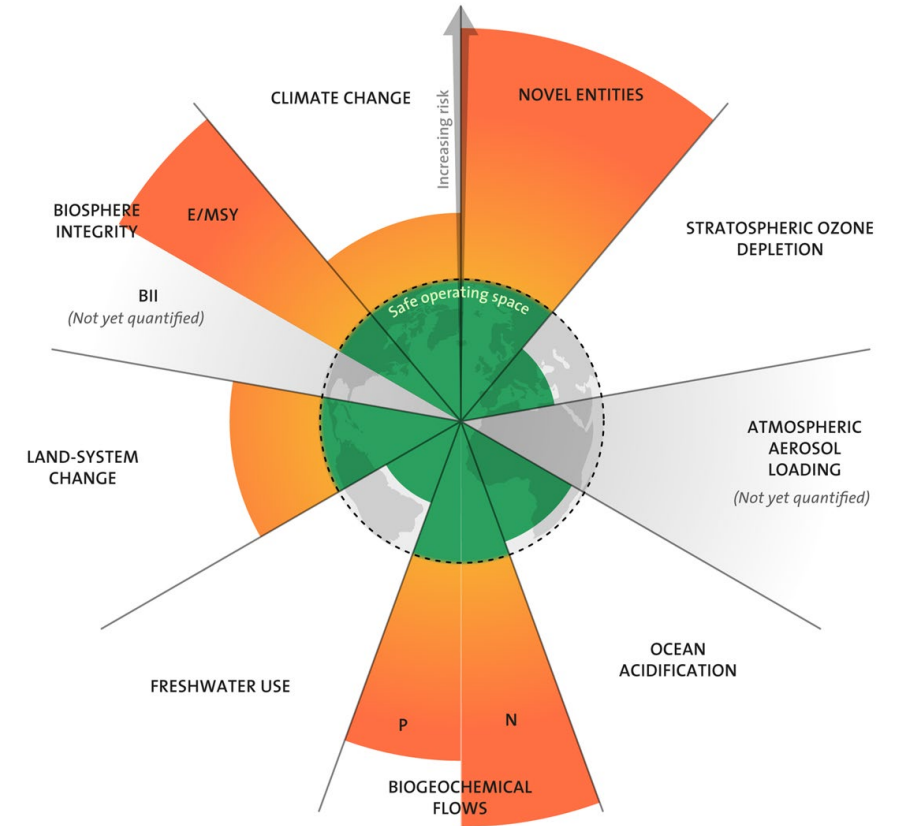
# Approaching Tipping Points

- 5 of 16 tipping points may be triggered at today's temperatures:
  1. Greenland ice sheets
  2. West Antarctic ice sheets
  3. Widespread abrupt permafrost thaw
  4. Collapse of convection in the Labrador Sea
  5. Massive die-off of tropical coral reefs.
- 4 of these 5 move from possible events to likely events at 1.5°C, with 5 more becoming possible around this level of heating

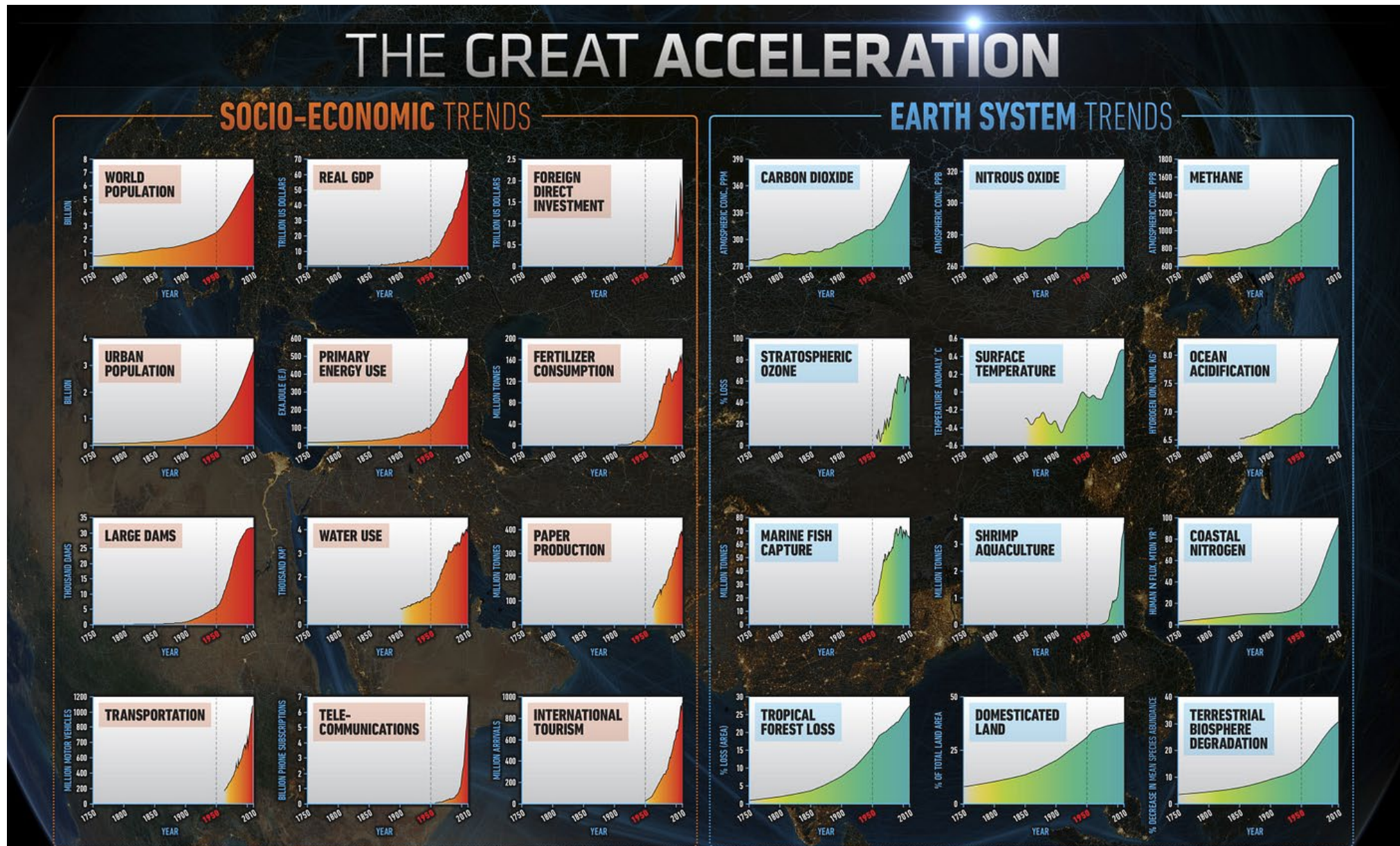


# Planetary Boundaries

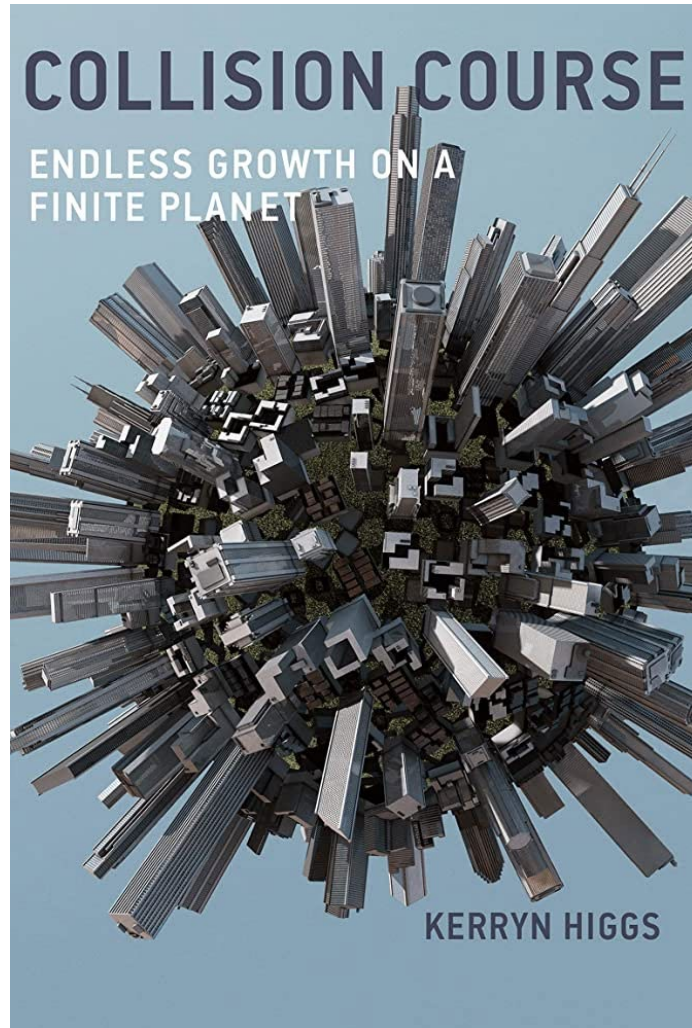
- 11,700 year-long Holocene is being destabilized  
→ new epoch, the Anthropocene.
- Nine planet boundaries (2009 paper):
  - Climate change
  - Changes in biospheric integrity
  - Biogeochemical flows
  - Stratospheric ozone depletion
  - Ocean acidification
  - Freshwater use
  - Land-system change
  - Atmospheric aerosol loading
  - Introduction of novel entities
- Guardrails not tipping points. Tightly linked.
- Earth System overreacts even to small nudges  
→ an angry beast.



# Anthropocene epoch. Great Acceleration: 1945 -- present

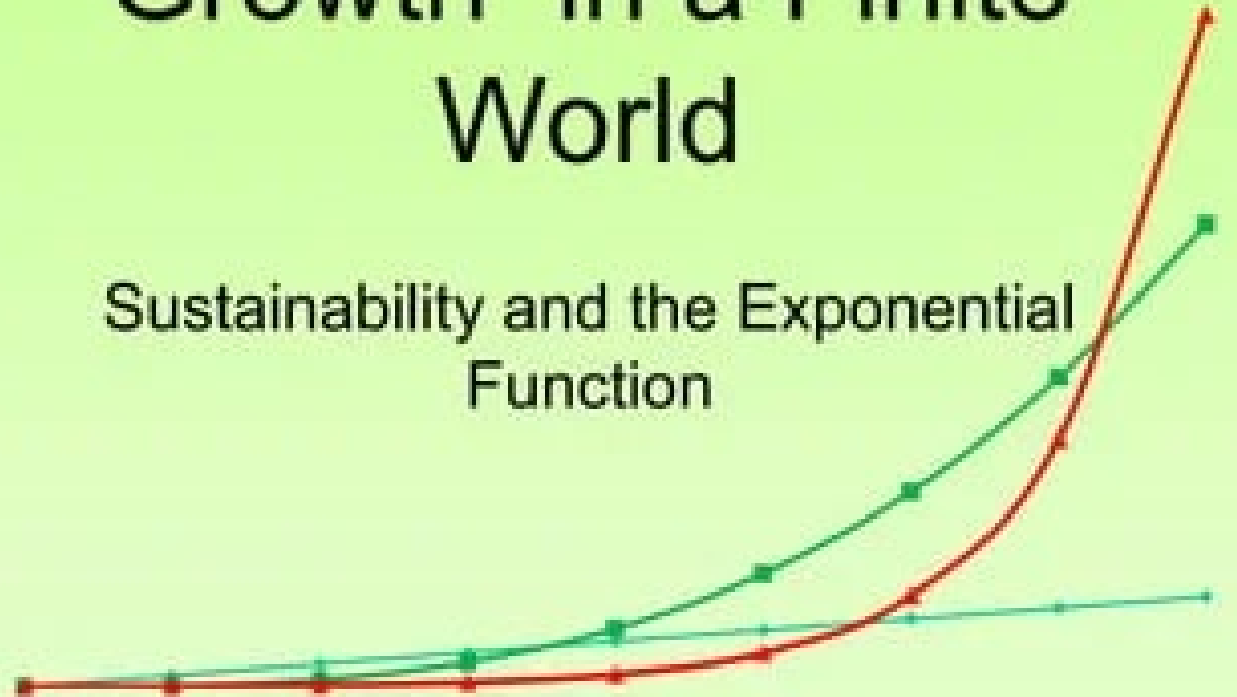


But what about exponential economic growth?



## Growth in a Finite World

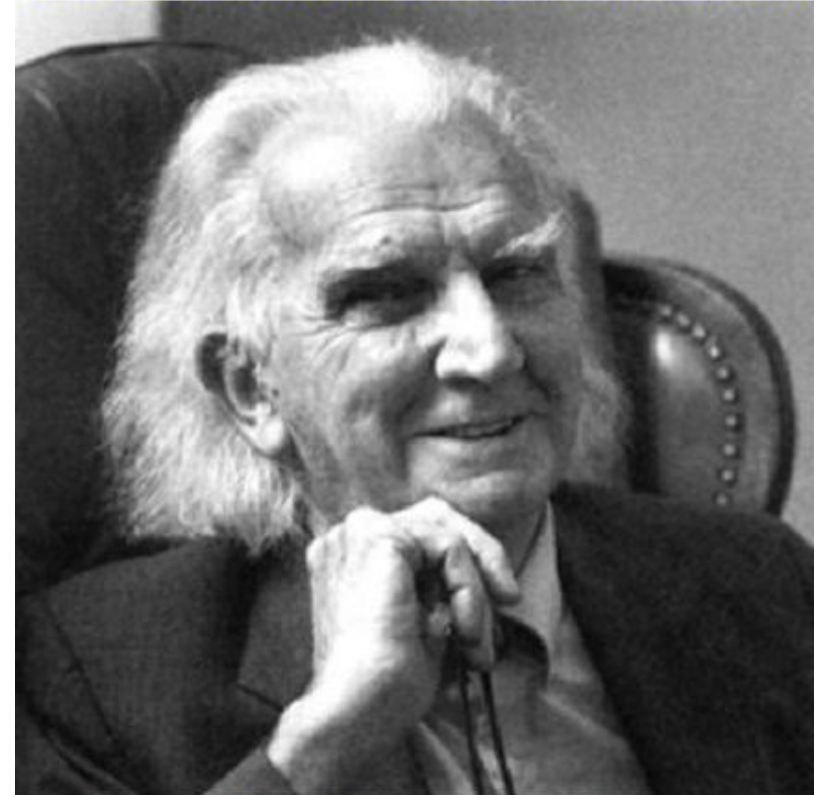
Sustainability and the Exponential Function





# Exponential economic growth on a finite planet

- The imperatives of capital take precedence over all other needs and values (e.g., wellbeing, care, stewardship)
- Constant pressure on corporations to improve productivity, reduce costs, etc. → pushes system to expand physically, financially, geographically.
- The ecological tyranny of the bottom line → when protecting humanity and the planet reduce profits, corporations will always put profits first.
- A zero-growth, steady-state capitalist economy is impossible.



**"Anyone who believes in indefinite growth in anything physical, on a physically finite planet, is either mad or an economist."** (Kenneth E. Boulding)

# Ecological critiques of capitalist system of production



“The modern world worships the gods of speed and quantity, and of quick and easy profit, and out of this idolatry monstrous evils have arisen.”

“The struggle against the massed might of industry is too big for one or two individuals...to handle”

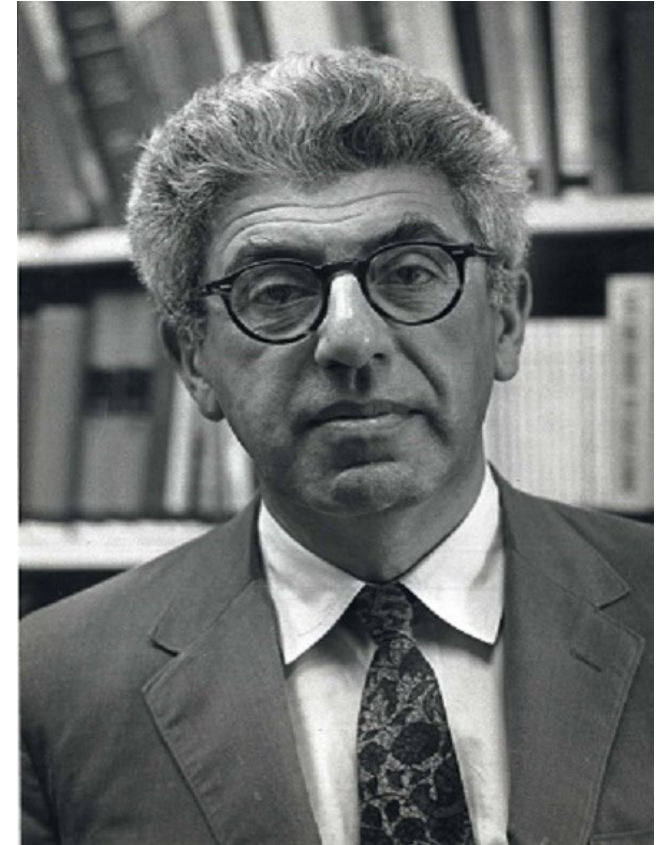
– Rachel Carson, biologist

# Ecological critiques of capitalist system of production



“We are in an environmental crisis because the means by which we use the ecosphere to produce wealth are destructive of the ecosphere itself. The present system of production is self-destructive; the present course of human civilization is suicidal.”--

Barry Commoner, biologist,  
1971



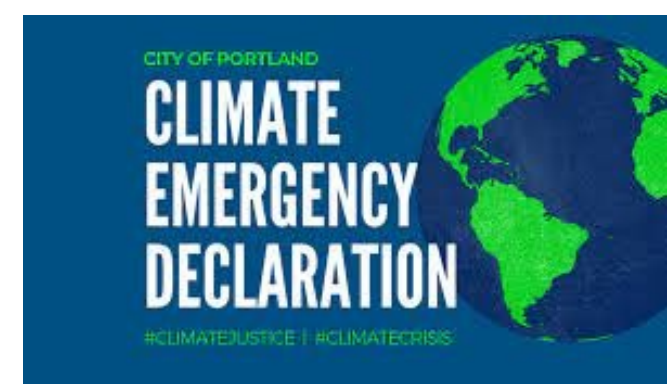
# Pull the Emergency Brake



“You only speak of green eternal economic growth because you are too scared of being unpopular. You only talk about moving forward with the same bad ideas that got us into this mess, even when the only sensible thing to do is **pull the emergency brake.**” – **Greta Thunberg**

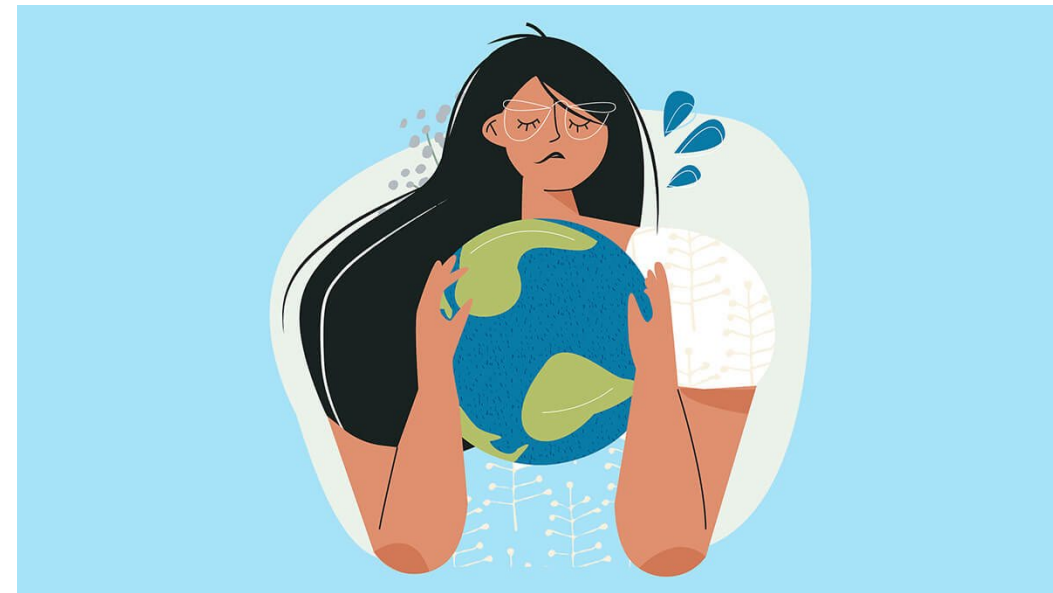
# A Climate Emergency

- Calls for **climate emergency declarations** in all towns and cities, unions, states.
- **Scientists are calling for radical transformation of economic system** – energy, agriculture, transportation, urban development.
- Current system is premised on 3% compound annual economic growth (on a finite planet), which is fueling the crisis. **Simply decarbonizing is not enough. Energy consumption will have to decline as well.**
- **Ecological critiques of our system of production are not new.** See biologists Rachel Carson (Silent Spring) and Barry Commoner (ally of Tony Mazzocchi). Commoner in 1971 called for changing the system of production, which was destroying the planet.

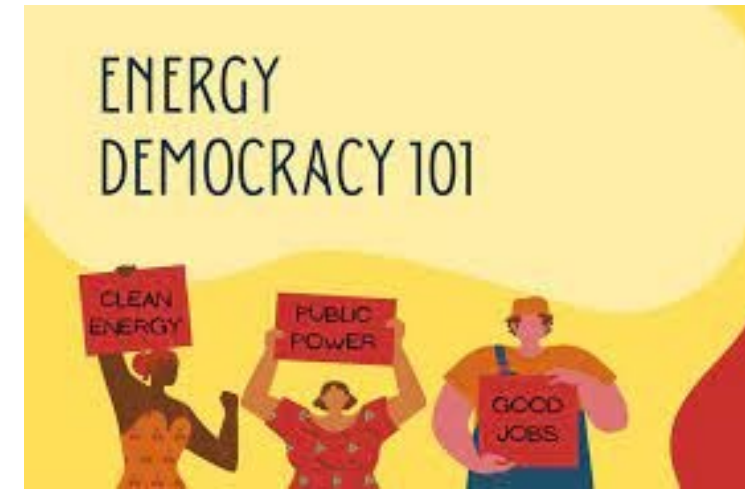


# Temperature Check

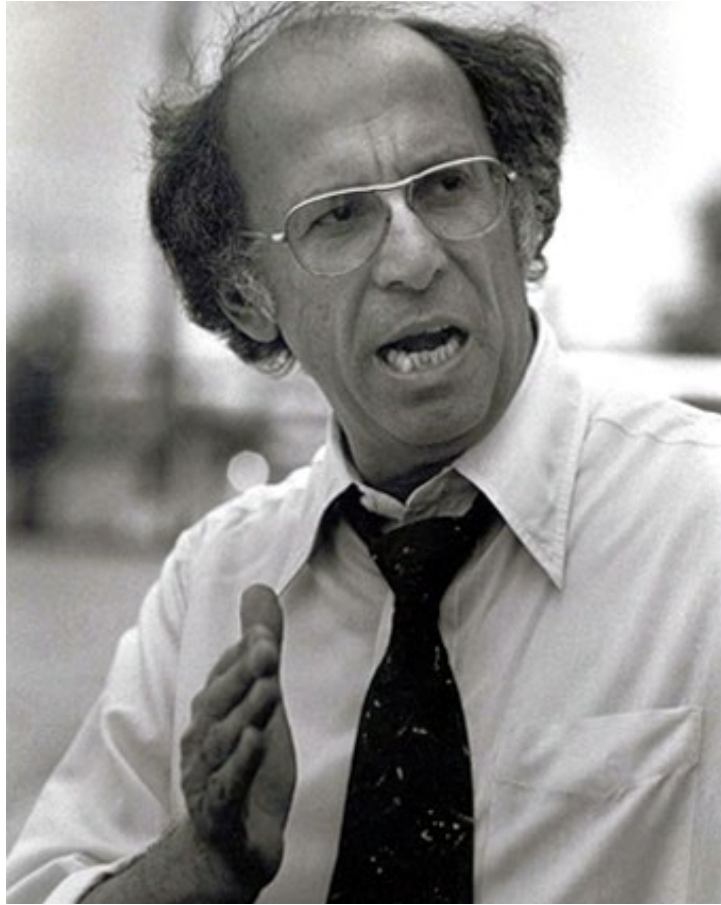
- How are you feeling right now?
- What are your concerns, your fears?
- What is your understanding of the scientists' warnings and the insufficient actions by policymakers and governments?
- What can we do?



# Climate Solutions

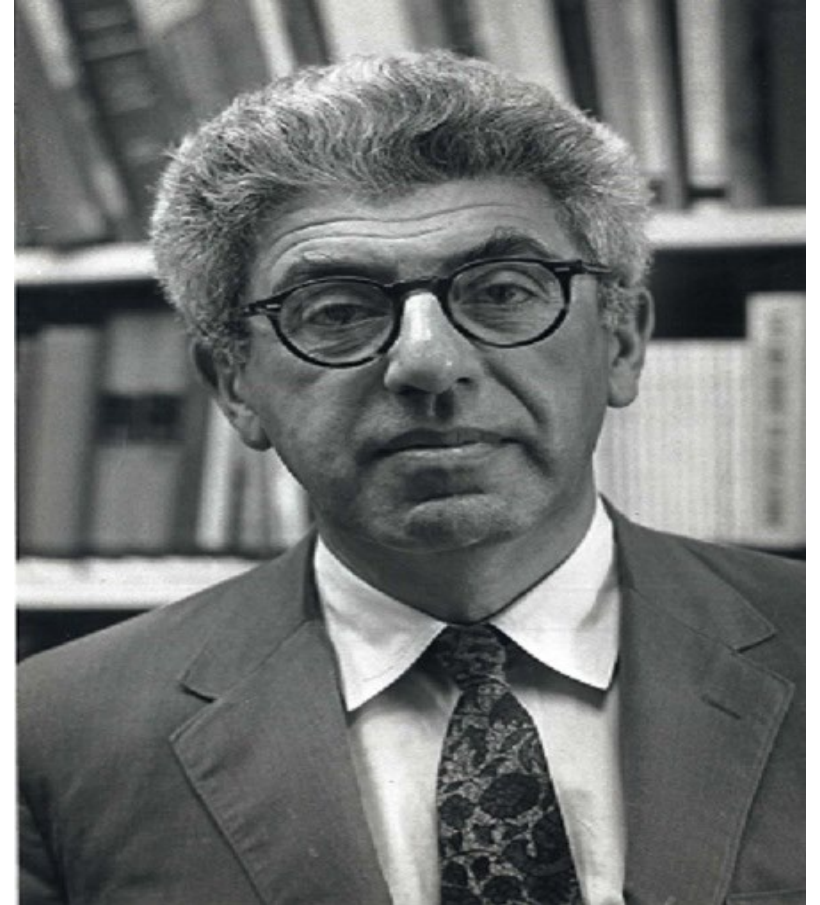


# Advocating Labor and Environmental Industrial Policy – Tony Mazzocchi and Barry Commoner



Oil, Chemical & Atomic Workers leader

← Allies →

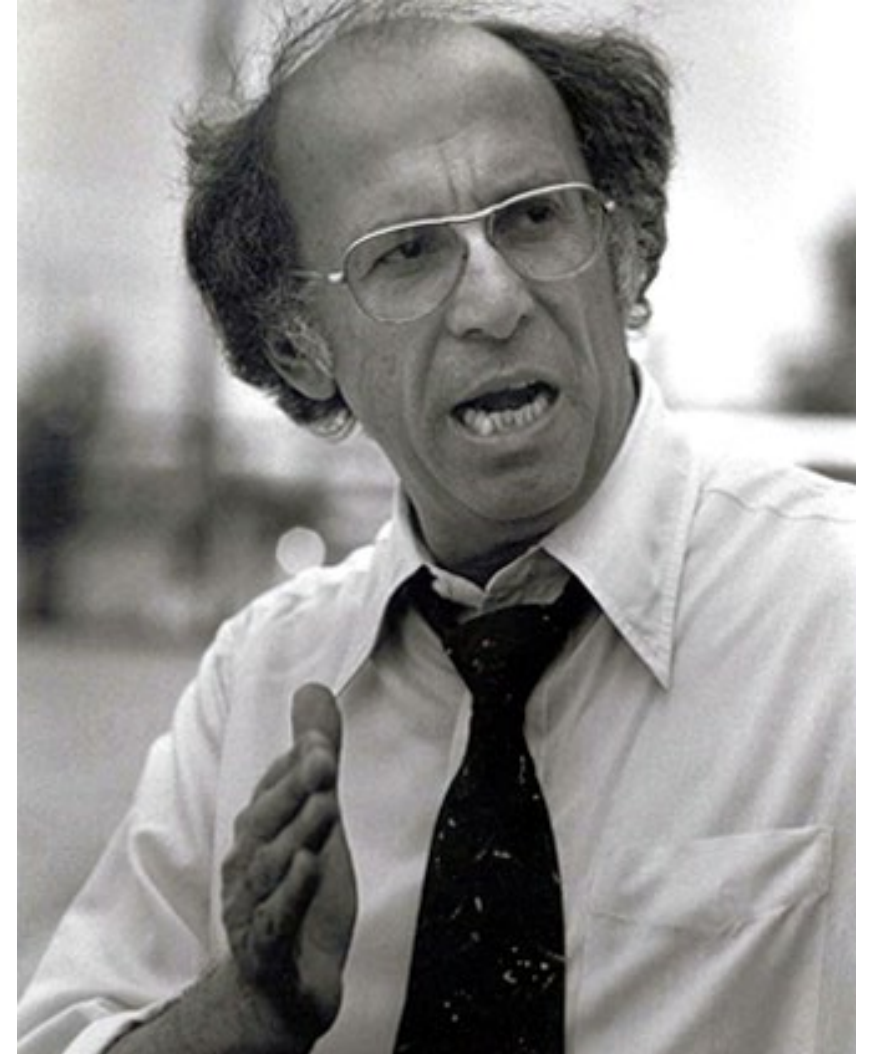


Biologist



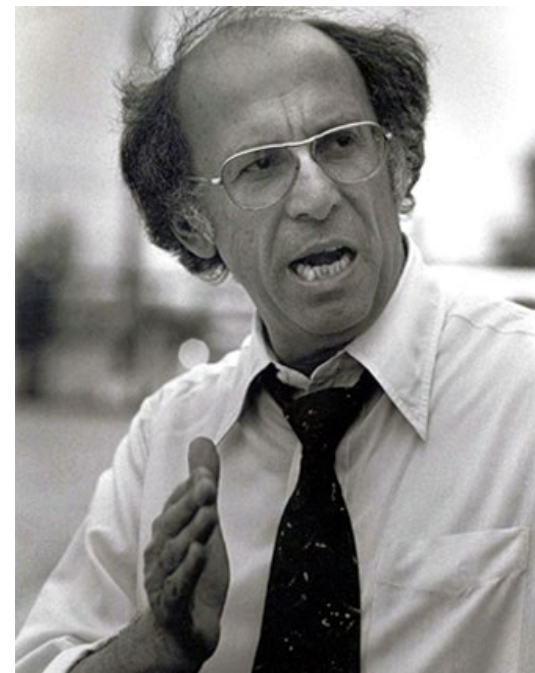
# Tony Mazzocchi, leader in Oil, Chemical & Atomic Workers

- **Built coalitions** with scientists, public health advocates, environmentalists in 1950s **against atomic bomb testing.**
- **Powered the 1960s movement** of labor/environment/public health for passage of the **OSH Act (1970).**
- **Created training program** for doctors to become occupational health physicians, bringing together medical doctors and labor.
- **Forged labor/environmental coalitions** throughout the 1970s, 80s, 90s.
- Spearheaded campaign to create a **Labor Party and Just Transition policy, 1990s.**



# OCAW's *Just Transition* Advocacy, 1990s

- **Solution to “jobs vs. environment” dilemma.**
- One element of a stronger **social and environmental welfare state.**
- **Just Transition Fund (1995)**, a major expansion of social welfare in U.S.: full wages up to 4 years of tuition, post-education subsidies, relocation assistance.
- JT Fund was part of **larger agenda of Labor Party**, including green industrial policy: end to bigotry, universal health care and education, family and community time through reduction of working time, regulation of corporations of reduction of their power, worker participation in design and organization of work
- Labor Party sought to **strengthen social welfare in U.S.**; OCAW sought to **diffuse Just Transition** within movements.
- OCAW plays critical role in creation of **Just Transition Alliance**



# Green New Deal resolution (AOC/Markey, 2019)

- **Massive public investment** to get economy to net zero by 2030s
- **Job guarantee**, giving public sector job for anyone who wants one. Connects climate crisis to economic misery.
- **Prioritizes clean energy and resiliency investments** in racialized and working-class communities.
- **Expands and improves access to huge range of social services:** free public college tuition, Medicare for All.



# Bernie Sanders' Green New Deal, 2020

- **Transform our energy system to 100 percent renewable** energy and create 20 million jobs
- **Ensure a just transition** for communities and workers
- **Ensure justice for frontline communities,**
- **Save American families money** with investments in weatherization, public transportation, etc.
- **Commit to reducing emissions throughout the world,** including providing \$200 billion to the Green Climate Fund,
- **Invest in conservation and public lands**
- **End the greed of the fossil fuel industry**



# Moderate Green New Deal



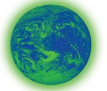
- **Carbon taxes, with refunds for the poor, and heavy investments in R&D** → decarbonize the economy gradually but efficiently. Uses tax incentives and price signals.
- **Narrow in scope**, focused mainly on energy, minimally intrusive in daily life.
- Focused on getting **agreement among policy elites**.
- Regards the focus on dismantling inequalities and disciplining corporations to be reckless and unrealistic.
- **Gentler targets** and slower change.

# A robust Green New Deal

- **Building a climate politics for the 99%:** multi-racial masses against a tiny elite, demanding justice for all on a livable planet.
- **Aim for close to 1.5°C .**
- **Uses the power of public investment and coordination** to prioritize decarbonization at speed, scope, and scale → a **rapid and just transition.**
- Sees energy as **connected to broader physical systems and social inequalities.**
- Sees **broadening of climate policy as a political asset** → an opportunity to build majority support for big change and mobilize to break the status quo.

FOREWORD BY NAOMI KLEIN

## A Planet to Win



## Why We Need a Green New Deal

KATE ARONOFF, ALYSSA BATTISTONI,  
DANIEL ALDANA COHEN, AND THEA RIOFRANCOS



# Degrowth (the movement)

- **To stay under 1.5°C or 2°C**, high-income nations cannot continue to pursue growth.
- **More growth requires more energy use** → more energy use makes it impossible for us to cover it with renewable alternatives in the short time we have left
- **The less energy we use, the easier it is to supply it with renewables** → in order to accomplish this, high-income nations need to scale down material extraction and production.
- **Degrowth** calls for: a **reduction of excess energy and material throughput.**
- We need a Green New Deal, yes, but **if we want our GND to be technologically feasible, ecologically coherent, and socially just, it needs to be a GND without growth.**



# Recap: current climate policies are just not enough

- Rapid decarbonization is hardly possible when fossil fuel projects are expanding
- Green New Deal and Just Transition are stalled
- A robust Green New Deal may be a good next step
- Other policy prescriptions – carbon tax, cap and trade, market-based solutions -- are insufficient
- Governments are too locked into Business as Usual and exponential economic growth
- Is it up to labor movement and climate justice movements to make themselves heard?





# Small Group Activity: Our task as Worker and Community Educators

- How do we communicate the dire climate situation?
- How do go beyond doing disaster preparedness to talk about organizing to save the climate?
- Suggestion: That every town have an emergency town meeting every week → How could we do this?
- You are Educators. Your task is to organize your union, your organization, your town about the urgency of the moment. What will you do?
- What policies will you be advocating for?

For more information, please  
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857-928-4163 (cell)

# Resources

- Carbon Brief's definitive guide to the entire IPCC sixth assessment cycle
  - <https://www.carbonbrief.org/carbon-briefs-definitive-guide-to-the-entire-ipcc-sixth-assessment-cycle/>
- IPCC's conservative nature masks true scale of action needed to avert catastrophic climate change
  - <https://theconversation.com/ipccs-conservative-nature-masks-true-scale-of-action-needed-to-avert-catastrophic-climate-change-202287>
- Dmitris Stevis. 2023. *Just Transitions: Promise and Contestation*
  - <https://www.cambridge.org/core/search?q=9781108947008>
- Ian Angus. 2017. *Facing the Anthropocene: Fossil Capitalism and the Crisis of the Earth System*. Monthly Review.
- Kate Aronoff et.al. 2019. *A Planet to Win: Why We Need a Green New Deal*. Verso.

# Resources (cont.)

- *How vested interests rewrote the IPCC's latest report*
  - <https://climateandcapitalism.com/2022/04/28/how-vested-interests-rewrote-the-ipccs-latest-report/>
- *Advance Release! The Leaked IPCC Reports*
  - <https://mronline.org/2021/09/08/advance-release-the-leaked-ipcc-reports/>
- IPCC. *Climate Change 2022 – Mitigation of Climate Change*.
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# Resources (cont.)

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- W. Steffen, et.al. 2018. *Trajectories of the Earth System in the Anthropocene*
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