Informal compilation of recent climate relevant references

Version 2.0 - 15 December 2023, updated after COP28

Climate March Brussels 3 December 2023, Picture credit Thomas Arnold

Thomas Arnold, Active Senior Green Transition, DG Research and Innovation, European Commission, and EU Staff for Climate

Active Seniors are retired officials no longer in charge of specific files. They can contribute sharing their expertise and experience. They do not represent the European Commission.

Contents

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All hyperlinks are active in the PDF version

Introduction and context

At the occasion of the COP28 in the United Arab Emirates, I am sharing an informal compilation of recent climate-relevant references which I have gathered over the last couple of weeks. The selection is of course subjective and does in no way claim to be comprehensive. Colleagues may find it useful to have this together in one single place for further consultation. The current version 2.0, updated 15 December 2023 after the end of COP28, replaces the previous version 1.0 of 8 December 2023.

The COP28 climate talks [What Think Tanks are thinking] | Think Tank | European Parliament

Here is a great compilation by the European Parliament Research Service of recent contributions by think-tanks.

https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)754596

> *Leaders and government officials from across the world will meet for the COP28 climate summit in Dubai, United Arab Emirates, from 30 November to 12 December, to try to raise ambition in efforts to fight climate change. The summit's main aim is to take stock of countries' efforts to limit greenhouse gas emissions to a level that keeps dangerous human-induced climate change in check, to adapt to climate change, and to mobilise climate finance. COP, or the Conference of Parties, is an annual United Nations summit to address the climate crisis. At COP21 in 2015, all parties adopted the historic Paris Agreement, the first universal, legally binding global climate agreement that agrees to limit the global temperature rise to well below 2˚C above pre-industrial levels, with an aspirational goal of a 1.5˚C limit. This year, the European Union will focus on keeping the 1.5˚C target alive, by pressing to triple global renewable energy capacity and double energy efficiency by 2030, and to agree on phasing out unabated fossil fuels and ensuring that fossil fuel consumption peaks well ahead of 2030. This note offers links to recent commentaries, studies and reports from international think tanks on climate issues published in the past few months.*

COP28: the science is clear — fossil fuels must go | Nature

COP28: the science is clear — fossil fuels must go (nature.com)

> ***Phasing out fossil fuels is not negotiable. World leaders will fail their people and the planet unless they accept this reality.***
>
> *The research itself is not the issue. According to the latest estimates, the world would need to eliminate emissions of carbon dioxide in little more than a decade, while also slashing those of methane and other greenhouse gases, to have even a 50% chance of limiting average warming to 1.5 °C above pre-industrial levels. That equation changes, however, if humans are able to extract CO_2 from the atmosphere on an industrial scale. Here lies the crux of the debate.*

See also:

The climate disaster strikes: what the data say (nature.com)

Letter from the climate system to Al Jaber | Michael Mann and Jean-Pascal van Ypersele

Climate scientists Jean-Pascal van Ypersele (UCLouvain, Former IPCC Vice-Chair) and Michael E. Mann (University of Pennsylvania) have written the following open letter to the COP president on behalf of the climate system.

Our Letter, on Behalf of the Climate System, to COP28 President Sultan Al Jaber | MICHAEL E. MANN (michaelmann.net)

https://x.com/JPvanYpersele/status/1732338051412591081?s=20

> ***Our Letter, on Behalf of the Climate System, to COP28 President Sultan Al Jaber***
>
> *Dear Sultan Al Jaber,*
>
> *As climate scientists, we welcome your commitment to develop at COP28 a real plan to achieve the goals of the Paris Agreement. We know you have met many different Parties to the Paris Agreement over the past year, and they are often represented by tough negotiators.*
>
> *We are sorry to have to inform y**ou that you have in front of you representatives of the most difficult Party**. It is a Party which has only red lines, and absolutely no flexibility.*
>
> *This Party is called the climate system, and **it only obeys the laws of nature** (physics, chemistry, and biology).*
>
> *On behalf of the climate system, signed: Prof. Jean-Pascal van Ypersele (UCLouvain, Former IPCC Vice-Chair) and Prof. Michael E. Mann, Presidential Distinguished Professor of Earth and Environmental Science, University of Pennsylvania.*

Phasing out 'unbated fossil fuels': the importance of defining 'abatement' | Grantham Institute, Imperial College London

The concepts of unabated and abated fossil fuels through carbon capture have become key points of discussion at the COP and a proxy for arguing the further continuation of fossil fuel use. They are likely to feed the controversy about the ambition and modalities of a "transitioning away" from fossil fuels. While the IPCC empathizes the importance of carbon capture for the 1,5° C target this does not mean that massive investments into carbon capture technologies are a license to continue or even expand further fossil fuel use. I include a couple of references on this key issue into the compilation.

Phasing out 'unbated fossil fuels': the importance of defining 'abatement' | Grantham Institute – Climate Change and the Environment | Imperial College London

Key points

- *To achieve our climate goals, total global fossil fuel demand needs to fall substantially, even in a scenario where 'abated' fossil fuels are permitted.*
- *Fitting Carbon Capture and Storage technology to fossil fuel plants does not automatically mean that carbon dioxide emissions have been 'abated' in line with the Paris Agreement goals. Without a formally agreed definition of what is meant by 'abatement', there is a risk that these goals will be compromised.*
- *To qualify as 'abated', fossil fuel plants must achieve: near total containment of methane emissions associated with extraction, processing and transport; near total containment of end-use combustion carbon dioxide emissions both for fuel production and use; and permanent storage of the captured carbon dioxide.*
- ***The term 'abated' should be reserved for where the ongoing emissions from using fossil fuels are reduced 90-95% or more; upstream fugitive methane emissions are less than 0.5%, and approaching 0.2%, of equivalent natural gas production; and captured emissions are stored permanently.***

Why does the definition of 'abated' matter?

In the run up to COP28, several influential stakeholders—including the G7 and European Council—have called for the phase out of '*unabated* fossil fuel'. This is different to calling for the phase out of fossil fuels (which refers to phasing out *all* fossil fuels) because it would permit some continued usage of fossil fuels, so long as they were 'abated'.

The issue, however, is that while 'abated' is generally understood to mean that some form of Carbon Capture and Storage (CCS) technology would be used to capture the emissions resulting from the use of fossil fuels, there is currently no formally agreed definition of the standard to which this would be expected to operate.

It might seem reasonable to assume that 'abated' fossil fuels would have no, or very minimal, levels of associated greenhouse gas emissions. But in fact, fitting CCS technology does not automatically achieve this. If the definition of 'abated' is left open to interpretation, there is a risk that it could inadvertently allow the continued emission of greenhouse gases.

'Unabated': a word to split the world at COP28 (phys.org)

The outcome of the most important climate negotiations in years could rest on the ambiguity surrounding one linchpin term, according to experts: "unabated fossil fuels".

With the world experiencing its hottest year on record and devastating heat, wildfires and flooding battering communities across the planet, negotiators at the COP28 talks must hammer out a response to a UN assessment that countries are far from meeting their climate targets.

Ditching coal, oil and gas for cleaner energies is essential if the world is to meet its goal of limiting global warming and avoiding the most catastrophic climate impacts.

Among the menu of hotly contested options negotiators have picked over this week include an agreement to accelerate "efforts towards phasing out unabated fossil fuels" and to cut their use to reach net-zero by around mid-century.

'Distraction tactic'

Even in the longer term, scientists project there will be only limited use of abatement technology, focused in sectors that are particularly hard to decarbonise, like cement.

In a statement released before the climate talks, the High Ambition Coalition of countries—including France, Kenya and Colombia—said abatement technology has a "minimal" role to play in decarbonizing energy.

"We cannot use it to green-light fossil fuel expansion," they said.

There are also concerns that the technology will not stop enough emissions from reaching the atmosphere.

An analysis by the group Climate Analytics this week found that an overreliance on large-scale CCS—and an underperformance of the technology—could lead to 86 billion tonnes of excess greenhouse gas emissions between 2020 and 2050.

Fischer said the focus on CCS was "very much a distraction tactic," adding it is unlikely ever to be useful in some significant areas of fossil fuel consumption, particularly oil.

"You can't really fit a little carbon capture device onto every exhaust pipe of a car," said Fischer.

CCS is not new. The fossil fuel industry has been using it since the 1970s, not to prevent CO_2 from leaching into the atmosphere but to inject the gas into oil fields to extract more crude.

Historically, bolting CCS facilities onto coal- and gas-fired power plants and then storing the CO_2 to reduce emissions has proven technically feasible but uneconomical.

A new report from Oxford University's Smith School of Enterprise and the Environment found that heavy dependence on CCS to reach net zero targets around 2050 would cost at least $30 trillion more than using mainly renewables, efficiency and electrification.

"Using CCS to facilitate business-as-usual fossil fuel use, even if feasible, would be highly economically damaging," it said.

Carbon capture becomes focus for divisions at climate conference | Reuters

Carbon capture becomes focus for divisions at climate conference

LONDON, Dec 7 (Reuters) - Carbon capture and storage has emerged as flashpoint at the UN climate conference in Dubai about how big a role it is destined to play in reaching the target of net zero emissions.

It has also prompted an unusual and bad-tempered confrontation between senior officials at the International Energy Agency (IEA) and the Organization of the Petroleum Exporting Countries (OPEC).

In the run up to the conference, the IEA called on oil and gas producers to let go of "the illusion that implausibly large amounts of carbon capture" are the solution to reducing emissions and reaching net zero targets.

OPEC hit back accusing the IEA of finger-pointing, vilifying producers and using an "extremely narrow framing" of the challenges in reaching net zero that downplays energy security and affordability.

Carbon capture has become a proxy for a broader political and diplomatic battle about the future for oil, gas and coal production in a world theoretically committed to achieving net zero emissions by 2050.

NICHE TECHNOLOGY

Carbon capture utilisation and storage are currently small-scale technologies that play a niche role in enhanced oil recovery and cleaning up methane from natural gas wells for sale.

In 2022, IEA data shows 45 million tonnes of carbon dioxide (CO2) were captured compared with total energy-related emissions of 37 billion tonnes, a capture rate of just 0.1%.

Under policies already announced by governments, the IEA projects the amount of CO2 captured will increase to 440 million tonnes a year by 2030 and 3.5 billion tonnes a year by 2050.

To achieve net zero emissions by mid-century, the IEA predicts capture would need to increase to 1 billion tonnes a year in 2030 and 6 billion tonnes a year in 2050.

Even under this more ambitious scenario, however, capture would account for just 10% of cumulative emissions reductions between 2022 and 2050.

Carbon capture's role is limited because the process is expensive, requiring enormous amounts of energy and water to separate CO2 from other gases, as well as heavy upfront capital expenditure in capture plants.

Even if costs fall as the technology is deployed more widely, large-scale capture would only be commercially viable in a scenario with a high implicit or explicit price on emissions.

But in a world characterised by a high price on emissions, other routes to net zero would become more viable and probably prove simpler, including grid-scale battery storage and hydrogen.

Carbon capture's role is likely to be restricted to industries such as cement, chemicals, and steelmaking that are hard to decarbonise by other means and produce large streams of relative concentrated CO2 as a waste product.

It is unlikely to play more than a minor role in reducing emissions from electricity generation.

CAPTURE COSTS

In the four-stage CCS process, carbon dioxide is captured, compressed, transported by pipeline, and injected underground or used as an industrial input.

Capture is the most expensive stage because the CO2 must be separated from other gases such as oxygen, nitrogen and methane, which uses large amounts of energy and water.

Process efficiency depends on the concentration of CO2 which is why it is most cost effective when paired with industrial processes that produce relatively pure CO2 in their exhaust streams such as cement manufacturing.

In electricity generation, where the waste stream is less concentrated, there are three main routes to capturing CO2 emissions:

- Post-combustion capture is the most mature technology but the low concentration of CO2in power plant exhaust streams makes it expensive.

- Pre-combustion capture attempts to solve the problem by treating or gasifying the fuel before burning it to remove a high-purity stream of CO2. Gasification has been used in the coal-to-liquids industry since the 1930s but has never successfully at scale for CCS and early pilot projects have not been encouraging.

- Oxy-combustion is a variation on post-combustion capture in which the fuel is burned in pure oxygen rather than air, resulting in a much higher concentration of CO2 for capture. But purifying oxygen is itself energy intensive and expensive.

Only the simple post-combustion system can be considered relatively mature technology for widespread deployment in the electricity sector.

But in a power plant fitted with post-combustion capture technology, the capture process uses up between 15% and 40% of the total electrical output, an enormous energy penalty.

Water consumption is also 25-200% higher than for a conventional power plant, limiting capture in areas where water is scarce.

And capital costs of building a power plant with post-combustion technology are roughly double those for a conventional plant without it.

As a result, post-combustion capture systems are likely to increase the cost of electricity by 50-100%, making CCS unviable without subsidies or a high CO2 price.

STORAGE ISSUES

The other stages of the CCS and CCU process are less expensive but raise practical, safety and social acceptability issues that could limit widespread adoption, according to the most recent UN climate assessment in 2022.

Compression and pipelines are well-established technologies; costs are likely to be moderate unless CO2 has to be transported over very long distances.

But storage creates more challenges because CO2 needs to be locked away for hundreds of years without escaping to reduce the climate impact.

CO2 is toxic, a threat to human health and life in concentrations of as little as 4%, so the integrity of underground storage must be carefully planned and monitored.

CO2 is normally stored by injecting it hundreds or even thousands of metres underground into depleted oil and gas fields or deep saline aquifers.

If CO2 is injected into depleted fields to enable the recovery of more oil and gas it can improve the economics of the project but results in a smaller emissions reduction.

Global geological potential to store CO2 has been estimated at 10,000 billion tonnes, split between oil and gas reservoirs (20%) and saline aquifers (80%), which is more than enough for the foreseeable future.

But the distribution of potential storage is uneven and not all potential sites will prove geologically or politically suitable.

The United States, Canada, the former Soviet Union, and the Middle East have lots of potential storage, but there is much less in China and Western Europe.

The political and social acceptability of large-scale underground storage remains uncertain, but it may be easier in communities with a history of oil and gas production or offshore.

What Does 'Unabated' Mean, Anyway? | NYT

What does 'unabated' mean for fossil fuels - The New York Times (nytimes.com)

A fierce debate at the global climate talks.

There's no shortage of jargon in the global climate talks in Dubai. But one particular word is taking central stage, and a fierce debate is brewing over "unabated."

- Sultan Al Jaber, the president of this year's COP, has said he hopes that all countries would agree to transition to "an energy system that is free of unabated fossil fuels."
- U.S. climate envoy John Kerry said earlier this week that "the bottom line is this COP needs to be committed to phasing out all unabated fossil fuels."
- The G7, the group that gathers some of world's largest economies, has committed "to accelerate the phaseout of unabated fossil fuels so as to achieve net zero in energy systems by 2050."

Unabated, when it comes to fossil fuels, means doing nothing.

There is no agreed-upon definition of unabated.

Scientists from the Intergovernmental Panel on Climate Change tried to define the term in the footnote of a report last year, saying it referred to fossil fuels "produced and used without interventions that substantially reduce the amount of greenhouse gases." That would mean capturing at least 90 percent of emissions from power plants, for example, or 50 to 80 percent of methane leaks.

But many climate change scientists worry that creates opportunities to game the system. Abated fossil fuels could, for example, be used to refer to technologies that capture a much smaller percentage of emissions at the source. Or they could refer to unproven carbon capture techniques that offset emissions elsewhere.

Geoffrey Supran, a professor of environmental science and policy at the University of Miami who focuses on the history of climate disinformation, said the term is reminiscent of the oil industry's history of "appropriating wonky scientific language" to "greenwash their image."

The word, Supran added, "seems to be having the effect of confusing the COP28 debate."

Nikki Reisch, director of the climate and energy program at the Center for International Environmental Law, warned against any COP agreement that "perpetuates the myth that we can continue to produce and use fossil fuels at scale and somehow still meet our climate goals."

Fossil fuel phase-out will 'not avert climate breakdown without protections for nature' | The Guardian

Fossil fuel phase-out will 'not avert climate breakdown without protections for nature' | Deforestation | The Guardian

Top climate scientist says carbon sinks such as forests and wetlands vital to keeping temperature rise below 1.5C

Human destruction of nature is pushing the planet to a point of no return, and even a phase-out of fossil fuels will not stave off climate breakdown unless we also protect the natural world, one of the world's top climate scientists has warned.

Johan Rockström, the director of the Potsdam Institute for Climate Impact Research, told the Guardian: "Even if we phase out all fossil fuels, if we do not get involved in nature, [the destruction of natural landscapes and habitats] can make us lose what we all have agreed on the safe future for humanity on Earth – that is, to stay within the 1.5C limit. It's really decisive, that we get it right on nature."

All the scientific models that show a pathway for the world to stay within the crucial temperature threshold of 1.5C above pre-industrial levels make big assumptions about the retention of natural "carbon sinks", such as forests, wetlands and peatlands, he said. Without these carbon sinks, the excess carbon dioxide in the atmosphere would increase even faster.

Speaking from the Cop28 UN climate summit in Dubai, he pointed to the Amazon, where the rainforest is under unprecedented threat from a combination of logging, rising temperatures and regional drought. Many scientists fear the rainforest could be approaching a "tipping point" whereby the forest could give way to savannah.

Research had suggested that the Amazon could tolerate as much as 3C of heating before tipping into a savannah-like state, but that did not take account of the impact of deforestation, said Rockström. When the forest is exploited, the "fishbone" pattern of roads encroaching on the trees creates evaporative flow, which dries out the forest. This is likely to mean that when deforestation reaches about 20% to 25% of the area, it combines with high temperatures to bring the system close to the tipping point to savannah.

Currently, he said, deforestation was at about 17%. "So we're very close to the ecological tipping point," he warned. "We have a lot of evidence to say that combination of deforestation, biodiversity loss and temperature rise is a very dangerous path to follow."

COP28 statement by climate scientists | Future Earth

Sign the COP28 statement. The Science is Clear: We Need Net Zero Carbon Dioxide Emissions by 2050. | Future Earth

Future Earth and World Climate Research Programme have convened a statement from scientists around the world in response to comments regarding fossil fuel phaseout pathways. This statement has been covered in the New York Times.

If you are a scientist working on climate change, it's open for signature at the bottom of the statement.

COP28: Later is Too Late - Petition

COP28: Later is Too Late (outrageandoptimism.org)

The B Team | The Transformation is Unstoppable

> *As COP28 enters its second week, over 2,000 signatories and counting from across business, finance, philanthropy, politics, academia and civil society join forces to call on Sultan Al Jaber and all Parties to deliver a 1.5C aligned outcome in response to the Global Stocktake - because later is too late.*

No science behind fossil fuel phase-out for 1,5° target? | The Guardian & WeDontHaveTime

A controversy has come up around statements by COP president Al Jaber that there was no science behind 1,5 degree target. According to other voices this may have been taken out of context.

Cop28 president says there is 'no science' behind demands for phase-out of fossil fuels | Cop28 | The Guardian

> *The president of Cop28, Sultan Al Jaber, has claimed there is "no science" indicating that a phase-out of fossil fuels is needed to restrict global heating to 1.5C, the Guardian and the Centre for Climate Reporting can reveal.*
>
> *Al Jaber also said a phase-out of fossil fuels would not allow sustainable development "unless you want to take the world back into caves".*

Has the COP President's "no science behind phase-out" statement been taken out of context? (wedonthavetime.org)

Big Oil Vs Science | NYT

It's Big Oil vs. Science at the COP28 Climate Summit - The New York Times (nytimes.com)

> *With fresh promises to cut methane and billions of dollars in new commitments to help poor countries adapt to a warming planet, a sense of momentum and optimism pervaded the first days of the United Nations climate summit in Dubai.*
>
> *Now comes the hard part.*
>
> *Five days into the two-week conference, known as COP28, the talks have become consumed by an intense debate over the future of fossil fuels.*

Kick Big Polluters Out (KBPO) coalition

https://kickbigpollutersout.org/articles/release-record-number-fossil-fuel-lobbyists-attend-cop28

Record number of fossil fuel lobbyists granted access to COP28 climate talks
Industry influx escalates call to protect talks from Big Polluters

LONDON 5th December 2023: *At least 2456 fossil fuel lobbyists have been granted access to the COP28 summit in Dubai, signalling an unprecedented presence at crucial climate talks from representatives of some of the world's biggest polluters, according to a new analysis from the* ***Kick Big Polluters Out*** *(KBPO) coalition.*

In a year when global temperatures and greenhouse gas emissions shattered records, there has been an explosion of fossil fuel lobbyists heading to UN talks, with nearly four times more than were granted access last year. This uptick coincides with a COP where fossil fuels and their phaseout are a focal point. It also elevates the growing call from Global South countries, public officials, UN constituencies, and wider civil society to eject polluters from talks.

There are significantly more fossil lobbyists granted access to COP28 than almost every country delegation – the 2456 fossil fuel lobbyists are only outnumbered by the 3081 people brought by Brazil (which is expected to host COP30), and the UAE, which as COP28 host brought 4409 people.

The Kick Big Polluters Out coalition analysed the provisional list of participants at COP28 line-by-line in the most in-depth study into the fossil fuel industry's presence at any talks to date. Among the additional topline findings:

- *Fossil fuel lobbyists have received more passes to COP28 than all the delegates from the ten most climate vulnerable nations combined (1509), underscoring how industry presence is dwarfing that of those on the frontlines of the crisis.*

- *A vast number of fossil fuel lobbyists were granted access to the COP as part of a trade association. Nine out of the ten biggest of these groups came from the Global North. The largest was the Geneva-based International Emissions Trading Association (IETA), who brought 116 people including representatives from Big Polluters Shell, TotalEnergies and Norway's Equinor.*

- *In a further sign that COP28 is being used by Big Polluters as an opportunity to advance a fossil-fuelled agenda at the expense of frontline communities, there are more than seven times the number of fossil fuel lobbyists permitted entry to the Dubai talks than official indigenous representatives (316).*

- *France brought fossil fuel giants such as TotalEnergies and EDF as part of its country delegation, Italy brought a team of ENI representatives, and the European Union brought employees of BP, ENI and ExxonMobil.*

See also:

Big meat and dairy lobbyists turn out in record numbers at Cop28 | Cop28 | The Guardian

Georges Montbiot - Here's a question Cop28 won't address: why are billionaires blocking action to save the planet? | The Guardian

To what extent maldistribution of wealth and power are directly linked to climate breakdown and the planetary emergency, is not only a question of ideology. It conditions the framing of the analyses of causes and the most suitable policy solutions.

Here's a question Cop28 won't address: why are billionaires blocking action to save the planet? | George Monbiot | The Guardian

- *So why do oligarchs who do not have direct investments in environmental destruction appear so hostile to environmental protection? Part of the reason is that any opposition to business as usual is perceived as opposition to its beneficiaries. Those who are billionaires or centimillionaires today are, by definition, well-served by the current system. They correctly perceive that a fairer, greener world means curtailing their immense economic and political power. Even those who have invested in green technologies or who donate to green causes doubtless feel an instinctive sense of threat.*

- *Networks funded by fossil fuel companies deliberately aggregate the issues, connecting green policies with communism and violent revolution, while promoting political candidates who will clamp down simultaneously on environmental action, democracy and redistribution. The property paranoia often associated with extreme wealth – the sense that everyone is plotting to take it away from you – is easily triggered.*

- *But we cannot discount the possibility that some of these people really don't care, even about their own children. There are two convergent forces here: first, many of those who rise to positions of great economic or political power have personality disorders, particularly narcissism or psychopathy. These disorders are often the driving forces behind their ambition, and the means by which they overcome obstacles to the acquisition of wealth and power – such as guilt about their treatment of others – which would deter other people from achieving such dominance.*

- *The second factor is that once great wealth has been acquired, it seems to reinforce these tendencies, inhibiting connection, affection and contrition. Money buys isolation. It allows people to wall themselves off from others, in their mansions, yachts and private jets, not just physically but also cognitively, stifling awareness of their social and environmental impacts, shutting out other people's concerns and challenges. Great wealth encourages a sense of entitlement and egotism. It seems to suppress trust, empathy and generosity. Affluence also appears to diminish people's interestin looking after their own children. If any other condition generated these symptoms, we would call it a mental illness. Perhaps this is how extreme wealth should be classified.*

- *So the fight against environmental breakdown is not and has never been just a fight against environmental breakdown. It is also a fight against the great maldistribution of wealth and power that blights every aspect of life on planet Earth. Billionaires – even the more enlightened ones – are bad for us. We cannot afford to keep them.*

We need power to prescribe climate policy, IPCC scientists say | The Guardian

That science advice to policy should NOT be prescriptive, is a key principle of science advice. This has now been questioned by several IPCC lead authors.

We need power to prescribe climate policy, IPCC scientists say | Intergovernmental Panel on Climate Change (IPCC) | The Guardian

> *Senior climate experts are calling for an overhaul of the structure and powers of the UN's Intergovernmental Panel on Climate Change in despair at the slow pace of climate action.*
>
> *Five lead authors of IPCC reports told the Guardian that scientists should be given the right to make policy prescriptions and, potentially, to oversee their implementation by the 195 states signed up to the UN framework convention on climate change (UNFCCC).*
>
> *"As climate change becomes worse and worse, it is becoming more difficult to be policy relevant without being prescriptive."*

Greta Thunberg, We won't stop speaking out about Gaza's suffering | The Guardian

There has been some recent controversy about the stance of Fridays on Palestine. I am including into the compilation Greta Thunberg's latest article in The Guardian as it helps to better understand issues at stake in that context and possible trends within the climate movement.

We won't stop speaking out about Gaza's suffering – there is no climate justice without human rights | Greta Thunberg and Fridays for Future Sweden | The Guardian

> *We won't stop speaking out about Gaza's suffering – there is no climate justice without human rights | Greta Thunberg and Fridays for Future Sweden | The Guardian*
>
> *« Young climate activists haven't 'been radicalised' – solidarity with marginalised people has always been at the heart of our message »*
>
> *« More than 15,000 people, of whom at least 6,000 were children. That's how many people Israel has reportedly killed in the Gaza Strip in a matter of weeks – and those numbers are still rising. Israel has bombed basic societal infrastructure and civilian targets such as hospitals, schools, shelters and refugee camps. Israel has imposed a siege, preventing food, medicine, water and fuel from reaching the 2.3 million Palestinians trapped in the occupied Gaza Strip, leading Oxfam to accuse Israel of employing "starvation as a weapon of war".*
>
> *Dozens of United Nations experts have described the situation as "a genocide in the making", hundreds of international scholars have warned of an unfolding genocide and prominent Israeli genocide expert Raz Segal has called it "a textbook case of genocide". But most of the world, particularly the so-called global north, is looking the other way.«*

Some recent key reports

UNEP Gap reports

Ahead of the COP, UNEP has updated its three climate flagship reports, the Emmissions Gap Report, the Adaptation Gap Report and the Production Gap Report. As expected, they provide a dire picture of a world, and of leadership, not on track as has been pointed out again by UN Secretary General Guterres.

Emissions gap report

Emissions Gap Report 2023 | UNEP - UN Environment Programme

> *As greenhouse gas emissions hit new highs, temperature records tumble and climate impacts intensify, the* Emissions Gap Report 2023: Broken Record – Temperatures hit new highs, yet world fails to cut emissions (again) *finds that the world is heading for a temperature rise far above the Paris Agreement goals unless countries deliver more than they have promised. The report is the 14th edition in a series that brings together many of the world's top climate scientists to look at future trends in greenhouse gas emissions and provide potential solutions to the challenge of global warming.*

Nations must go further than current Paris pledges or face global warming of 2.5-2.9°C (unep.org)

Urging Leaders to Tear Out 'Poisoned Root of Climate Crisis — Fossil Fuels', Secretary-General Warns Environment Report Shows Dangerous Emissions Gap | UN Press

> *In short, the report shows that the emissions gap is more like an emissions canyon. A canyon littered with broken promises, broken lives, and broken records. All of this is a failure of leadership, a betrayal of the vulnerable, and a massive missed opportunity.*

World facing 'hellish' 3C of climate heating, UN warns before Cop28 | Climate crisis | The Guardian

> *Guterres said: "Present trends are racing our planet down a dead-end 3C temperature rise. This is a failure of leadership, a betrayal of the vulnerable, and a massive missed opportunity. Renewables have never been cheaper or more accessible. We know it is still possible to make the 1.5 degree limit a reality. It requires tearing out the poisoned root of the climate crisis: fossil fuels."*
>
> *He added: "Leaders must drastically up their game, now, with record ambition, record action, and record emissions reductions. No more greenwashing. No more foot-dragging."*

Climate on track to warm by nearly 3C without aggressive actions, UN report finds | Reuters

> Climate on track to warm by nearly 3C without aggressive actions, UN report finds | Reuters

Adaptation gap report

https://www.unep.org/resources/adaptation-gap-report-2023

> *In 2023, temperature records toppled, while storms, floods, droughts and heatwaves caused devastation.* UNEP's Adaptation Gap Report 2023: Underfinanced. Underprepared – Inadequate investment and planning on climate adaptation leaves world exposed *finds that progress on climate adaptation is slowing when it should be accelerating to catch up with these rising climate change impacts.*

What's new in this year's report?

The report – which looks at progress in planning, financing and implementing adaptation actions – finds that the adaptation finance needs of developing countries are 10-18 times as big as international public finance flows. This is over 50 per cent higher than the previous range estimate.

The modelled costs of adaptation in developing countries are estimated at US$215 billion per year this decade. The adaptation finance needed to implement domestic adaptation priorities is estimated at US$387 billion per year.

Despite these needs, public multilateral and bilateral adaptation finance flows to developing countries declined by 15 per cent to US$21 billion in 2021. As a result of the growing adaptation finance needs and faltering flows, the current adaptation finance gap is now estimated at US$194-366 billion per year. At the same time, adaptation planning and implementation appear to be plateauing. This failure to adapt has massive implications for losses and damages, particularly for the most vulnerable.

This report identifies seven ways to increase financing, including through domestic expenditure and international and private sector finance. Additional avenues include remittances, increasing and tailoring finance to Small and Medium Enterprises and a reform of the global financial architecture. The new Loss and Damage fund will also need to move towards more innovative financing mechanisms to reach the necessary scale of investment.

Production gap report

https://www.unep.org/resources/production-gap-report-2023

The Production Gap Report — first launched in 2019 — tracks the discrepancy between governments' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C.

What's new in this year's report?

The 2023 Production Gap Report: "Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises" finds that governments plan to produce around 110% more fossil fuels in 2030 than would be consistent with limiting warming to 1.5°C, and 69% more than would be consistent with 2°C.

The Report provides newly expanded country profiles for 20 major fossil-fuel-producing countries: Australia, Brazil, Canada, China, Colombia, Germany, India, Indonesia, Kazakhstan, Kuwait, Mexico, Nigeria, Norway, Qatar, the Russian Federation, Saudi Arabia, South Africa, the United Arab Emirates, the United Kingdom of Great Britain and Northern Ireland, and the United States of America. These profiles show that most of these governments continue to provide significant policy and financial support for fossil fuel production.

"We cannot address climate catastrophe without tackling its root cause: fossil fuel dependence. COP28 must send a clear signal that the fossil fuel age is out of gas — that its end is inevitable. We need credible commitments to ramp up renewables, phase out fossil fuels, and boost energy efficiency, while ensuring a just, equitable transition'' said UN Secretary-General António Guterres.

WMO, Provisional State of the Global Climate

The World Meteorological Organisations has issued in November its report on the Provisional State of the Global Climate in 2023. The report shows that the year was about 1,4 degrees Celsius (with a margin of uncertainty of ±0.12°C) above the pre-industrial 1850-1900 baseline.

Provisional State of the Global Climate in 2023 (wmo.int)

2023 shatters climate records, with major impacts (wmo.int)

> *Provisional State of the Global Climate in 2023*
>
> *The WMO provisional State of the Global Climate report confirms that 2023 is set to be the warmest year on record. Data until the end of October shows that the year was about 1.40 degrees Celsius (with a margin of uncertainty of ±0.12°C) above the pre-industrial 1850-1900 baseline. The difference between 2023 and 2016 and 2020 - which were previously ranked as the warmest years - is such that the final two months are very unlikely to affect the ranking.*
>
> ***Key messages***
>
> - ***2023 set to be warmest year on record***
> - ***Greenhouse gas levels continue to increase***
> - ***Record sea surface temperatures and sea level rise***
> - ***Record low Antarctic sea ice***
> - ***Extreme weather causes death and devastation***

See also

Earth just had its hottest year on record — climate change is to blame (nature.com)

Report: Hottest 12 Months (ctfassets.net)

Copernicus, Recent data

Recent Copernicus data do also confirm that 2023 was the hottest year throughout available records. 2°C warmer than pre-industrial levels has been briefly reached on two days in November.

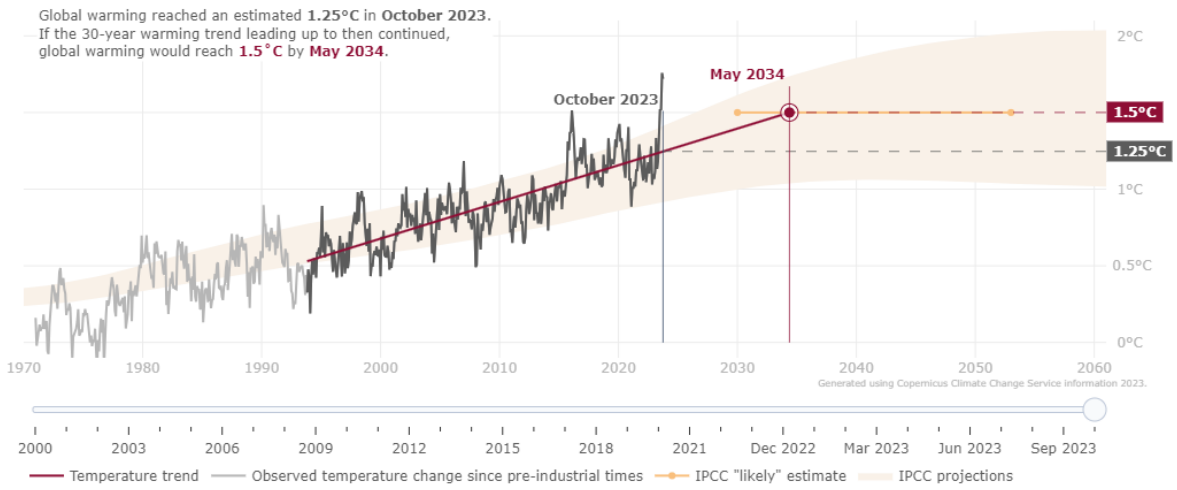
Copernicus: November 2023 – Remarkable year continues, with warmest boreal autumn. 2023 will be the warmest year on record | Copernicus

November 2023 – Surface air temperature and sea surface temperature highlights:

- *November 2023 was the warmest November on record globally, with an average surface air temperature of 14.22°C, 0.85°C above the 1991-2020 average for November and 0.32°C above the temperature of the previous warmest November, in 2020.*
- *The global temperature anomaly for November 2023 was on a par with October 2023, and only lower than the September 2023 anomaly of 0.93°C.*
- *November 2023 was about 1.75°C warmer than an estimate of the November average for 1850-1900, the designated pre-industrial reference period.*
- *For the calendar year to date, January to November, the global mean temperature for 2023 is the highest on record, 1.46°C above the 1850-1900 pre-industrial average, and 0.13°C higher than the eleven-month average for 2016, currently the warmest calendar year on record.*
- *The average sea surface temperature for November 2023 over 60°S–60°N was the highest on record for November at 0.25 °C warmer than the second warmest November, in 2015.*
- *The El Niño event continued in the equatorial Pacific, with anomalies remaining lower than those reached at this time of year in the 2015 event.*

Home | Copernicus

How close are we to reaching a global warming of 1.5˚C?



Reaching 1.5˚C of global warming - a limit agreed under the Paris agreement - may feel like a very distant reality, but it might be closer than you think. Experts suggest it is likely to happen between 2030 and the early 2050s. See where we are now and how soon we would reach the limit if the warming continued at today's pace. ***Use the slider to explore how the estimate changes in time.***

Explore the app in the CDS

Global temperature exceeds 2°C above pre-industrial average on 17 November | Copernicus

> ***Global temperature exceeds 2°C above pre-industrial average on 17 November***
>
> ***Earth briefly passed a critical warming threshold this past weekend. According to data from ERA5, the European Centre for Medium-Range Weather Forecasts' (ECMWF) fifth generation reanalysis of the global climate from 1940 to the present, 17 November 2023 was the first day in which the global temperature exceeded 2°C above pre-industrial levels. These latest figures put Earth's rising temperatures into sharp focus ahead of COP28, which is set to start in Dubai, United Arab Emirates, on 30 November. Let's take a closer look at what the ERA5 data shows.***
>
> *The ERA5 data indicate that the global surface air temperature on 17 November reached 2.07°C above the pre-industrial average, an average temperature taken between 1850-1900 prior to extensive use of fossil fuels. Also, the provisional data for 18 November indicate a temperature anomaly at 2.06°C above the pre-industrial level.*

Record warm November consolidates 2023 as the warmest year | Copernicus

> ***November 2023 was the warmest November globally in the ERA5 data record, going back to 1940. Every month since June was the warmest, with the warmest boreal summer and autumn, making 2023 the warmest on record, according to the latest monthly climate update from the Copernicus Climate Change Service (C3S).***
>
> *"2023 has now had six record breaking months and two record breaking seasons. The extraordinary global November temperatures, including two days warmer than 2°C above preindustrial, mean that 2023 is the warmest year in recorded history." said Samantha Burgess, Deputy Director of the Copernicus Climate Change Service (C3S). C3S Director, Carlo Buontempo adds: "As long as greenhouse gas concentrations keep rising, we can't expect different outcomes from those seen this year. The temperature will keep rising and so will the impacts of heatwaves and droughts. Reaching net zero as soon as possible is an effective way to manage our climate risks."*

Global Carbon Budget Project report

The latest report of the Global Carbon Budget Project notes that CO_2 emissions from fossil fuels have further increased in 2022 globally. The report estimates a 50% chance global warming will exceed 1.5°C consistently in about seven years. The report also highlights that current levels of technology-based Carbon Dioxide Removal (ie excluding nature-based means such as reforestation) amount to about 0.01 million tonnes CO2, more than a million times smaller than current fossil CO2 emissions.

Global Carbon Budget | Fossil CO2 emissions at record high in 2023

Fossil CO2 emissions at record high in 2023 | ScienceDaily

Key Messages Global Carbon Budget 2023 FINAL.pdf - Google Drive

Key messages

The annual Global Carbon Budget projects fossil carbon dioxide (CO_2) emissions of 36.8 billion tonnes in 2023, up 1.1% from 2022.

Fossil CO_2 emissions are falling in some regions, including Europe and the USA, but rising overall – and the scientists say global action to cut fossil fuels is not happening fast enough to prevent dangerous climate change.

Emissions from land-use change (such as deforestation) are projected to decrease slightly but are still too high to be offset by current levels of reforestation and afforestation (new forests).

The report projects that total global CO_2 emissions (fossil + land use change) will be 40.9 billion tonnes in 2023.

This is about the same as 2022 levels, and part of a 10-year "plateau" – far from the steep reduction in emissions that is urgently needed to meet global climate targets.

The research team included the University of Exeter, the University of East Anglia (UEA), CICERO Center for International Climate Research, Ludwig-Maximilian-University Munich and 90 other institutions around the world.

"The impacts of climate change are evident all around us, but action to reduce carbon emissions from fossil fuels remains painfully slow," said Professor Pierre Friedlingstein, of Exeter's Global Systems Institute, who led the study.

"It now looks inevitable we will overshoot the 1.5°C target of the Paris Agreement, and leaders meeting at COP28 will have to agree rapid cuts in fossil fuel emissions even to keep the 2°C target alive."

How long until we cross 1.5°C of global warming? *This study also estimates the remaining carbon budget before the 1.5°C target is breached consistently over multiple years, not just for a single year. At the current emissions level, the Global Carbon Budget team estimates a 50% chance global warming will exceed 1.5°C consistently in about seven years. This estimate is subject to large uncertainties, primarily due to the uncertainty on the additional warming coming from non-CO_2 agents, especially for the 1.5°C targets which is getting close to the current warming level. However, it's clear that the remaining carbon budget – and therefore the time left to meet the 1.5°C target and avoid the worse impacts of climate change – is running out fast.*

Atmospheric CO2 levels are projected to average 419.3 parts per million in 2023, 51% above pre-industrial levels.

***Other key findings from the 2023 Global Carbon Budget include*:**

- *Regional trends vary dramatically. Emissions in 2023 are projected to increase in India (8.2%) and China (4.0%), and decline in the EU (-7.4%), the USA (-3.0%) and the rest of the world (-0.4%).*
- *Global emissions from coal (1.1%), oil (1.5%) and gas (0.5%) are all projected to increase.*
- *About half of all CO2 emitted continues to be absorbed by land and ocean "sinks," with the rest remaining in the atmosphere where it causes climate change.*
- *Global CO2 emissions from fires in 2023 have been larger than the average (based on satellite records since 2003) due to an extreme wildfire season in Canada, where emissions were six to eight times higher than average.*
- *Current levels of technology-based Carbon Dioxide Removal (ie excluding nature-based means such as reforestation) amount to about 0.01 million tonnes CO2, more than a million times smaller than current fossil CO2 emissions.*

University of Exeter's Global Systems Institute, Global Tipping point report

Global Tipping Points | Home (global-tipping-points.org)

*Global Tipping Points is led by Professor Tim Lenton from the **University of Exeter's Global Systems Institute** with the support of more than 200 researchers from over 90 organisations in 26 countries.*

The Global Tipping Points Report was launched at COP28 on 6 December 2023. The report is an authoritative assessment of the risks and opportunities of both negative and positive tipping points in the Earth system and society.

Summary Report

Harmful tipping points in the natural world pose some of the gravest threats faced by humanity. Their triggering will severely damage our planet's life-support systems and threaten the stability of our societies.

Key messages

01 IRREVERSIBLE CHANGE

CLIMATE CHANGE AND NATURE LOSS COULD SOON CAUSE 'TIPPING POINTS' IN THE NATURAL WORLD

Environmental stresses could become so severe that large parts of the natural world are unable to maintain their current state, leading to abrupt and/or irreversible changes. These moments are called Earth system 'tipping points'. Five major tipping systems are already at risk of crossing tipping points at the present level of global warming: the Greenland and West Antarctic ice sheets, warm-water coral reefs, North Atlantic Subpolar Gyre circulation, and permafrost regions.

02 POSING THREATS

THESE TIPPING POINTS POSE THREATS OF A MAGNITUDE NEVER FACED BY HUMANITY

These threats could materialise in the coming decades, and at lower levels of global warming than previously thought. They could be catastrophic, including global-scale loss of capacity to grow major staple crops. Triggering one Earth system tipping point could trigger another, causing a domino effect of accelerating and unmanageable damage. Tipping points show that the overall threat posed by the climate and ecological crisis is far more severe than is commonly understood.

03 TRIGGERING DESTRUCTION

THE EFFECTS OF TIPPING POINTS WILL BE TRANSMITTED AND AMPLIFIED THROUGHOUT OUR GLOBALISED WORLD

This will multiply crises in the same way that the COVID-19 pandemic caused cascading stress to societies and economic systems globally, with unequal and unjust consequences. These impacts could escalate to threaten the breakdown of economic, social and political systems, triggering destructive tipping points in societies experiencing stresses beyond their ability to cope.

04 URGENT ACTION

STOPPING THESE THREATS IS POSSIBLE BUT REQUIRES URGENT GLOBAL ACTION

Global governance is currently inadequate to minimise tipping point threats and to do so equitably. Governance is needed across multiple scales to address the different drivers, potentially rapid changes,

and diverse, often irreversible, impacts of tipping points. An immediate priority for governance actors is to set an agenda for developing this framework. Governance must also guard against counterproductive reactions to tipping point threats, such as the misguided reliance on speculative solar geoengineering approaches.

05 VICIOUS CYCLE

EVEN WITH URGENT GLOBAL ACTION, SOME EARTH SYSTEM TIPPING POINTS MAY BE UNAVOIDABLE

Some Earth system tipping points may still be triggered in the time it takes us to undertake global emergency action. Mitigating risk is still possible by reducing vulnerability, and becomes ever more urgent, because each manifestation of a tipping point threat diverts attention and resources to disaster response, eroding away some of our agency to tackle the underlying drivers. This increases the risk of triggering more Earth system tipping points, creating a vicious cycle.

06 ACCELERATING TRANSFORMATIONS

'POSITIVE TIPPING POINTS' CAN ACCELERATE A TRANSFORMATION TOWARDS SUSTAINABILITY

A scale and pace of action necessary to mitigate tipping point threats can be achieved, partly because similar tipping dynamics exist in societies, and can work in our favour.

These positive tipping point opportunities can be exploited, whereby coordinated strategic interventions can lead to disproportionately large and rapid benefits that accelerate

the transition of societies toward sustainability. This is already happening in some cases. For example, targeted actions by innovators, governments, investors and companies have created economies of scale that are now propelling the exponential uptake of renewable energy worldwide, which has reached or exceeded cost parity with fossil fuel power generation.

07 POSITIVE CHANGE

ONE POSITIVE TIPPING POINT CAN TRIGGER OTHERS, CREATING A DOMINO EFFECT OF CHANGE

For example, as electric vehicles pass a positive tipping point towards becoming a dominant form of transport, this reduces the costs of battery technology. Lower-cost batteries in turn provide essential storage capacity to reinforce the positive tipping point to renewable power, which can trigger another tipping point in producing green ammonia for fertilisers, shipping, and so on.

08 COORDINATED ACTION

TRIGGERING POSITIVE TIPPING POINTS REQUIRES COORDINATED ACTION THAT CONSIDERS EQUITY AND JUSTICE

Many areas of society have the potential to be 'tipped', including politics, social norms and mindsets. But these opportunities are not realised on their own. Concerted and coordinated action is usually needed to create the enabling conditions for triggering positive tipping points. Once near a tipping point, it may even be triggered by relatively small groups with targeted action. Appropriate governance can enable this process and is required to equitably manage its knock- on effects, so that all parts of society can engage with and benefit from tipping point opportunities.

09 A DEEPER UNDERSTANDING

WE NEED A DEEPER UNDERSTANDING OF TIPPING POINTS – BUT WITHOUT DELAYING ACTION

Improving understanding of tipping point threats and opportunities in both nature and societies is an urgent priority to support governance and decision making, with the aim to limit harm and support transformations to sustainability. But this quest for knowledge must not delay or slow action. We know enough to identify that the threat of Earth system tipping points demands an urgent response. Indeed, our best models likely underestimate tipping point risks. The world is largely flying blind into this vast threat.

10 A POWERFUL COUNTER EFFECT

POSITIVE TIPPING POINTS CAN CREATE A POWERFUL COUNTER EFFECT TO THE RISK OF EARTH SYSTEM TIPPING POINTS CASCADING OUT OF CONTROL

The ultimate risk presented by Earth system tipping points is that they cascade, creating a growing momentum that undermines our collective ability to deal with the vicious cycle of escalating consequences. But both protecting and enhancing our collective ability to realise positive tipping point opportunities – even as damaging events escalate – can create a powerful counter effect, avoiding spiralling disaster. Doing so means urgently making our societies more resilient to this new era of rapid change and implementing equitable global governance.

500+ pages, 200+ researchers: Global Tipping Points Report delivers comprehensive assessment of tipping point risks and societal opportunities — Potsdam Institute for Climate Impact Research (pik-potsdam.de)

12/06/2023 - Tipping points pose some of the biggest risks to our planet's life-support systems and the stability of our societies. In an unprecedented effort by the scientific community, researchers have now published a comprehensive report on Earth system tipping points and their potential impacts and opportunities for societal change. More than 200 scientists from around the world contributed to the 'Global Tipping Points Report'. The report with more than 500 pages provides an authoritative guide to the state of knowledge on tipping points, explores opportunities for accelerating much needed transformations, and outlines options

Catastrophic change looms as Earth nears climate 'tipping points', report says (nature.com)

Climate change has placed the world in danger of breaching numerous planetary "tipping points", according to a scientific assessment compiled by more than 200 researchers. Crossing those points could lead to irreversible effects on natural systems that are crucial to human livelihoods, write the authors, who add that it's time to confront these dangers head-on — and accelerate efforts to prevent them.

Some scientists remain wary of over-emphasizing tipping points, because it's difficult to define the risks and assess their likelihood. But few doubt that the risks are real, or that they are increasing as global temperatures escalate.

IEA, The Oil and Gas Industry in Net Zero Transitions

A recent report from IEA points out how oil and gas industry can shift to play a real role in the clean energy economy. The report is explicit that industry needs to let go the illusion that implausibly large amounts of carbon capture are the solution.

The Oil and Gas Industry in Net Zero Transitions – Analysis - IEA

> ***From executive summary:***
>
> ***Structural changes in the energy sector are now moving fast enough to deliver a peak in oil and gas demand by the end of this decade under today's policy settings****. After the peak, demand is not currently set to decline quickly enough to align with the Paris Agreement and the 1.5 °C goal. But if governments deliver in full on their national energy and climate pledges, then oil and gas demand would be 45% below today's level by 2050 and the temperature rise could be limited to 1.7 °C. If governments successfully pursue a 1.5 °C trajectory, and emissions from the global energy sector reach net zero by mid-century, oil and gas use would fall by 75% to 2050.*

Oil and gas industry faces moment of truth – and opportunity to adapt – as clean energy transitions advance - News - IEA

> *Yet the oil and gas sector – which provides more than half of global energy supply and employs nearly 12 million workers worldwide – has been a marginal force at best in transitioning to a clean energy system, according to the report. Oil and gas companies currently account for just 1% of clean energy investment globally – and 60% of that comes from just four companies.*
>
> *"The oil and gas industry is facing a moment of truth at COP28 in Dubai. With the world suffering the impacts of a worsening climate crisis, continuing with business as usual is neither socially nor environmentally responsible," said **IEA Executive Director Fatih Birol**. "Oil and gas producers around the world need to make profound decisions about their future place in the global energy sector. The industry needs to commit to genuinely helping the world meet its energy needs and climate goals – which means letting go of the illusion that implausibly large amounts of carbon capture are the solution. This special report shows a fair and feasible way forward in which oil and gas companies take a real stake in the clean energy economy while helping the world avoid the most severe impacts of climate change."*
>
> *The report also notes that carbon capture, currently the linchpin of many firms' transition strategies, cannot be used to maintain the status quo. If oil and natural gas consumption were to evolve as projected under today's policy settings, limiting the temperature rise to 1.5 °C would require an entirely inconceivable 32 billion tonnes of carbon captured for utilisation or storage by 2050, including 23 billion tonnes via direct air capture. The amount of electricity needed to power these technologies would be greater than the entire world's electricity demand today.*
>
> *"The fossil fuel sector must make tough decisions now, and their choices will have consequences for decades to come," Dr Birol said. "Clean energy progress will continue with or without oil and gas producers. However, the journey to net zero emissions will be more costly, and harder to navigate, if the sector is not on board."*

Lancet Countdown on health and climate change

The interface between health and climate is gaining increased focus, including at COP.

[The 2023 report of the Lancet Countdown on health and climate change: the imperative for a health-centred response in a world facing irreversible harms - The Lancet]

Executive Summary

The Lancet Countdown is an international research collaboration that independently monitors the evolving impacts of climate change on health, and the emerging health opportunities of climate action. In its eighth iteration, this 2023 report draws on the expertise of 114 scientists and health practitioners from 52 research institutions and UN agencies worldwide to provide its most comprehensive assessment yet.

In 2022, the Lancet Countdown warned that people's health is at the mercy of fossil fuels and stressed the transformative opportunity of jointly tackling the concurrent climate change, energy, cost-of-living, and health crises for human health and wellbeing. This year's report finds few signs of such progress. At the current 10-year mean heating of 1·14°C above pre-industrial levels, climate change is increasingly impacting the health and survival of people worldwide, and projections show these risks could worsen steeply with further inaction. However, with health matters gaining prominence in climate change negotiations, this report highlights new opportunities to deliver health-promoting climate change action and a safe and thriving future for all.

The rising health toll of a changing climate

In 2023, the world saw the highest global temperatures in over 100 000 years, and heat records were broken in all continents through 2022. Adults older than 65 years and infants younger than 1 year, for whom extreme heat can be particularly life-threatening, are now exposed to twice as many heatwave days as they would have experienced in 1986–2005 (indicator 1.1.2). Harnessing the rapidly advancing science of detection and attribution, new analysis shows that over 60% of the days that reached health-threatening high temperatures in 2020 were made more than twice as likely to occur due to anthropogenic climate change (indicator 1.1.5); and heat-related deaths of people older than 65 years increased by 85% compared with 1990–2000, substantially higher than the 38% increase that would have been expected had temperatures not changed (indicator 1.1.5).

Simultaneously, climate change is damaging the natural and human systems on which people rely for good health. The global land area affected by extreme drought increased from 18% in 1951–60 to 47% in 2013–22 (indicator 1.2.2), jeopardising water security, sanitation, and food production. A higher frequency of heatwaves and droughts in 2021 was associated with 127 million more people experiencing moderate or severe food insecurity compared with 1981–2010 (indicator 1.4), putting millions of people at risk of malnutrition and potentially irreversible health effects. The changing climatic conditions are also putting more populations at risk of life-threatening infectious diseases, such as dengue, malaria, vibriosis, and West Nile virus (indicator 1.3).

Compounding these direct health impacts, the economic losses associated with global heating increasingly harm livelihoods, limit resilience, and restrict the funds available to tackle climate change. Economic losses from extreme weather events increased by 23% between 2010–14 and 2018–22, amounting to US$264 billion in 2022 alone (indicator 4.1.1), whereas heat exposure led to global potential income losses worth $863 billion (indicators 1.1.4 and 4.1.3). Labour capacity loss resulting from heat exposure affected low and medium Human Development Index (HDI) countries the most, exacerbating global inequities, with potential income losses equivalent to 6·1% and 3·8% of their gross domestic product (GDP), respectively (indicator 4.1.3).

The multiple and simultaneously rising risks of climate change are amplifying global health inequities and threatening the very foundations of human health. Health systems are increasingly strained, and 27% of surveyed cities declared concerns over their health systems being overwhelmed by the impacts

of climate change (indicator 2.1.3). Often due to scarce financial resources and low technical and human capacity, the countries most vulnerable to climate impacts also face the most challenges in achieving adaptation progress, reflecting the human risks of an unjust transition. Only 44% of low HDI countries and 54% of medium HDI countries reported high implementation of health emergency management capacities in 2022, compared with 85% of very high HDI countries (indicator 2.2.5). Additionally, low and medium HDI countries had the highest proportion of cities not intending to undertake a climate change risk assessment in 2021 (12%; indicator 2.1.3). These inequalities are aggravated by the persistent failure of the wealthiest countries to deliver the promised modest annual sum of $100 billion to support climate action in those countries defined as developing within the UN Framework Convention on Climate Change. Consequently, those countries that have historically contributed the least to climate change are bearing the brunt of its health impacts—both a reflection and a direct consequence of the structural inequities that lie within the root causes of climate change.

The human costs of persistent inaction

The growing threats experienced to date are early signs and symptoms of what a rapidly changing climate could mean for the health of the world's populations. With 1337 tonnes of CO_2 emitted each second, each moment of delay worsens the risks to people's health and survival.

In this year's report, new projections reveal the dangers of further delays in action, with every tracked health dimension worsening as the climate changes. If global mean temperature continues to rise to just under 2°C, annual heat-related deaths are projected to increase by 370% by midcentury, assuming no substantial progress on adaptation (indicator 1.1.5). Under such a scenario, heat-related labour loss is projected to increase by 50% (indicator 1.1.4), and heatwaves alone could lead to 524·9 million additional people experiencing moderate-to-severe food insecurity by 2041–60, aggravating the global risk of malnutrition. Life-threatening infectious diseases are also projected to spread further, with the length of coastline suitable for Vibrio pathogens expanding by 17–25%, and the transmission potential for dengue increasing by 36–37% by midcentury. As risks rise, so will the costs and challenges of adaptation. These estimates provide some indication of what the future could hold. However, poor accounting for non-linear responses, tipping points, and cascading and synergistic interactions could render these projections conservative, disproportionately increasing the threat to the health of populations worldwide.

A world accelerating in the wrong direction

The health risks of a 2°C hotter world underscore the health imperative of accelerating climate change action. With limits to adaptation drawing closer, ambitious mitigation is paramount to keep the magnitude of health hazards within the limits of the capacity of health systems to adapt. Yet years of scientific warnings of the threat to people's lives have been met with grossly insufficient action, and policies to date have put the world on track to almost 3°C of heating.

The 2022 Lancet Countdown report highlighted the opportunity to accelerate the transition away from health-harming fossil fuels in response to the global energy crisis. However, data this year show a world that is often moving in the wrong direction. Energy-related CO_2 emissions increased by 0·9% to a record 36·8 Gt in 2022 (indicator 3.1.1), and still only 9·5% of global electricity comes from modern renewables (mainly solar and wind energy), despite their costs falling below that of fossil fuels. Concerningly, driven partly by record profits, oil and gas companies are further reducing their compliance with the Paris Agreement: the strategies of the world's 20 largest oil and gas companies as of early 2023 will result in emissions surpassing levels consistent with the Paris Agreement goals by 173% in 2040—an increase of 61% from 2022 (indicator 4.2.6). Rather than pursuing accelerated development of renewable energy, fossil fuel companies allocated only 4% of their capital investment to renewables in 2022.

Meanwhile, global fossil fuel investment increased by 10% in 2022, reaching over $1 trillion (indicator 4.2.1). The expansion of oil and gas extractive activities has been supported through both private and public financial flows. Across 2017–21, the 40 banks that lend most to the fossil fuel sector collectively invested $489 billion annually in fossil fuels (annual average), with 52% increasing their lending from

2010–16. Simultaneously, in 2020, 78% of the countries assessed, responsible for 93% of all global CO_2 emissions, still provided net direct fossil fuels subsidies totalling $305 billion, further hindering fossil fuel phase-out (indicator 4.2.4). Without a rapid response to course correct, the persistent use and expansion of fossil fuels will ensure an increasingly inequitable future that threatens the lives of billions of people alive today.

The opportunity to deliver a healthy future for all

Despite the challenges, data also expose the transformative health benefits that could come from the transition to a zero-carbon future, with health professionals playing a crucial role in ensuring these gains are maximised. Globally, 775 million people still live without electricity, and close to 1 billion people are still served by health-care facilities without reliable energy. With structural global inequities in the development of, access to, and use of clean energy, only 2·3% of electricity in low HDI countries comes from modern renewables (against 11% in very high HDI countries), and 92% of households in low HDI countries still rely on biomass fuels to meet their energy needs (against 7·5% in very high HDI countries; indicators 3.1.1 and 3.1.2). In this context, the transition to renewables can enable access to decentralised clean energy and, coupled with interventions to increase energy efficiency, can reduce energy poverty and power high quality health-supportive services. By reducing the burning of dirty fuels (including fossil fuels and biomass), such interventions could help avoid a large proportion of the 1·9 million deaths that occur annually from dirty-fuel-derived, outdoor, airborne, fine particulate matter pollution ($PM_{2·5}$; indicator 3.2.1), and a large proportion of the 78 deaths per 100 000 people associated with exposure to indoor air pollution (indicator 3.2.2). Additionally, the just development of renewable energy markets can generate net employment opportunities with safer, more locally available jobs. Ensuring countries, particularly those facing high levels of energy poverty, are supported in the safe development, deployment, and adoption of renewable energy is key to maximising health gains and preventing unjust extractive industrial practices that can harm the health and livelihoods of local populations and widen health inequities.

With fossil fuels accounting for 95% of road transport energy (indicator 3.1.3), interventions to enable and promote safe active travel and zero-emission public transport can further deliver emissions reduction, promote health through physical activity, and avert many of the 460 000 deaths caused annually by transport-derived $PM_{2·5}$ pollution (indicator 3.2.1), and some of the 3·2 million annual deaths related to physical inactivity. People-centred, climate-resilient urban redesign to improve building energy efficiency, increase green and blue spaces, and promote sustainable cooling, can additionally prevent heat-related health harms, avoid air-conditioning-derived emissions (indicator 2.2.2), and provide direct physical and mental health benefits.

Additionally, food systems are responsible for 30% of global greenhouse gas (GHG) emissions, with 57% of agricultural emissions in 2020 being derived from the production of red meat and milk (indicator 3.3.1). Promoting and enabling equitable access to affordable, healthy, low-carbon diets that meet local nutritional and cultural requirements can contribute to mitigation, while preventing many of the 12·2 million deaths attributable to suboptimal diets (indicator 3.3.2).

The health community could play a central role in securing these benefits, by delivering public health interventions to reduce air pollution, enabling and supporting active travel and healthier diets, and promoting improvements in the environmental conditions and commercial activities that define health outcomes. Importantly, the health sector can lead by example and transition to sustainable, resource-efficient, net-zero emission health systems, thereby preventing its 4·6% contribution to global GHG emissions, with cascading impacts ultimately affecting the broader economy (indicator 3.4).

Some encouraging signs of progress offer a glimpse of the enormous human benefits that health-centred action could render. Deaths attributable to fossil-fuel-derived air pollution have decreased by 15·7% since 2005, with 80% of this reduction being the result of reduced coal-derived pollution. Meanwhile the renewable energy sector expanded to a historical high of 12·7 million employees in 2021 (indicator 4.2.2); and renewable energy accounted for 90% of the growth in electricity capacity in 2022 (indicator 3.1.1). Supporting this, global clean energy investment increased by 15% in 2022, to

$1·6 trillion, exceeding fossil fuel investment by 61% (indicator 4.2.1); and lending to the green energy sector rose to $498 billion in 2021, approaching fossil fuel lending (indicator 4.2.7).

Scientific understanding of the links between health and climate change is rapidly growing, and although coverage lags in some of the most affected regions, over 3000 scientific articles covered this topic in 2022 (indicators 5.3.1 and 5.3.2). Meanwhile, the health dimensions of climate change are increasingly acknowledged in the public discourse, with 24% of all climate change newspaper articles in 2022 referring to health, just short of the 26% in 2020 (indicator 5.1). Importantly, international organisations are increasingly engaging with the health co-benefits of climate change mitigation (indicator 5.4.2), and governments increasingly acknowledge this link, with 95% of updated Nationally Determined Contributions (NDCs) under the Paris Agreement now referring to health—up from 73% in 2020 (indicator 5.4.1). These trends signal what could be the start of a life-saving transition.

A people-centred transformation: putting health at the heart of climate action

With the world currently heading towards 3°C of heating, any further delays in climate change action will increasingly threaten the health and survival of billions of people alive today. If meaningful, the prioritisation of health in upcoming international climate change negotiations could offer an unprecedented opportunity to deliver health-promoting climate action and pave the way to a thriving future. However, delivering such an ambition will require confronting the economic interests of the fossil fuel and other health-harming industries, and delivering science-grounded, steadfast, meaningful, and sustained progress to shift away from fossil fuels, accelerate mitigation, and deliver adaptation for health. Unless such progress materialises, the growing emphasis on health within climate change negotiations risks being mere healthwashing; increasing the acceptability of initiatives that minimally advance action, and which ultimately undermine—rather than protect—the future of people alive today and generations to come.

Safeguarding people's health in climate policies will require the leadership, integrity, and commitment of the health community. With its science-driven approach, this community is uniquely positioned to ensure that decision makers are held accountable, and foster human-centred climate action that safeguards human health above all else. The ambitions of the Paris Agreement are still achievable, and a prosperous and healthy future still lies within reach. But the concerted efforts and commitments of health professionals, policy makers, corporations, and financial institutions will be needed to ensure the promise of health-centred climate action becomes a reality that delivers a thriving future for all.

See also

Phasing out fossil fuels could save millions of lives | Max Planck Institute for Chemistry (mpic.de)

A new study by an international team of scientists provides new evidence to motivate rapid fossil fuel phaseout. The science team determined exposure to ambient air pollution and its health impacts using an updated atmospheric composition model, a newly developed relative risk model and recent satellite-based fine particle data. They estimated all-cause and disease-specific mortality and attributed them to emission categories. They show that phasing out fossil fuels is a remarkably effective health-improving and life-saving intervention. About 5 million excess deaths per year globally could potentially be avoided.

Solar Impulse Foundation, The New Climate Narrative

The Solar Impulse Foundation, with Bertrand Piccard, has proposed a new climate narrative which aims to convey positive messages about the ecological transition to overcome wide-spread and further rising resistance across populations.

However, replacing '*sufficiency*' by '*efficiency*', '*climate action*' by '*new business opportunities*', '*protection of nature*' by '*protection of the purchase power*', or '*climate urgency*' by '*economic imperative*', as suggested in the glossary, may distract from uncomfortable policy choices of deep societal transformation, neglect the social dimension and inequalities with regard to the responsibility for the causes. There are increasing signals from science that both efficiency and sufficiency are required.

[The New Climate Narrative (solarimpulse.com)]

THE NEW CLIMATE NARRATIVE - A STRATEGY TO OVERCOME RESISTANCE TO THE ECOLOGICAL TRANSITION

[News / Clean and Profitable solutions over expensive]

problems: Bertrand Piccard and the Solar Impulse Foundation present a New Narrative to overcome reluctance towards climate action

News / Clean and Profitable solutions over expensive problems: Bertrand Piccard and the Solar Impulse Foundation present a New Narrative to overcome reluctance towards climate action

« Amongst other topics discussed, the New Climate Narrative includes the following approaches to talking about climate change:

Efficiency over sobriety (sacrifice) – While sobriety requires sacrifices, usually from the most vulnerable, efficiency can deliver a qualitative economy that uses fewer resources whilst improving purchase power and quality of life.

New professions versus lost jobs – Upskilling and reskilling of workers will be a beneficial factor in both the pace and location of the ecological transition.

It's about saving humanity, not saving the planet – When we speak of saving the planet, we must be clear that we actually speak of saving humanity and preserving our quality of life.

Throughout its conclusion, the New Climate Narrative offers a comprehensive glossary to replace the terms that frighten the opponents by words inspiring them in order to communicate climate action more efficiently and influence public perception and acceptance.

Oxfam/SEI, Climate Equality: A planet for the 99%

Oxfam's latest report 'Climate Equality: A planet for the 99%', with research carried out by Stockholm-based SEI, finds that the upper 1% account for more carbon emissions than the poorest two third of humanity.

My own take is that the findings of this report give further evidence for an approach to climate breakdown - and the planetary emergency at large - that combines sufficiency for those that can afford it with inclusion and protection of livelihoods for those lagging behind.

Climate Equality: A planet for the 99% (openrepository.com)

Description

> *The world faces twin crises of climate breakdown and runaway inequality. The richest people, corporations and countries are destroying the world with their huge carbon emissions. Meanwhile, people living in poverty, those experiencing marginalization, and countries in the Global South are those impacted the hardest. Women and girls, Indigenous Peoples, people living in poverty and other groups experiencing discrimination are particularly at a disadvantage. The consequences of climate breakdown are felt in all parts of the world and by most people, yet only the richest people and countries have the wealth, power and influence to protect themselves. With that power comes huge responsibility.*
>
> *If no action is taken, the richest will continue to burn through the carbon we have left to use while keeping the global temperature below the safe limit of 1.5°C, destroying any chance of ending poverty and ensuring equality. The world needs an equal transformation. Only a radical reduction in inequality, transformative climate action and fundamentally shifting our economic goals as a society can save our planet while ensuring wellbeing for all.*
>
> *Find all the underlying data on SEI's emissions inequality dashboard: Emissions Inequality*
>
> *You will find more on our new report: Climate Equality: A planet for the 99%*

Climate equality: a planet for the 99% | SEI

> *Climate equality: a planet for the 99%*
>
> *Richest 1% account for more carbon emissions than poorest 66%, report says. 'Polluter elite' are plundering the planet to point of destruction, says Oxfam*

Richest 1% account for more carbon emissions than poorest 66%, report says | Greenhouse gas emissions | The Guardian

https://www.rtbf.be/article/les-1-les-plus-riches-emettent-autant-de-co2-que-deux-tiers-de-lhumanite-selon-une-etude-doxfam-11289422

https://oxfambelgique.be/les-1-les-plus-riches-emettent-autant-de-co2-que-deux-tiers-de-lhumanite

Future Earth, The Earth League and the World Climate Research Programme, 10 New Insights in Climate Science 2023/2024

Essential research findings to support decision-making in a critical decade - 10insightsclimate

10NICS-2023-Report_digital.pdf (10insightsclimate.science)

10 New Insights in Climate Science at COP28: Rapid fossil fuels phase-out crucial for minimising 1.5°C overshoot — Potsdam Institute for Climate Impact Research (pik-potsdam.de)

Top 10 Climate Science Insights:

1. *Overshooting 1.5°C is fast becoming inevitable. Minimising the magnitude and duration of overshoot is essential.*
2. *A rapid and managed fossil fuel phase-out is required to stay within the Paris Agreement target range.*
3. *Robust policies are critical to attain the scale needed for effective carbon dioxide removal (CDR).*
4. *Over-reliance on natural carbon sinks is a risky strategy; their future contribution is uncertain.*
5. *Joint governance is necessary to address the interlinked climate and biodiversity emergencies.*
6. *Compound events amplify climate risks and increase their uncertainty.*
7. *Mountain glacier loss is accelerating.*
8. *Human immobility in areas with climate risks is increasing.*
9. *New tools to operationalise justice enable more effective climate adaptation.*
10. *Reforming food systems can contribute to just climate action.*

2023 State of the climate report: Entering uncharted territory | BioScience | Oxford Academic

https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/biad080/7319571

Life on planet Earth is under siege. We are now in an uncharted territory. For several decades, scientists have consistently warned of a future marked by extreme climatic conditions because of escalating global temperatures caused by ongoing human activities that release harmful greenhouse gasses into the atmosphere. Unfortunately, time is up. We are seeing the manifestation of those predictions as an alarming and unprecedented succession of climate records are broken, causing profoundly distressing scenes of suffering to unfold. We are entering an unfamiliar domain regarding our climate crisis, a situation no one has ever witnessed firsthand in the history of humanity.

In the present report, we display a diverse set of vital signs of the planet and the potential drivers of climate change and climate-related responses first presented by Ripple and Wolf and colleagues (2020), who declared a climate emergency, now with more than 15,000 scientist signatories. The trends reveal new all-time climate-related records and deeply concerning patterns of climate-related disasters. At the same time, we report minimal progress by humanity in combating climate change. Given these distressing developments, our goal is to communicate climate facts and policy recommendations to scientists, policymakers, and the public. It is the moral duty of us scientists and our institutions to clearly alert humanity of any potential existential threat and to show leadership in taking action. This report is part of our series of concise and easily accessible yearly updates on the state of the climate crisis.

2023 Forest Declaration Assessment: Off track and falling behind

2023 Forest Declaration Assessment: Off track and falling behind - Forest Declaration

> *WE ARE IN A CRISIS: The world remains off track to reach the goals of halting and reversing deforestation and forest degradation by 2030.*
>
> *In 2022, global gross deforestation reached 6.6 million hectares worldwide and was 21 percent higher than needed to eliminate deforestation by 2030.*
>
> *The loss of primary tropical forests reached 4.1 million hectares and is even further off track—the loss was 33 percent higher than the needed trajectory to halt primary forest loss by the end of the decade.*
>
> *This backslide puts forest goals even farther out of reach after the small but insufficient progress made in 2021.*

Oxford Smith School of Enterprise and the Environment, Assessing the relative costs of high-CCS and low-CCS pathways to 1.5 degrees

Heavy dependence on Carbon Capture and Storage 'highly economically damaging', says Oxford report | Smith School of Enterprise and the Environment

https://www.smithschool.ox.ac.uk/sites/default/files/2023-12/Assessing-the-relative-costs-of-high-CCS-and-low-CCS-pathways-to-1-5-degrees.pdf

- A high Carbon Capture and Storage (CCS) pathway to net zero emissions in 2050 is expected to cost at least $30 trillion more than a low CCS pathway - roughly $1 trillion per year
- The cost of CCS implementation has not declined at all in 40 years, in contrast to renewable technologies like solar, wind, and batteries, which have fallen in cost dramatically
- Governments putting CCS at the centre of their national decarbonisation plans risk putting themselves at a competitive disadvantage

Heavy dependence on Carbon Capture and Storage (CCS) to reach net zero targets around 2050 would be "highly economically damaging", costing at least $30 trillion more than a route based primarily on renewable energy, energy efficiency and electrification, a new report from Oxford University's Smith School of Enterprise and the Environment has found.

CCS is set to feature prominently at the COP28 Summit in Dubai this week, with major oil and gas producing countries expected to unveil shared carbon storage goals.

But the new analysis suggests that rolling out CCS throughout the economy, rather than just in a handful of essential sectors, makes little sense from a financial perspective.

The report, Assessing the relative costs of high-CCS and low-CCS pathways to 1.5 degrees, provides cost estimates for two different sets of pathways to net zero in 2050 - one that uses CCS to mitigate about one tenth of today's emissions, and the other that uses it to mitigate about half of today's emissions.

Based on the latest technology cost data, it concludes that the high-CCS route would cost approximately one trillion dollars per year more than the low-CCS route - a total additional cost of about $30 trillion by 2050. The researchers believe this is almost certainly an underestimate of the real difference.

Navigate Synthesis Report

NAVIGATE synthesis report published – Navigate (navigate-h2020.eu)

NAVIGATE-synthesis-report-compressed.pdf (navigate-h2020.eu)

1.5°C pathways can still be achieved, combining fairness and global climate protection — Potsdam Institute for Climate Impact Research (pik-potsdam.de)

> *HOW TO ACHIEVE A RAPID, FAIR, AND EFFICIENT TRANSFORMATION TO NET ZERO EMISSIONS*
>
> *"Only the combination of producer- and consumer-oriented policies can realise the full emission reduction potential in all sectors," says Elmar Kriegler from Potsdam Institute for Climate Impact Research (PIK), coordinator of the NAVIGATE project. "Their combined and immediate implementation can substantially accelerate climate action and close the gap to a pathway limiting warming to 1.5°C by 2100." The results from NAVIGATE also show that re-distributive policies buffer the impact on poor households while allowing them to reap the benefit of avoided climate impacts in the longer term. This demonstrates that a global net zero transition done right not only safeguards the climate but also protects against worsening global inequality.*

Selection of recent climate science articles, books etc.

Here is a pick of several recent climate science articles and various further references.

Global Warming in the pipeline - Hansen et al. | Oxford Open Climate Change

Former NASA scientist Hansen, who has been launching alarming messages about climate-break-down decades ago, has now published an article in Oxford Open Climate Change highlighting that, under the present geopolitical approach to GHG emissions, global warming will exceed 1.5°C in the 2020s and 2°C before 2050. Impacts on people and nature will accelerate as global warming increases hydrologic (weather) extremes.

Global warming in the pipeline | Oxford Open Climate Change | Oxford Academic (oup.com)

Abstract

Improved knowledge of glacial-to-interglacial global temperature change yields Charney (fast-feedback) equilibrium climate sensitivity 1.2 ± 0.3°C (2σ) per W/m2, which is 4.8°C ± 1.2°C for doubled CO2. Consistent analysis of temperature over the full Cenozoic era—including 'slow' feedbacks by ice sheets and trace gases—supports this sensitivity and implies that CO2 was 300–350 ppm in the Pliocene and about 450 ppm at transition to a nearly ice-free planet, exposing unrealistic lethargy of ice sheet models. Equilibrium global warming for today's GHG amount is 10°C, which is reduced to 8°C by today's human-made aerosols. Equilibrium warming is not 'committed' warming; rapid phaseout of GHG emissions would prevent most equilibrium warming from occurring. However, decline of aerosol emissions since 2010 should increase the 1970–2010 global warming rate of 0.18°C per decade to a post-2010 rate of at least 0.27°C per decade. Thus, under the present geopolitical approach to GHG emissions, global warming will exceed 1.5°C in the 2020s and 2°C before 2050. Impacts on people and nature will accelerate as global warming increases hydrologic (weather) extremes. The enormity of consequences demands a return to Holocene-level global temperature. Required actions include: (1) a global increasing price on GHG emissions accompanied by development of abundant, affordable, dispatchable clean energy, (2) East-West cooperation in a way that accommodates developing world needs, and (3) intervention with Earth's radiation imbalance to phase down today's massive human-made 'geo-transformation' of Earth's climate. Current political crises present an opportunity for reset, especially if young people can grasp their situation.

Assessing the size and uncertainty of remaining carbon budgets | Nature

https://www.nature.com/articles/s41558-023-01848-5

> *„The remaining carbon budget (RCB), the net amount of CO2 humans can still emit without exceeding a chosen global warming limit, is often used to evaluate political action against the goals of the Paris Agreement. RCB estimates for 1.5 °C are small, and minor changes in their calculation can therefore result in large relative adjustments. Here we evaluate recent RCB assessments by the IPCC and present more recent data, calculation refinements and robustness checks that increase confidence in them. We conclude that the RCB for a 50% chance of keeping warming to 1.5 °C is around 250 GtCO2 as of January 2023, equal to around six years of current CO2 emissions. For a 50% chance of 2 °C the RCB is around 1,200 GtCO2. Key uncertainties affecting RCB estimates are the contribution of non-CO2 emissions, which depends on socioeconomic projections as much as on geophysical uncertainty, and potential warming after net zero CO2.“*

See also

https://phys.org/news/2023-10-early-earth-breaching-key-threshold.html

> *In early 2029, Earth will likely lock into breaching key warming threshold, scientists calculate*
>
> *„In a little more than five years—sometime in early 2029—the world will likely be unable to stay below the internationally agreed temperature limit for global warming if it continues to burn fossil fuels at its current rate, a new study says.*
>
> *The study moves three years closer the date when the world will eventually hit a critical climate threshold, which is an increase of 1.5 degrees Celsius (2.7 degrees Fahrenheit) since the 1800s.*
>
> *Beyond that temperature increase, the risks of catastrophes increase, as the world will likely lose most of its coral reefs, a key ice sheet could kick into irreversible melt, and water shortages, heat waves and death from extreme weather dramatically increase, according to an earlier United Nations scientific report.*
>
> *Hitting that threshold will happen sooner than initially calculated because the world has made progress in cleaning up a different type of air pollution—tiny smoky particles called aerosols. Aerosols slightly cool the planet and mask the effects of burning coal, oil and natural gas, the study's lead author said. Put another way, while cleaning up aerosol pollution is a good thing, that success means slightly faster rises in temperatures“*

Is it too late to keep global warming below 1.5 °C? | Nature

Is it too late to keep global warmingbelow 1.5 °C?The challenge in 7 charts (nature.com)

The challenge in 7 charts

Chances are rapidly disappearing to limit Earth's temperature rise to the globally agreed mark, but researchers say there are some positive signs of progress.

Future floods: Global warming intensifies heavy rain – even more than expected | PIK Potsdam

Constraining the pattern and magnitude of projected extreme precipitation change in a multi-model ensemble in: Journal of Climate - Ahead of print (ametsoc.org)

Future floods: Global warming intensifies heavy rain – even more than expected — Potsdam Institute for Climate Impact Research (pik-potsdam.de)

The intensity and frequency of extreme rainfall increases exponentially with global warming, a new study finds. The analysis by researchers from the Potsdam Institute of Climate Impact Research (PIK) shows that state-of-the-art climate models significantly underestimate how much extreme rainfall increases under global warming – meaning that extreme rainfall could increase quicker than climate models suggest.

"Our study confirms that the intensity and frequency of heavy rainfall extremes are increasing exponentially with every increment of global warming," explains Max Kotz, lead-author of the study published in the 'Journal of Climate'. These changes follow the physical theory of the classic Clausius-Clapeyron relation of 1834, which established that warmer air can hold more water vapour. "State-of-the-art climate models vary on how strongly extreme rainfall scales with global warming and that they underestimate it compared to historical observations."

"Climate impacts on society have been calculated using climate models. Now our findings suggest that these impacts could be much worse than we thought. Extreme rainfall will be heavier and more frequent. Society needs to be prepared for this," says PIK department head and author of the study Anders Levermann. Changes in the frequency and intensity of daily rainfall extremes over land can impact social welfare, the economy and social stability, given their link to flooding but also ground-water availability, which can cause considerable loss of life and financial losses.

Stronger increases of extremes across tropical regions

The researchers at PIK analysed the intensity and frequency of daily precipitation extremes over land in 21 state-of-the-art climate simulations (CMIP-6) and compared the changes projected by CMIP-6 models to those observed historically. The method they applied draws on pattern-filtering techniques, allowing them to separate which changes in the climate system are forced by human emissions, and which are not.

While most land-areas exhibit increases in both the intensity and frequency of extremes, stronger increases are typically found across tropical regions, according to the study. Significant changes most often occur across the tropics and high-latitudes, like in Southeast Asia or Northern Canada. The fact that these changes follow the Clausius-Clapeyron relation underpins the fact that thermodynamics, i.e. temperature and not dynamics, i.e. winds, dominate the global change of extreme rainfall events. "The good news is that this makes it easier to predict the future of extreme rainfall. The bad news is: It will get worse, if we keep pushing up global temperatures by emitting greenhouse gases," Anders Levermann adds.

Extreme weather in a changing climate | IOPscience

Extreme weather in a changing climate - IOPscience

Abstract

"Extreme weather events are rising at a pace which exceeds expectations based on thermodynamic arguments only, changing the way we perceive our climate system and climate change issues. Every year, heatwaves, floods and wildfires, bring death and devastation worldwide, increasing the evidence about the role of anthropogenic climate change in the increase of extremes. In this viewpoint article, we summarize some of the most recent extremes and put them in the context of the most recent research on atmospheric and climate sciences, especially focusing on changes in thermodynamics and dynamics of the atmosphere. While some changes in extremes are to be expected and are clearly attributable to rising greenhouse gas emissions, other seem counterintuitive, highlighting the need for further research in the field. In this context, research on changes in atmospheric dynamics plays a crucial role in explaining some of these extremes and more needs to be done to improve our understanding of the physical mechanisms involved."

Extracts:

"Europe has emerged as a hot-spot of heat extremes: it has seen a stronger increase in summer heat than other regions in the northern mid-latitudes. This enhanced warming has been related to dynamical changes such as an increase of double jet patterns, which could explain all of the additional rise in heat waves beyond what is expected simply by thermodynamics (Rousi et al 2022). Both observation and model experiment support the hypothesis that shrinking Arctic sea ice and reduced snow cover over northern Eurasia in spring can also contribute to increased blocking over Europe and consequent frequency of heatwaves (Zhang et al 2020). Sea surface temperature anomalies (in particular the northern Atlantic 'warming hole' mentioned earlier) can also reinforce heatwaves in central Europe, such as in 2015 (Duchez et al 2015).

In summary, it is now clear that global warming is already greatly increasing the number and intensity of many types of weather extremes, as has been predicted by climate science for decades. Much of this is due to thermodynamics. With that we mean that the atmosphere is warmer, which means it holds more energy and water to power extreme weather. The ocean is also warmer and can provide more energy and moisture as fuel to tropical cyclones. However, increasingly the attention of researchers has turned to dynamic effects. With that we refer to changes in circulation and stability of atmosphere and ocean. It includes changes to the jet stream, polar vortex, atmospheric planetary waves or to the Atlantic meridional overturning circulation.

Obtaining robust conclusions about changes in weather extremes requires long time series, given that extreme events are by definition rare events and are not easy to model. Nevertheless, the signal of climate change has now clearly emerged from the noise for many types of extremes. Disentangling the dynamic mechanisms is harder again and represents a current frontline of research. Driving forces behind dynamic changes are often regionally diverse temperature changes, such as Arctic amplification, enhanced land warming and sea surface temperature anomalies. Many facets of the dynamic mechanisms are still being debated in the scientific literature. Even if not everything is fully understood, researchers and journalists should not be shy to use every opportunity to educate the public about the fact that human-caused global warming is making weather extremes worse, already causing serious harm to many millions of people.

Even once global warming is stopped, we will see unprecedented extremes for a long time to come. Just think of a former once-in-5000 year event which at 1.5 °C warming may have become a once-in-50 year event. Thus, it will take many decades until we have seen all the possible extreme events a 1.5 °C warmer world has in store for us."

A Paris Agreement Compliant Definition for “Abated Fossil Fuels”

A Paris Agreement Compliant Definition for “Abated Fossil Fuels” by Chris Bataille, Alaa Al Khourdajie, Heleen de Coninck, Kiane de Kleijne, Lars J. Nilsson, Igor Bashmakov, Steve Davis, Paul Fennell :: SSRN

Abstract

COP27 in Egypt, 2022, brought the possibility of a commitment to phase out “unabated” fossil fuels, and recent UNFCCC climate negotiations in Bonn, June 2023, have demonstrated this will require that “abated” will need to be carefully and transparently defined to be consistent with the Paris Agreement goals. Recent literature and the IPCC AR6 WGIII scenario database indicate the role of fossil fuels in future net-zero energy and industrial systems. There needs to be a substantial reduction in overall fossil fuel use, use of CO2 capture and storage (CCS) on the remaining fossil fuels, and minimal use of unabated fossil fuels only where CCS is not possible. Upstream fugitive emissions of methane from coal, oil and gas extraction must also be reduced by 50-80% or more from current levels. Stricter requirements for systems compatible with the 1.5°C limit include all new and retrofit CO2 emitters employing 90-95%+ capture rates starting in the late 2020s and early 2030s. This is not practically feasible for most mobile, dispersed, and smaller volume emitters, which will require alternative mitigation measures. We elaborate on the standards required for abated fossil fuels and reflect as to whether they can be credibly met in the near term.

Carbon Colonialism: How Rich Countries Export Climate Breakdown – review / LSE Review of Books

Carbon Colonialism: How Rich Countries Export Climate Breakdown – review | LSE Review of Books

> *In Carbon Colonialism: How Rich Countries Export Climate Breakdown, Laurie Parsons spotlights the injustice of global climate politics and policy which enable the Global North to outsource carbon production and waste disposal to the Global South. Emphasising the cost to developing nations who bear the severest effects of climate breakdown, Parsons makes a convincing case for radical collective action and an overhaul of the legal framework on climate, writes Sneha Biswas.*

Green transition and its potential territorial discontents | Cambridge Journal of Regions, Economy and Society | Oxford Academic

green transition and its potential territorial discontents | Cambridge Journal of Regions, Economy and Society | Oxford Academic (oup.com)

Abstract

The impacts of climate change are unevenly distributed across territories. Less is known about the potential effects of climate policies aimed at mitigating the negative consequences of climate change while transitioning economies towards low-carbon standards. This paper presents an analytical framework for identifying and assessing the regional impacts of the green transition. We develop a Regional Green Transition Vulnerability Index, a composite measure of the regional vulnerability of European regions to the socio-economic reconfigurations prompted by the green transition. The index brings to light strong regional variations in vulnerability, with less developed, peri-urban and rural regions in Southern and Eastern Europe more exposed to the foreseeable changes brought about by the green transition. We also draw attention to the potential rise of pockets of growing 'green' discontent, especially if the green transition contributes, as is likely to be the case, to leaving already left-behind regions further behind.

Existential Security: Towards a Security Framework for the Survival of Humanity | Global Policy Journal

> ***"Policy Implications***
>
> *'Anthropogenic existential threats' refer to a class of threats that have their origins in human agency and could bring about, at the minimum, the collapse of civilization, or, at the maximum, human extinction. The spectrum of anthropogenic existential threats is broad and growing.*
>
> *Anthropogenic existential threats should be conceptualized as a matter of 'security'; that is, through a logic of protection from threats to the survival of some referent object.*
>
> *Existing security frames are inappropriate for security policy towards anthropogenic existential threats: a 'human security' frame would lead to policy incoherence, while a 'national security' frame could even exacerbate the threats to humanity. Policy makers should resist making political decisions on the basis of a national security frame in response to anthropogenic existential threats.*
>
> *'Existential security' represents a new framework for security policy; security is about the survival of humanity. Its referent object is humanity, the dangers are anthropogenic existential threats, the modes of protection are mutual restraint and resilience, the security actors are nation states and global political institutions, and the timeframe is intergenerational."*

See also:

What is existential security? — EA Forum (effectivealtruism.org)

Existential security: Safeguarding humanity or globalising power? - Hobson - 2023 - Global Policy - Wiley Online Library

Scientists as Activists | Frontiers

Frontiers | “Beyond being analysts of doom”: scientists on the frontlines of climate action (frontiersin.org)

> *What happens when scientists become activists? In this paper, we discuss the principles, commitments and experiences of Scientist Rebellion (SR), a movement of scientists, academics, and researchers committed to activism, advocacy and non-violent civil disobedience against the (in)actions of governments, corporations and other institutions, including academic ones. In sharing experiences from the frontlines of direct actions with SR along with the perspectives from individual scientists, coming from a variety of geographical locations, and a range of academic levels and disciplines, we reflect on the need to transgress the boundaries of a system of knowledge production and education that is effectively reproducing the very structures that have led us into climate and ecological crises. This article provides a reflective and critical engagement with Scientist Rebellion, drawing on a range of interviews with activists, as well as material from and about Scientist Rebellion. We conclude with a reflection on the relation between scientists and their institutions, as well as a mobilizing plea to the scientific community to take action.*

See also

More than 1,000 climate scientists urge public to become activists | Environmental activism | The Guardian

Tipping of the Atlantic Ocean Circulation | YouTube

Some chill here

https://www.youtube.com/watch?v=oDZpIDID15I

30th October 2023- Prof. Henk Dijkstra - YouTube

Abstract: The Atlantic Ocean Circulation, in particular its zonally averaged component called the Atlantic Meridional Overturning Circulation (AMOC), is one of the tipping elements in the climate system. The AMOC is sensitive to freshwater perturbations and may undergo a transition to a climate disrupting state within a few decades under continuing greenhouse gas emissions. In this presentation, I will focus on the complex systems aspects of the problem of assessing the probability of a collapse of the AMOC under future climate change.

L'Hypothèse K - La science face à la catastrophe écologique | Aurélien Barrau

Astrophysicist and philosopher Aurélien Barrau proposes a much deeper analysis of climate breakdown and the wider ecological crisis, framing it as a crisis of civilization. This has consequences about how he perceives the role of science.

https://www.grasset.fr/livre/lhypothese-k-9782246837145/

> *Sortir la science de ses mauvaises habitudes, tel est le projet de ce bref et révolutionnaire essai. Face à la catastrophe écologique, la science est utilisée pour donner une réponse essentiellement « ingénierique » : technologie à tout prix, algorithmes envahissants, machines toutes-puissantes. Cela constitue le pire des choix. Si elle peut jouer un rôle salvateur, c'est, tout au contraire, en contribuant à un renouveau radical des symboles et des valeurs. En réinventant le sens du monde.*
>
> *Elle se révèle essentielle dans le constat du délitement : les espèces disparaissent, les populations s'effondrent, la pollution et la chaleur tuent, la planète devient inhospitalière… Elle demeure pourtant incapable de choisir la direction souhaitable. Considérée comme un simple outil, elle ne pourra que contribuer à accélérer l'effondrement. Comme l'écrit Aurélien Barrau, nous ne tenons pas assez compte des rêves des chiens.*
>
> *A partir de ce qu'il appelle « l'hypothèse K. », un laisser-faire entraînant une prolifération technique exponentielle, ce texte suggère de réinvestir la science de l'immense charge poétique qui lui a été déniée. Et cela afin de la libérer, de lui rendre son pouvoir bénéfique. Un plaidoyer pour une science nomade, tzigane ou touareg, humble et intransigeante. Une science déviante et fière de l'être.*

https://www.rtbf.be/article/quoi-de-neuf-sur-la-premiere-cette-semaine-du-15-au-21-decembre-11300444

> ***Face à la "catastrophe civilisationnelle", avec Aurélien Barrau, RTBF, Samedi 16 décembre, de 10h à 11h***
>
> *" Ni un drame écologique, ni une crise climatique, ni un délitement social : une catastrophe civilisationnelle. Voilà où nous en sommes. Un effondrement de la vie et une perte du sens " : le constat est signé par l'astrophysicien Aurélien Barrau. Il veut mobiliser la science pour faire face au désastre et considère que le pullulement technologique est un cancer. Mais alors, que faire ? Il propose de poétiser la science... La COP 28 venant de se clôturer à Dubaï, Pascal Claude reçoit samedi Aurélien Barrau, auteur de "L'hypothèse K. La science face à la catastrophe écologique.", qui nous parle de ses questionnements de scientifique face au défi climatique.*

Outcomes of COP28 and some reactions

While the first mention ever of fossil fuels in a COP28, although through a possibly lightened wording of "transitioning away" has been widely celebrated, even more so as it happened in an OPEC country, there are critical voices, including from scientists, on modalities and lack of ambition.

UNFCCC, Outcome of the first global stocktake

The advance unedited versions of COP28 outcome documents are here:

Outcomes of the Dubai Climate Change Conference - Advance Unedited Versions (AUVs) and list of submissions from the sessions in Dubai | UNFCCC

Matters relating to the global stocktake under the Paris Agreement | UNFCCC

CMA4_AUV_TEMPLATE (unfccc.int)

Mitigation

18. Acknowledges that significant collective progress towards the Paris Agreement temperature goal has been made, from an expected global temperature increase of 4 °C according to some projections prior to the adoption of the Agreement to an increase in the range of 2.1–2.8 °C with the full implementation of the latest nationally determined contributions;

19. Expresses appreciation that all Parties have communicated nationally determined contributions that demonstrate progress towards achieving the Paris Agreement temperature goal, most of which provided the information necessary to facilitate their clarity, transparency and understanding;

20. Commends the 68 Parties that have communicated long-term low greenhouse gas emission development strategies and notes that 87 per cent of the global economy in terms of share of gross domestic product is covered by targets for climate neutrality, carbon neutrality, greenhouse gas neutrality or net zero emissions, which provides the possibility of achieving a temperature increase below 2 °C when taking into account the full implementation of those strategies;

21. Notes with concern the findings in the latest version of the synthesis report on nationally determined contributions that implementation of current nationally determined contributions would reduce emissions on average by 2 per cent compared with the 2019 level by 2030 and that significantly greater emission reductions are required to align with global greenhouse gas emission trajectories in line with the temperature goal of the Paris Agreement and recognizes the urgent need to address this gap;

22. Notes the findings in the synthesis report on nationally determined contributions that greenhouse gas emission levels in 2030 are projected to be 5.3 per cent lower than in 2019 if all nationally determined contributions, including all conditional elements, are fully implemented and that enhanced financial resources, technology transfer and technical cooperation, and capacity-building support are needed to achieve this;

23. Notes with concern the findings of the Sixth Assessment Report of the Intergovernmental Panel on Climate Change that policies implemented by the end of 2020 are projected to result in higher global greenhouse gas emissions than those implied by the nationally determined contributions, indicating an implementation gap, and resolves to take action to urgently address this gap;

24. Notes with significant concern that, despite progress, global greenhouse gas emissions trajectories are not yet in line with the temperature goal of the Paris Agreement, and that there is a rapidly narrowing window for raising ambition and implementing existing commitments in order to achieve it;

25. Expresses concern that the carbon budget consistent with achieving the Paris Agreement temperature goal is now small and being rapidly depleted and acknowledges that historical cumulative net carbon dioxide emissions already account for about four fifths of the total carbon budget for a 50 per cent probability of limiting global warming to 1.5 °C;

26. Recognizes the finding in the Synthesis Report of the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 2 based on global modelled pathways and assumptions, that global greenhouse gas emissions are projected to peak between 2020 and at the latest before 2025 in global modelled pathways that limit warming to 1.5 °C with no or limited overshoot and in those that limit warming to 2 °C and assume immediate action, and notes that this does not imply peaking in all countries within this time frame, and that time frames for peaking may be shaped by sustainable development, poverty eradication needs and equity and be in line with different national circumstances, and recognizes that technology development and transfer on voluntary and mutually agreed terms, as well as capacity-building and financing, can support countries in this regard;

27. Also recognizes that limiting global warming to 1.5 °C with no or limited overshoot requires deep, rapid and sustained reductions in global greenhouse gas emissions of 43 per cent by 2030 and 60 per cent by 2035 relative to the 2019 level and reaching net zero carbon dioxide emissions by 2050;

28. Further recognizes the need for deep, rapid and sustained reductions in greenhouse gas emissions in line with 1.5 °C pathways and calls on Parties to contribute to the following global efforts, in a nationally determined manner, taking into account the Paris Agreement and their different national circumstances, pathways and approaches:

(a) Tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030;

(b) Accelerating efforts towards the phase-down of unabated coal power;

(c) Accelerating efforts globally towards net zero emission energy systems, utilizing zero- and low-carbon fuels well before or by around mid-century;

(d) Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science;

(e) Accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilization and storage, particularly in hard-to-abate sectors, and low-carbon hydrogen production;

(f) Accelerating and substantially reducing non-carbon-dioxide emissions globally, including in particular methane emissions by 2030;

(g) Accelerating the reduction of emissions from road transport on a range of pathways, including through development of infrastructure and rapid deployment of zero and low-emission vehicles;

(h) Phasing out inefficient fossil fuel subsidies that do not address energy poverty or just transitions, as soon as possible;

29. Recognizes that transitional fuels can play a role in facilitating the energy transition while ensuring energy security;

30. Welcomes that over the past decade mitigation technologies have become increasingly available, and that the unit costs of several low-emission technologies have fallen continuously, notably wind power and solar power and storage, thanks to technological advancements, economies of scale, increased efficiency and streamlined manufacturing processes, while recognizing the need to increase the affordability and accessibility of such technologies;

31. Emphasizes the urgent need for accelerated implementation of domestic mitigation measures in accordance with Article 4, paragraph 2, of the Paris Agreement, as well as the use of voluntary cooperation, referred to in Article 6, paragraph 1, of the Paris Agreement;

32. Also emphasizes the urgent need to strengthen integrated, holistic and balanced nonmarket approaches in accordance with Article 6, paragraph 8, of the Paris Agreement, in the context of sustainable development and poverty eradication, in a coordinated and effective manner, including through mitigation, adaptation, finance, technology transfer and capacitybuilding, as appropriate;

33. Further emphasizes the importance of conserving, protecting and restoring nature and ecosystems towards achieving the Paris Agreement temperature goal, including through enhanced efforts towards halting and reversing deforestation and forest degradation by 2030, and other terrestrial and marine ecosystems acting as sinks and reservoirs of greenhouse gases and by conserving biodiversity, while ensuring social and environmental safeguards, in line with the Kunming-Montreal Global Biodiversity Framework;

34. Notes the need for enhanced support and investment, including through financial resources, technology transfer and capacity-building, for efforts towards halting and reversing deforestation and forest degradation by 2030 in the context of sustainable development and poverty eradication, in accordance with Article 5 of the Paris Agreement, including through results-based payments for policy approaches and positive incentives for activities relating to reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries; and alternative policy approaches, such as joint mitigation and adaptation approaches for the integral and sustainable management of forests, while reaffirming the importance of incentivizing, as appropriate, non-carbon benefits associated with such approaches;

35. Invites Parties to preserve and restore oceans and coastal ecosystems and scale up, as appropriate, ocean-based mitigation action;

36. Notes the importance of transitioning to sustainable lifestyles and sustainable patterns of consumption and production in efforts to address climate change, including through circular economy approaches, and encourages efforts in this regard;

37. Recalls Article 3 and Article 4, paragraphs 3, 4, 5 and 11, of the Paris Agreement and requests Parties that have not yet done so to revisit and strengthen the 2030 targets in their nationally determined contributions as necessary to align with the Paris Agreement temperature goal by the end of 2024, taking into account different national circumstances;

38. Recalls Article 4, paragraph 4, of the Paris Agreement, which provides that developed country Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets, and that developing country Parties should continue enhancing their mitigation efforts and are encouraged to move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances;

39. Reaffirms the nationally determined nature of nationally determined contributions and Article 4, paragraph 4, of the Paris Agreement and encourages Parties to come forward in their next nationally determined contributions with ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with limiting global warming to 1.5 °C, as informed by the latest science, in the light of different national circumstances;

40. Notes the importance of aligning nationally determined contributions with long-term low greenhouse gas emission development strategies, and encourages Parties to align their next nationally determined contributions with long-term low greenhouse gas emission development strategies;

41. Notes the capacity challenges of the least developed countries and small island developing States related to preparing and communicating nationally determined contributions;

42. Urges Parties that have not yet done so and invites all other Parties to communicate or revise, by the sixth session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (November 2024), their long-term low greenhouse gas emission development strategies referred to in Article 4, paragraph 19, of the Paris Agreement towards just transitions to net zero emissions by or around mid-century, taking into account different national circumstances;

COP28 Agreement Signals "Beginning of the End" of the Fossil Fuel Era | UNFCCC

UN Climate Change News, 13 December 2023 – *The United Nations Climate Change Conference (COP28) closed today with an agreement that signals the "beginning of the end" of the fossil fuel era by laying the ground for a swift, just and equitable transition, underpinned by deep emissions cuts and scaled-up finance.*

In a demonstration of global solidarity, negotiators from nearly 200 Parties came together in Dubai with a decision on the world's first 'global stocktake' to ratchet up climate action before the end of the decade – with the overarching aim to keep the global temperature limit of 1.5°C within reach.

"Whilst we didn't turn the page on the fossil fuel era in Dubai, this outcome is the beginning of the end," said UN Climate Change Executive Secretary Simon Stiell in his closing speech. "Now all governments and businesses need to turn these pledges into real-economy outcomes, without delay."

The global stocktake is considered the central outcome of COP28 – as it contains every element that was under negotiation and can now be used by countries to develop stronger climate action plans due by 2025.

The stocktake recognizes the science that indicates global greenhouse gas emissions need to be cut 43% by 2030, compared to 2019 levels, to limit global warming to 1.5°C. But it notes Parties are off track when it comes to meeting their Paris Agreement goals.

The stocktake calls on Parties to take actions towards achieving, at a global scale, a tripling of renewable energy capacity and doubling energy efficiency improvements by 2030. The list also includes accelerating efforts towards the phase-down of unabated coal power, phasing out inefficient fossil fuel subsidies, and other measures that drive the transition away from fossil fuels in energy systems, in a just, orderly and equitable manner, with developed countries continuing to take the lead.

In the short-term, Parties are encouraged to come forward with ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with the 1.5°C limit in their next round of climate action plans (known as nationally determined contributions) by 2025.

Statement of President von der Leyen on the outcome of COP28 (europa.eu)

Statement of President von der Leyen on the outcome of COP28 (europa.eu)

*President of the European Commission, Ursula **von der Leyen** said today:*

"I welcome the successful conclusion of the COP28 UN Climate Conference and the first Global Stocktake of the Paris Agreement. It is good news for the whole world that we now have a multilateral agreement to accelerate emission reductions towards net zero by 2050, with urgent action in this critical decade. This includes an agreement by all parties to transition away from fossil fuels. We have agreed on reducing global emissions by 43% by 2030, in line with the best available science, to keep 1.5 Celsius within reach. This will keep us on track with the goals of the Paris Agreement, and speed up the transition to a cleaner and healthier economy.

2023 has been the hottest year on record, and so it is fitting that we also make it the most ambitious year on record for climate action. Parts of Southern Europe have reached almost 30 degrees Celsius again this week, in the middle of December, and we are not alone in facing such extreme weather. Climate adaptation is becoming increasingly important. That is why the European Union is also standing in solidarity and working in partnership with countries all around the globe. We are dedicating record amounts of money to international climate finance, including adaptation finance. The European Union has also helped to operationalise a new loss and damage fund at COP28, and with our Member States we have contributed over two thirds of the initial funding pledges.

We stand ready to do more, and we know that more must be done. For example, COP28 has also been the opportunity to discuss carbon pricing with other Parties, so that more countries start to put a price on pollution. And we have also been able to lay the ground for broader financial reforms, new innovative sources of funding, and aligning all financial flows with the Paris Agreement."

After 30 years of waiting, Cop28 deal addresses the elephant in the room | Cop28 | The Guardian

After 30 years of waiting, Cop28 deal addresses the elephant in the room | Cop28 | The Guardian

> ***He was personally vilified, but Sultan Al Jaber has managed what no other Cop presidency has ever done.***
>
> *As temperatures broke records around the world this summer, António Guterres, the UN secretary general, warned in September: "Humanity has opened the gates of hell."*
>
> *On Wednesday, he hailed delegates at the Cop28 climate summit in Dubai, as two weeks of fraught talks ended. "For the first time, the outcome recognises the need to transition away from fossil fuels," he said. "The era of fossil fuels must end, and it must end with justice and equity."*
>
> *More than 190 nations accepted a text on Wednesday morning that calls on the world to "transition away" from fossil fuels. But is this a historic deal that will spell the eventual end of gas, oil and coal? Or will it be one more step on the road to hell?*
>
> *In the world of climate talks, these two are not mutually exclusive. The text that was gavelled on Wednesday morning, known as the "global stocktake", enjoins countries for the first time to embark on a de facto phase-out of fossil fuels. But it cannot require them to do so and it contains "a litany of loopholes", according to the small island states that are most vulnerable to the impacts of the climate crisis, that will hamper the world from cutting greenhouse gas emissions drastically enough to limit global heating to 1.5C (2.7F) above pre-industrial levels.*
>
> *It may seem incredible, but it has taken 30 years of nearly annual climate summits to come up with an agreement that includes clear directions on the future of fossil fuels.*
>
> *For 30 years, the world has been forced to avoid the elephant in the room: the overwhelming source of the climate breakdown we are experiencing, fossil fuels. Oil-producing countries, abetted by many rich countries, having reluctantly agreed to talk about the climate, refused to allow legally binding treaties to make the link with fossil fuels explicit.*
>
> *That it has taken an oil-producing country to introduce such a commitment into a Cop outcome for the first time is remarkable. That the president of this Cop is chief executive of the United Arab Emirates' national oil company, Adnoc, almost defies belief. Few people predicted a strong outcome from this Cop, and Al Jaber was personally vilified.*
>
> *The mood in the closing plenary at Cop28 on Wednesday morning was clear: this deal does represent significant progress for the countries that want to tackle the climate crisis. The world must take this signal as the end of the fossil fuel era – now, before the gates of hell close behind us.*

See also:

Critical or concerning? Cop28 debates role of carbon markets in climate crisis | Carbon offsetting | The Guardian

COP28 climate summit signals the end of fossil fuels — but is it enough? |Nature

COP28 climate summit signals the end of fossil fuels — but is it enough? (nature.com)

> ***Nations make historic pledge to 'transition' energy systems away from fossil fuels — some scientists are disappointed by the softened wording.***
>
> *Scientists have voiced mixed reactions to a pledge to "transition away from fossil fuels" made by the world's governments at the end of the COP28 climate summit in Dubai.*
>
> *"It's major," says Lisa Schipper a developmental geographer at the University of Bonn, Germany. Previous end-of-COP declarations have failed to mention fossil fuels in this way — at COP26 in Glasgow, delegates pledged to "phase down" unabated coal, which was regarded as a first at the time.*
>
> *COP28 is the first global stocktake after the 2015 Paris Climate Agreement (COP21) in which representatives of more than 190 countries pledged to limit global warming to within 1.5 ºC degrees of pre-industrial levels.*
>
> *The final COP28 text calls on parties to be: "Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science."*
>
> *The text, which was agreed on the morning of 13 December after several all-night negotiating sessions, "shows that they are actually listening to the science", Schipper says. But she adds that "transitioning away" rather than "phasing out" fossil fuels, is still disappointing, as 'transition' could be interpreted in different ways. It doesn't mean eliminating, whereas 'phasing out' fossil fuels, is about 'the end'," she says.*
>
> *The United Nations Framework Convention on Climate Change, the agency that organizes COP meetings, headlined its press release: 'Beginning of the end of the fossil fuel era'. However, hours after the agreement, Saudi Arabia's energy minister Abdulaziz bin Salman was reported in Al-Arabiya newspaper as saying that it would not affect the country's exports of crude oil.*

See also:

First cash pledged for countries devastated by climate change: COP28 starts with historic decision (nature.com)

Nature Briefing: Anthropocene (campaign-archive.com)

Nature Briefing (campaign-archive.com)

Johan Rockström
LRI @jrockstrom PDI

No, COP28 will not enable us to hold the 1.5°C limit, but yes, the result is a pivotal land-mark. It makes clear to finance, business and societies that we are now finally - 8 years behind Paris schedule - at the beginning of the end of the fossil-fuel driven world economy (1/4).

13/12/2023, 12:11

> **Johan Rockström**
> LRI @jrockstrom PDI
>
> *Science called for a mitigation COP, and we got a mitigation COP, focused on fossil-fuels. The world must now act accordingly, i.e. rapidly transition away from oil, coal and gas, aiming at >40% reductions by 2030 and reaching net-zero by 2050, as recognized in the text (2/4).*
>
> 13/12/2023, 12:11

Johan Rockström
LRI @jrockstrom PDI

Yet, the text on transition away from fossil-fuel remains too vague, with no accountability for 2030, 2040 & 2050. No recognition that scaling CO2 removal technology needs to occur in addition to fossil-fuel phase out, to have a chance of limiting global warming to 1.5°C (3/4)

13/12/2023, 12:12

Johan Rockström
LRI @jrockstrom PDI

And there is no convincing plan on how to transition away from fossil-fuels. National voluntary action alone will not do it. Collective, global action, on finance, carbon pricing, and technology exchange are also needed, at a scale vastly exceeding what is now on the table (4/4).

13/12/2023, 12:12

Al Gore, Tweet

Al Gore

@algore

The decision at #COP28 to finally recognize that the climate crisis is, at its heart, a fossil fuel crisis is an important milestone. But it is also the bare minimum we need and is long overdue. The influence of petrostates is still evident in the half measures and loopholes included in the final agreement. Fossil fuel interests went all out to control the outcome, but the passionate work of millions of climate activists around the world inspired and motivated delegates from many nations to loosen the industry's grip. Whether this is a turning point that truly marks the beginning of the end of the fossil fuel era depends on the actions that come next and the mobilization of finance required to achieve them. We must ask ourselves how much longer will the world have wait before all nations summon the political will to overcome these narrow special interests and act on behalf of the future of humanity. It is up to all of us to hold our leaders accountable to their promise to transition away from fossil fuels once and for all.

9:30 am · 13 Dec 2023

Vanessa Nakate

@vanessa_vash

COP28 is the first to talk about the end of “fossil fuels”, so it tells us what we already knew - the fossil fuel era is ending.

But it’s a desperately weak deal that again leaves the Global South without the climate finance it needs. It also mentions transition fuels, and pic.twitter.com/LCiqDISJh8

13/12/2023, 14:14