any other type of CDR is pointless. If we rapidly decarbonize industrial processes and food systems and thereby halt further ecosystem destruction, a portfolio of CDR approaches could be part of a solution. But we are far away from that scenario. Emissions in 2024 were at an all-time high. At this point, promises to recover after overshoot are just that — promises.

Overshooting 1.5 degrees could be the moment when we fully realize that past and current approaches have not worked and that we need new thinking about the climate and ecological crisis. Unfortunately, there is scant evidence that any such awakening is on the horizon. In fact, policy makers may double down on the existing course by going beyond CDR into the even more fantastical realm of solar geoengineering approaches. One of these is sulfate aerosol injection (SAI), which would involve spraying millions of tons of sulfurous compounds in the high atmosphere each year in order to reduce the amount of energy from the sun that reaches the planet's surface. As unhinged as that sounds, SAI is garnering increasing interest and financing.

The clearest path to a safe and stable climate begins with the rapid phase-out of fossil fuels. We must stop carbon dioxide flooding into the atmosphere. Increasing our reliance on overshoot Hail Marys like DAC and SAI increases the dangers we face because they lock us into technological solutions. If these fail to deliver — and well-informed people have very little confidence that they will succeed — we face catastrophe.

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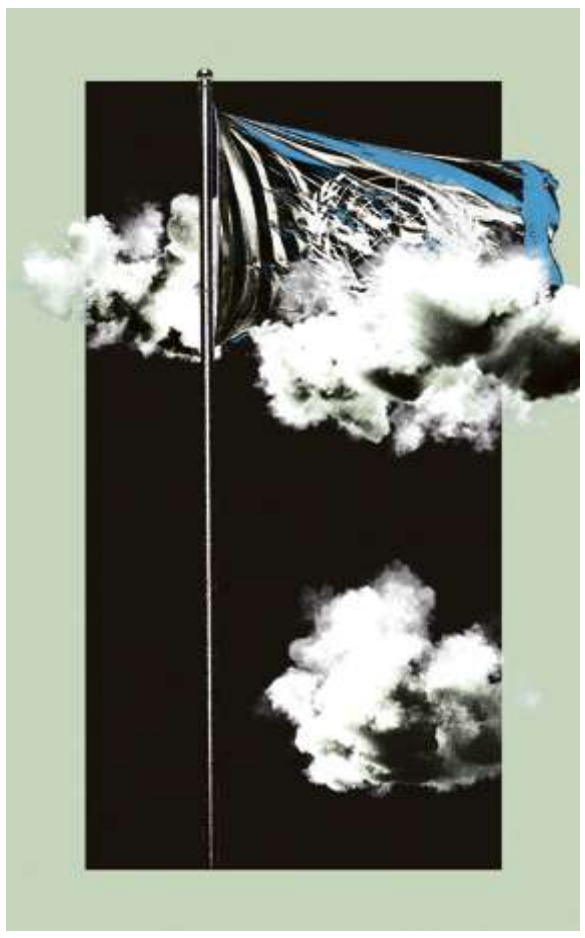
The world's biggest climate goal was a waste of time and money

By Ted Nordhaus



No one is sure exactly how much money the United Nations' most recent climate confab in Belém, Brazil, cost. The Brazilian government may have spent as much as $1 billion on the November event. Spending by other public and private interests to accommodate almost 60,000 official delegates and countless further corporate and nonprofit participants surely rivaled the government's expenditures. Whatever the final tally, it almost certainly exceeded the $350 million that rich countries, after years of wrangling, have ponied up in recent years to compensate poor countries for climate losses and damages.

Thirty years after the first Council of Parties, or COP, conference was held in Berlin in 1995, it is not at all clear what the long-running UN-led effort to galvanize international action on climate change has accomplished. Official accounts are contradictory. The UN and other parties insist the world faces dire consequences should atmospheric warming exceed 1.5 degrees Celsius above preindustrial levels. At the same time, many of those voices also claim that international efforts marshaled by the COP have already averted catastrophe, reducing likely warming by the end of this century from 5 degrees Celsius to less than 3 degrees.

The first claim is dubious. There has never been any credible science establishing that 1.5 degrees marks a threshold beyond which catastrophe is assured. The 1.5 degree target was originally put forward in 2009 by small island nations arguing that they would be inundated by rising seas if the world surpassed it. But there is little evidence to date that rising sea levels have particularly threatened the future of island nations. To the contrary, many continue to add coastline and land area through landfilling and other coastal modifications, as low-lying regions have for many centuries. One recent survey found that 221 atolls across the Pacific and Indian Oceans had increased their land mass by 6 percent between 2000 and 2017 despite rising sea levels. So while there is significant uncertainty about how fast sea levels will rise in the coming decades, low-lying areas including small island nations will likely have substantial capability to adapt to those changes.

Nonetheless, in the years after it was adopted at the Paris COP in 2015 as an "aspirational" target, 1.5 degrees has taken on a life of its own. The World Economic Forum claims that "1.5°C is a physical limit beyond which Earth systems enter a danger zone of cascading climate tipping points that propel further warming." UN Secretary General António Guterres opened the COP plenary in Belém by asserting that "1.5°C limit is a red line for humanity."

These warnings conflate highly speculative concerns about triggering irreversible geophysical processes with claims that climate calamity has already arrived in the form of present-day disasters. But the data tell a different story. Mortality due to climate-related extremes and disasters of all sorts has fallen dramatically over all relevant timescales. 2025 will likely feature the lowest mortality from climate-related disasters in recorded human history. The economic costs of disasters continue to rise, as the world is both richer and more populous than ever. But those costs have declined significantly as a share of global GDP. Despite the warming climate, human societies are today more resilient to climatic extremes than they have ever been.

The second claim — that international efforts have already averted catastrophe — is risible. The COP negotiations and the Paris Agreement have not significantly altered the trajectory of global emissions. The ostensible progress is an artifact of the misuse of emissions scenarios projecting 5 degrees Celsius or more of future warming, which were never plausible, not a shift in the underlying characteristics of the global energy economy. The carbon intensity of the global economy has been falling at a consistent rate for decades, since at least the energy crises of the 1970s, when nations began collecting decent data. Most advanced developed nations have seen falling emissions for the last two decades or longer, as population and economic growth have slowed and energy technologies have continued to improve. The same processes are now underway across much of the rest of the world.

None of these developments are attributable to the COP process, which was originally intended to negotiate a binding international treaty to limit emissions. The 1997 Kyoto Accord collapsed after COP15 in Copenhagen in 2009. In its aftermath, the 2015 Paris Agreement shifted to voluntary actions, in which individual nation-states proffered Nationally Determined Contributions (NDCs), laying out development pathways to limit emissions. A decade later, few nations are on track to meet their NDCs. With updates due by the end of the year, fewer than half of the participating countries submitted new NDCs in advance of the conference.

Instead, the world has made progress toward decarbonization and adaptation not because of the UN-led effort but in spite of it. The main drivers of emissions trajectories nationally and globally have always been macroeconomic and technological, not political. The primary determinants of climate impacts on human societies are socioeconomic, not climatological. Nations have always had good reasons to invest in energy technology innovation, promote socioeconomic development, and pursue resilience to natural disasters without any reference to climate change at all.

In the aftermath of the latest COP, much of the attention has focused on what was absent, not what was accomplished. The Trump administration not only pulled out of the Paris Agreement but chose not to send any official delegation to COP30 at all. Bill Gates, arguably the world's most important climate philanthropist, announced in the run-up to the conference that he was shifting his focus from climate change to poverty alleviation and global health. Both moves have been widely criticized as blows to the climate effort. But it is entirely possible that they may do more to address the problem than anything produced at recent COPs.

Notwithstanding its climate skepticism, the Trump administration's determination to double down on US natural gas production and exports is likely to accelerate the global coal-to-gas transition, while its unprecedented commitments to commercializing a new generation of advanced nuclear reactors could end up accelerating decarbonization in coming decades. Gates's shift to poverty and public health, similarly, may do far more to improve resilience to climate extremes among the most vulnerable than the COPs' long-running dramas around loss and damages and climate adaptation funding.

On each of these fronts, the COP conferences not only have proved to be a waste of time and resources but have often actively caused harm. Until recently, for instance, all discussion of nuclear energy, still the world's largest source of clean energy, was limited to side events at COP meetings. COPs over the last decade have resulted in outright bans on investment by multilateral institutions like the World Bank in fossil fuel extraction and infrastructure in poor countries, which contribute almost nothing to global emissions and whose vulnerability to climatic extremes is due to energy poverty, not a changing climate. Rich country commitments to provide mitigation and adaptation aid to poor countries, meanwhile, have not increased the aid those countries receive. Instead, they have diverted funds from proven development activities such as education and public health programs toward dubious mitigation and adaptation projects.

Despite these serial failures and the harm that they have caused, there appears to be no interest at the UN or other quarters of the climate community in reconsidering whether the annual COP conferences serve any real purpose. Next year, all of the same players will gather in the Mediterranean resort city of Antalya, Turkey, to replay the same debates and drama that we just witnessed in Brazil. Billions of dollars that might be spent on bed nets or childhood vaccinations will instead be wasted on flying the global climate commentariat and the huge government, nonprofit, and corporate sustainability sector that has grown up around it to hobnob and speechify and make empty commitments. For this reason, it is not enough to simply ignore the UN's annual climate bacchanal as a pointless contrivance. It's long past time to abolish it.

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ing violent transformation.

Climate models suggest a range of outcomes depending on how much carbon we emit. These models are based on observed data, reconstruction of past change, and scientific understanding of the global climate system. Unfortunately, critical aspects of climate science remain poorly understood and contentious. We don't really understand cloud dynamics, for instance, which are important for predicting how quickly things might warm. Nor is there clear agreement on topics like tipping points, glacier collapse, and the effects of methane release from Arctic permafrost.

Nevertheless, climate science offers general outlines of what's to come, mostly ever more chaotic weather, including both extreme precipitation and increased drought, increased flooding, and sea level rise. Even now, on the cusp of 1.5 degrees Celsius warming, we see climate chaos causing trouble. As warming accelerates, that chaos will only get worse.

What climate models can't do is predict how humans will react. There's an old adage from statistician George Box: "All models are wrong, but some are useful." Box's point is that models are inherently biased and reductive: A map is not the territory. But a map can still help you get somewhere, if it's a good map.

Unfortunately, the models from the Intergovernmental Panel on Climate Change and other big science organizations are not very good maps. They're not only wrong in the sense Box means but dangerously biased and reductive in misleading ways. They often include presuppositions about the human response to climate change that are based on nothing more than wishful thinking — for instance, that countries will actually meet their climate commitments or that we'll develop and implement cost-effective carbon removal at scale in time to prevent a rapid shift to a hotter planetary equilibrium.

If there's one thing you learn from studying history, it's that human beings are wildly unpredictable. We don't know how social change happens, and we have zero data from the future. In political and cultural terms, our future is not only unknown but unknowable.

Some people find hope in that. An optimistic view of the past two centuries argues that things have been getting better and are likely to keep doing so, and that human beings' innovative unpredictability gives us resilience in the face of adversity. Optimists point to new solar and wind farms and electric cars and legal rulings from the International Criminal Court as evidence that we're hitting a "social tipping point."

Optimists also conveniently ignore that global energy consumption continues to rise, planetary warming is accelerating, and there's no international governing body capable of forcing the largest greenhouse gas emitters like China and the United States to comply with any emissions regulations at all. A less optimistic view of the past two centuries — a time of technological development, increasing consumption, and unprecedented human impact — sees a bubble fueled by the voracious consumption of ancient carbon stocks, a bubble all but certain to burst.

One way to respond to our situation is with optimistic faith in progress; another is grounded in an empirical understanding of history and earth system science. It's true that optimism is generally associated with better health and increased longevity. And humans seem to have an innate bias to look on the bright side, even to the point of self-delusion. But under conditions of high stakes, low information, and unpredictable outcomes, optimism isn't just self-deluding, it's reckless and irresponsible.

We don't know what happens when we pass 1.5 degrees Celsius, but we're going to find out. There's considerable scientific confidence that increased warming is going to have significant impacts on human society. And there's no good evidence for the optimistic claim that we're going to see miraculous political and technological changes capable of stopping global warming or even coping with the consequences. We face a future at once radically unpredictable and deeply menacing.

What we need from our leaders and from one another is not optimism but an ethical pessimism grounded in the recognition of human limits. We've failed to stop climate change, and we're failing to adapt to the climate chaos we've unleashed: Catastrophic drought is causing starvation, disrupting trade, and sparking fires around the world; increasingly devastating storms are displacing people from Alaska and California to Sri Lanka and Jamaica; climate change is driving an insurance crisis; more than 80 percent of the world's coral reefs are bleaching because of heat stress; billions of people across the globe are increasingly subjected to heat stress from extreme heat; and while mass deportations might make good political theater, they don't address the deeper problem of global climate-change-driven migration. And all this is only the beginning. There's not going to be any solution: It's going to be one disaster after another, followed by triage and salvage. But as I argue in my book "Impasse: Climate Change and the Limits of Progress," pessimism offers a responsible and ethical framework for apprehending our situation.

What happens when we pass 1.5 degrees warming — or 2, 3, and 4 degrees? Nobody knows. The world we live in will pass away like so many fallen empires, and a new world will be born in its place. We might have been able to stop this once, but now it's too late. With pessimism as our guide, maybe we can navigate the change with a little more compassion and wisdom. It might just be our only hope.

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