

# New study warns of the dangers in “overshooting” climate targets

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7 November 2024

An important study was published last month in the journal *Nature*, titled “Overconfidence in climate overshoot.” While increasingly dire warnings of the catastrophic impacts of global climate change continue to be published by scientists, the findings of this new paper provide another stark reminder of the urgent necessity to limit global warming by immediately reducing greenhouse gas (GHG) emissions.

In particular, the paper highlights the need to prevent “overshoot” of climate targets. Overshoot refers to a scenario in which a proposed warming target (usually 1.5°C above pre-industrial levels) is initially surpassed, but carbon dioxide removal efforts later cool down Earth to reach the same temperature.

Commenting on the significance of the new research, Lund University professors Wim Carton and Andreas Malm explained the proposition behind overshoot proposals as follows: “Staying below a temperature limit is the same as first crossing it and then, a few decades hence, using methods of removing carbon from the atmosphere to dial temperatures back down again.”

This proposition can be accepted as accurate, however, only if it is assumed that 1) it is scientifically feasible that the global temperature could be “dialled back down” to its target level, and 2) there are no meaningful climate impacts associated with an overshoot scenario.

The new study casts serious doubt on both these assumptions. A climate scenario that initially overshoots the 1.5°C target could theoretically reverse this additional warming to meet the target in the long run. But compared to a pathway that never reached 1.5°C in the first place, there could be a myriad of climate impacts associated with the overshoot itself.

This is true even if the end-result average temperature is the same between the two scenarios. In the words of the authors of the new study: “We show that global and regional climate change and associated risks after an

overshoot are different from a world that avoids it.”

The research team was led by Carl-Friedrich Schleussner, Head of Climate Science at the Berlin-based research institution Climate Analytics. Its examination of climate models determined that overshoot scenarios outlined in previous reports are overconfident in the viability of mitigating climate change.

There are essentially two components to these latest findings. First, that reverting back to a 1.5°C global average warming after overshooting it is far from guaranteed, and at the very least is likely to be much more challenging than once expected.

Part of the reason for this is the increased likelihood of hitting climate tipping points above 1.5°C of warming. These tipping points can begin feedback loops and accelerate warming beyond what is already done by fossil fuel emissions. The collapse of the Greenland ice sheet and the dieback of Amazon forests are two examples of this.

These developments contribute to increased warming through a decrease of both carbon sequestration ability and the Earth’s albedo (ability to reflect away incoming sunlight). And though both these processes are already well underway, above a certain threshold of warming they are estimated to be irreversible due to the feedback loops. The increased warming from reaching those tipping points through overshoot makes it more unlikely that a reversion to temperatures below 1.5°C would be viable.

Second, even if reversing the temperature to 1.5°C is to be accomplished, the climate after the fact is not likely to be the same as it would be had the target not been surpassed in the first place. This is likely to be true even if the warming increase above 1.5°C is entirely reversed, a scenario which the researchers deem an “optimistic assumption.” Certain climate impacts are more or less irreversible for each increment of increased global warming.

The study explains: “For a range of climate impacts, there is no expectation of immediate reversibility after an overshoot. This includes changes in the deep ocean, marine biogeochemistry and species abundance, land-based biomes, carbon stocks and crop yields, but also biodiversity on land.”

The Paris Agreement of 2015, a non-binding treaty ratified by 195 countries, was one of the agreements put forward by governments to supposedly keep Earth’s temperature from reaching 1.5°C above pre-industrial levels. But it was always designed to prioritise corporate profits, including those of fossil fuel companies, over any serious efforts to curtail climate change.

The WSWS described it as “a way for countries and companies such as ExxonMobil to participate in carbon trading and carbon tax schemes to maximize their profits while only implementing token reductions in carbon emissions.”

Despite the legitimate scientific importance of a 1.5°C target, scientists have been warning for many years that global efforts are nowhere near on track to reach this target. Most recently, a United Nations report indicated the world is on track for 3.1°C of warming without cuts to GHG emissions. This figure is in line with previous scientific estimates.

The 2018 Intergovernmental Panel on Climate Change “Special Report” indicated that most scenarios put forward to reduce emissions would see the world overshoot the 1.5°C target. Nevertheless, the Paris Agreement itself does not consider such an overshoot a violation of its stated goals, if those temperatures are later reversed by the end of this century.

By contrast, the authors of the current study state: “It is misleading to frame overshoot as an alternative way to achieve a similar climate outcome. We show that several climate impacts in a pre- and post-overshoot world are different, indicating impact reversibility is not a given.”

One of the crucial implications of the study’s results is that the estimated amount of carbon dioxide removal (CDR) needed to reverse global temperatures after an overshoot is likely to be unfeasible. The paper states that “the extent of CDR required to achieve stable temperatures in the twenty-first century might be strongly underappreciated.”

There are many serious doubts, in particular, about the effectiveness and viability of carbon capture technology, which would be necessary to reach CDR targets. Moreover, when proposed by governments as an alternative to reducing GHG emissions, CDR projects can

often be used to justify the continued existence and expansion of fossil fuel production. Capitalist governments cite CDR as a distraction from their refusal to set strict emission reduction targets, in order to shore up profits within their own nation-state.

This does not mean that CDR methods in principle should not be a component of climate mitigation. In fact, although the top priority for climate mitigation is to drastically cut fossil fuel emissions, removing existing carbon dioxide from the atmosphere is necessary. But CDR technology in the hands of big business cannot be relied upon for this task.

Importantly, the authors point out the unequal nature of climate change, the impacts of which disproportionately affect the poorest in society. They write that “overshoot entails socioeconomic impacts and climate-related loss and damage that are typically irreversible and fall most severely on poor people.”

This is true, but it should be stressed also that the causes of climate change itself—and not just the impacts—highlight the class divide in society. It is not humanity in general but the relentless drive of the capitalist class and its representatives in government to increase profits that lie at the root of environmental destruction.

Above all, the study reaffirms what the consensus of climate science research has been warning for decades. It concludes: “Emissions reductions need to be accelerated as quickly as possible to slow down temperature increase and reduce peak warming. Pursuing such an enhanced protection pathway is the only robust strategy to, if not avoid then, at least minimize, far-reaching climate risks over the twenty-first century.”

Efforts to accomplish this task inevitably run into the barrier of the corporate profit motive inherent to the capitalist system. Climate mitigation raises the necessity of abolishing this system and replacing it with socialism to avoid catastrophic ecological disaster.



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