

# *Window for Meeting Key Climate Goal Is Even Narrower Than Thought*

Limiting warming to 1.5 degrees Celsius would be harder than ever, new calculations show, but less ambitious targets are still in reach.



By Raymond Zhong

Oct. 30, 2023

**Climate Forward** There's an ongoing crisis — and tons of news. Our newsletter keeps you up to date. [Get it in your inbox.](#)

Five years and change. That's how long humans can keep pumping carbon into the atmosphere at our current rate before we're likely to push global warming past the most ambitious limit set by the Paris Agreement, according to new estimates released Monday by a team of climate scientists.

The calculations add weight to a dismal conclusion that many researchers already take as foregone: that we are cutting emissions far too slowly to have much hope of keeping warming below 1.5 degrees Celsius, or 2.7 Fahrenheit. Already, human activity has raised average global temperatures by about 1.2 degrees Celsius relative to preindustrial conditions.

The most promising paths for avoiding 1.5 degrees are clearly gone, Joeri Rogelj, a climate scientist at Imperial College London who worked on the new projections, said at a news briefing. "And they have been gone for a while, to be honest," he added.

Even so, having an up-to-date picture of emissions and warming can still help governments figure out how to meet less ambitious climate goals, including the Paris pact's second-best limit of 2 degrees Celsius. Every extra increment of warming increases the risk of dangerous heat waves, floods, crop failures, species extinctions and wildfires.

“If we limit warming to 1.6 degrees, or 1.65 degrees, or 1.7 degrees, that's a lot better than 2 degrees,” said Christopher J. Smith, a climate scientist at the University of Leeds who also contributed to the calculations. “We still need to fight for every 10th of a degree.”

Not long ago, the window of opportunity looked somewhat bigger. Scientists convened by the United Nations said in 2021 that we could continue emitting at today's pace for about 11 more years before we would probably blow past 1.5 degrees.

Since then, though, humans have added many more billions of tons of carbon dioxide to the atmosphere, at a rate that flagged only briefly during the pandemic. After including recent emissions and making other updates to their calculations, Dr. Rogelj, Dr. Smith and their colleagues produced a lower estimate of the amount of carbon that can still be added to the atmosphere without pushing global temperatures beyond 1.5 degrees, a quantity known as the remaining carbon budget.

Scientists have long understood that Earth warms in direct connection with cumulative emissions. But determining the precise budget for 1.5 degrees is tricky because the threshold is already so close.

“The budget for 1.5 degrees Celsius is getting very small, so small that any change in the method can change the budget by a large amount,” said Pierre Friedlingstein, a climate scientist at the University of Exeter who wasn't involved in the new estimates.

One reason the latest calculations, which were published in the journal *Nature Climate Change*, show a smaller budget than before has to do with air pollution. Burning fossil fuels for energy can release both carbon dioxide and tiny particles such as soot and sulfates. These particles harm human health, but they also cool the atmosphere by blocking solar radiation.

In the new budget estimates, the researchers incorporated an improved understanding of the size of this cooling effect. The result, they found, was that reducing air pollution in the coming years would remove the cooling influence by a larger amount — good for lungs, bad for global warming.

Once the remaining carbon budget is spent, warming won't necessarily surpass 1.5 degrees and stay above it right away. That could happen somewhat earlier or later, depending on natural climate cycles like El Niño and on how much societies reduce emissions of other heat-trapping gases, such as methane.

This year's extraordinary heat has made it possible that global warming for 2023 will come in at around 1.5 degrees above mid-19th-century conditions. But the Paris goals are about the average climate over many years, not in a single year.

World leaders are scheduled to convene in the United Arab Emirates next month for the latest round of U.N. climate talks. They will discuss what is still possible for easing climate change, and, perhaps just as importantly, what is not.

**Raymond Zhong** is a climate reporter. He joined *The Times* in 2017 and was part of the team that won the 2021 Pulitzer Prize in public service for coverage of the coronavirus pandemic. More about Raymond Zhong