

# Three Scenarios for the Future of Climate Change



The events of the next several millennia hinge on actions that will be taken by the time today's toddlers reach adulthood. - Photograph by Raphael Neal / Agence VU / Redux

Like millions of other Americans, I first learned about climate change in the summer of 1988. For its day, it was a scorcher: *Yellowstone National Park* burst into flames; the Mississippi River ran so low that almost four thousand barges got backed up at Memphis; and, for the first time in its history, Harvard University shut down owing to heat. It was on an afternoon when the mercury in Washington, D.C., hit ninety-eight degrees that James Hansen, then the head of NASA's *Goddard Institute for Space Studies*, told a Senate committee that

*"the greenhouse effect has been detected and is changing our climate now."*

Speaking to reporters after the hearing, Hansen went a step further:

*"It is time to stop waffling so much and say that the evidence is pretty strong that the greenhouse effect is here."*

Hansen's warning was certainly not the first. A report to President Lyndon Johnson in 1965 noted that the effect of burning fossil fuels was likely to be

*"deleterious from the point of view of human beings."*

Another report, prepared for the Department of Energy in 1979, predicted that even a relatively small increase in temperature could lead to the ultimate "disintegration" of the West Antarctic ice sheet, a process that would raise global sea levels by sixteen feet. A third report, also from 1979, found that, as carbon accumulated in the atmosphere, there was no doubt that the climate would change and "no reason to believe" that the change "will be negligible." But, for some reason, when Hansen spoke up, on that sweltering afternoon in June, the story of climate change shifted. The *Times* ran its article at the top of page 1, under a three-column headline:

*"GLOBAL WARMING HAS BEGUN, EXPERT TELLS SENATE."*

The following year, Bill McKibben published "*The End of Nature*,"<sup>1</sup> first as a *New Yorker* piece under the rubric "Reflections," and then, in longer form, as a book.<sup>2</sup>

Had the words of either man been heeded in the intervening three decades, the world today would be a very different place—incalculably better off in innumerable ways. Instead, during that interval, some two hundred billion metric tons of carbon have been spewed into the atmosphere. (This is roughly as

<sup>1</sup> <https://www.newyorker.com/magazine/1989/09/11/the-end-of-nature>

<sup>2</sup> <https://www.amazon.com/End-Nature-Bill-McKibben/dp/0812976088>

much CO<sub>2</sub> as had been emitted from the start of the Industrial Revolution to that point.) Meanwhile, trillions of dollars have been sunk into coal-burning power plants, oil pipelines, gas pipelines, liquid-natural-gas export terminals, and a host of other fossil-fuel projects that, in a saner world, would never have been constructed.

And global temperatures, as everyone can by now attest—though some still refuse to acknowledge—have continued to rise, to the point where the sweltering summer of 1988 no longer stands out as particularly hot. The nineteen-nineties were, on average, warmer than the eighties, the aughts hotter than the nineties, and the past decade hotter still. Each of the past five years has ranked among the warmest on record.

The *New Yorker* has run dozens of pieces<sup>3</sup> on climate change. All might be described as “reflections” on this fundamental disconnect. Even as the consequences—rising seas, fiercer droughts, longer wild-fire seasons, more devastating storms—have become daily news, global carbon emissions have continued to increase. In 2019, they reached a new record of ten billion metric tons. Emissions in India rose by almost two per cent, and in China by more than two per cent. In the United States, they actually dropped, by about 1.5 per cent. On November 4, 2019, the Trump Administration formally notified the United Nations that it planned to withdraw from the Paris climate accord, negotiated by the Obama Administration back in 2015. The very next day, a group called the *Alliance of World Scientists* released a statement, signed by eleven thousand researchers, warning that

*“the climate crisis has arrived and is accelerating faster than most scientists expected.”*

*“Especially worrisome,” the statement continued, were “irreversible climate tipping points,” the crossing of which “could lead to a catastrophic ‘hothouse Earth,’ well beyond the control of humans.”*

What will the Earth look like thirty years from now?

To a discomfiting extent, the future has already been written. There’s a great deal of inertia in the climate system; as a result, we’ve yet to experience the full effects of the CO<sub>2</sub> that’s been emitted to date. No matter what happens during the next few decades, it’s pretty much guaranteed that glaciers and ice sheets will continue to melt, as temperatures and sea levels continue to rise.

But to an extent that, depending on your perspective, is either heartening or horrifying, the future—and not just of the next several decades but of the next several millennia—hinges on actions that will be taken by the time today’s toddlers reach adulthood. What’s technically referred to as “*dangerous anthropogenic interference with the climate system*” and colloquially known as “*catastrophe*” is warming so dramatic that it’s apt to obliterate whole nations (such as the Marshall Islands and the Maldives) and destroy entire ecosystems (such as coral reefs). A host of scientific studies suggest that a temperature increase of two degrees Celsius (3.6 degrees Fahrenheit) or more would qualify.

A great many studies suggest that warming of 1.5 degrees Celsius (2.7 degrees Fahrenheit) would be enough to do the trick. At current emissions rates, the 1.5-degree threshold will be crossed in about a decade. As Drew Shindell, an atmospheric scientist at Duke University, told *Science*,

*“No longer can we say the window for action will close soon—we’re here now.”*

So how hot—which is to say, how bad—will things get?

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<sup>3</sup> <https://www.newyorker.com/tag/climate-change>

One of the difficulties of making such predictions is that there are so many forms of uncertainty, from the geopolitical to the geophysical. (No one, for example, knows exactly where various “climate tipping points” lie.) That being said, I’ll offer three scenarios.

In one scenario—let’s call this “blue skies”—the world will finally decide to “stop waffling” and start to bring emissions down more or less immediately. In the U.S., proponents of the *Green New Deal* have proposed a “ten-year national mobilization” in order to meet a hundred per cent of the country’s power demand “through clean, renewable, and zero-emission energy sources.” Such a timetable is obviously fantastically ambitious, but not for this reason infeasible. According to a report by the *International Energy Agency*, using technologies now available, offshore wind turbines could provide the country with twice as much electricity as it currently uses, and, according to some estimates, weaning the U.S. off fossil fuels would create tens of millions of jobs.

Bending the emissions curve globally is an even more formidable challenge. Leaders of many developing nations point out the injustice in asking their countries to forgo carbon-based fuels just because richer nations have already blown through the world’s carbon budget. India, which will soon overtake China as the world’s most populous country, gets three-quarters of its electricity from coal, and that proportion has, at least until recently, been growing. Still, it’s possible to imagine that global emissions could peak in the next decade or so. (At the U.N. last month, China’s President, Xi Jinping, pledged that his country’s emissions would crest by 2030.) Owing to the pandemic, emissions worldwide are expected to drop by about five per cent this year, compared with 2019. This would be the largest year-to-year drop since the Second World War, and it could mark an inflection point. Were it to be sustained, the increase in global temperatures could be held to less than two degrees Celsius. The world in 2050 would still be hotter than it is now, but it would also be less polluted, less given over to vast concentrations of oil wealth, and, in all likelihood, more just. As Narasimha Rao, a professor at Yale’s School of Forestry & Environmental Studies, put it in the *Times*, it’s hard to see how serious global-emissions cuts could take place without “increased attention to equity.”

Alternatively, global emissions could continue to grow through the middle of the century and, along with them, global inequality. In this scenario, by 2050 a temperature increase of two degrees Celsius would, for all intents and purposes, be locked in. Developed nations would have constructed storm-surge barriers to keep out the sea and erected border walls to keep out refugees. They would also have started to air-condition the outdoors. Developing nations, meanwhile, would have been left to fend for themselves. To a certain extent, all of this is already happening. A study published in 2019 by Noah Diffenbaugh and Marshall Burke, both of Stanford University, found that in the past fifty years warming had slowed economic growth in those parts of the world which have emitted the least carbon, perhaps by as much as twenty-five per cent.

*“Not only have poor countries not shared in the full benefits of energy consumption, but many have already been made poorer (in relative terms) by the energy consumption of wealthy countries,” the two wrote.*

Qatar, one of the world’s hottest countries and also one of the richest, already cools its soccer stadiums and its outdoor malls.

In a third scenario, global warming could by 2050 produce global conflict that draws in poor nations and rich ones alike. This, too, already seems, to a certain extent, to be taking place. A significant body of research suggests that the Syrian civil war was caused, at least in part, by a drought that pushed more than a million people out of their villages. The war, which has claimed some four hundred thousand lives, has, in the course of nearly a decade of bloodshed, involved the U.S., Russia, Saudi Arabia, Iran, and Turkey. Future droughts in the Middle East are apt to be even more severe and prolonged, as are droughts in other volatile regions, like the Horn of Africa. It doesn’t seem that it would

take too many more Syrian-scale conflicts to destabilize large swaths of the globe. At the very least, climate change

*“will endanger the stability of the international political order and the global trading networks upon which American prosperity rests,” Michael Klare, an expert on resource competition and a professor at Hampshire College, has written. “As conditions deteriorate, the United States could face an even more perilous outcome: conflict among the great powers themselves.”*

If all these scenarios appear to be either too unrealistic or too unpleasant, I invite readers to write their own. Here’s the one stipulation: it must involve drastic change. At this point, there’s simply no possible future that averts dislocation.

The horrific fires this fall in California and Oregon, which were, in a manner of speaking, stoked by climate change, serve as a preview of the world to come. As Andrew Dessler, a professor of atmospheric sciences at Texas A. & M. University, recently put it,

*“If you don’t like all of the climate disasters happening in 2020, I have some bad news for you about the rest of your life.”*

Billions of people will have to dramatically change the way they live or the world will change dramatically or some combination of the two. My experience reporting on climate change, which now spans almost twenty years, has convinced me that the most extreme outcomes are, unfortunately, among the most likely. As the warnings have grown more dire and the consequences of warming more obvious, emissions have only increased that much faster. Until the coronavirus<sup>4</sup> hit, they were tracking the highest of the so-called pathways studied by the Intergovernmental Panel on Climate Change. If this continues, the I.P.C.C. projects that, by the end of this century, global temperatures will have risen by almost eight degrees Fahrenheit. Let’s just say that at that point no amount of outdoor air-conditioning will be sufficient.

A few years ago, I interviewed James Hansen for a video project that I was working on. Hansen retired from NASA in 2013, but he has continued to speak out about climate change—and to get arrested protesting projects like the *Keystone XL* pipeline. He was blunt about the world’s failure. When I asked him if he had a message for young people, he said,

*“The simple thing is I’m sorry we’re leaving such a fucking mess.”*

□ This excerpt was drawn from the afterword of *“The Fragile Earth: Writing from The New Yorker on Climate Change,”* which is out October 6th, from Ecco.



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<sup>4</sup> <https://www.newyorker.com/tag/coronavirus>