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[Climate Change](#)

# The Problem With Climate Catastrophizing

## The Case for Calm

By [Oren Cass](#)

Climate change may or may not bear responsibility for the flood on last night's news, but without question it has created a flood of despair. Climate researchers and activists, according to a 2015 *Esquire* feature, "When the End of Human Civilization is Your Day Job," suffer from depression and PTSD-like symptoms. In a poll on his Twitter feed, meteorologist and writer Eric Holthaus found that nearly half of 416 respondents felt "emotionally overwhelmed, at least occasionally, because of news about climate change." For just such feelings, a Salt Lake City support group provides "a safe space for confronting" what it calls "climate grief."

Panicked thoughts often turn to the next generation. "Does Climate Change Make It Immoral to Have Kids?" pondered columnist Dave Bry in *The Guardian* in 2016. "[I] think about my son," he wrote, "growing up in a gray, dying world—walking towards Kansas on potholed highways." Over the summer, National Public Radio tackled the same topic in "Should We Be Having Kids In The Age Of Climate Change?" an interview with Travis Rieder, a philosopher at Johns Hopkins University, who offers "a provocative thought: Maybe we should protect our kids by not having them." And Holthaus himself once responded to a worrying scientific report by announcing that he would never fly again and might also get a vasectomy.

Such attitudes have not evolved in isolation. They are the most intense manifestations of the same mindset that produces regular headlines about "saving the planet" and a level

of obsession with reducing carbon footprints that is otherwise reserved for reducing waistlines. Former U.S. President Barack Obama finds climate change “terrifying” and considers it “a potential existential threat.” He declared in his 2015 State of the Union address that “no challenge—no challenge—poses a greater threat to future generations.” In another speech offering “a glimpse of our children’s fate,” he described “Submerged countries. Abandoned cities. Fields that no longer grow. Political disruptions that trigger new conflict, and even more floods of desperate peoples.” Meanwhile, during a presidential debate among the Democratic candidates, Vermont Senator Bernie Sanders warned that “the planet that we’re going to be leaving our kids and our grandchildren may well not be habitable.” At the Vatican in 2015, New York Mayor Bill de Blasio shared his belief that current policy will “hasten the destruction of the earth.”



*A boy flies his kite on dry and cracked farmland in San Juan town, Batangas province, south of Manila, April 18, 2010.*

ROMEO RANOCO / REUTERS

And yet, such catastrophizing is not justified by the science or economics of climate change. The well-established scientific consensus that human activity is causing the climate to change does not extend to judgments about severity. The most comprehensive and often-cited efforts to synthesize the disparate range of projections—for instance, the United Nations’ Intergovernmental Panel on Climate Change (IPCC)

and the Obama administration's estimate of the "Social Cost of Carbon"—consistently project real but manageable costs over the century to come. To be sure, more speculative worst-case scenarios abound. But humanity has no shortage of worst cases about which people succeed in remaining far calmer: from a global pandemic to financial collapse to any number of military crises.

What, then, explains the prevalence of climate catastrophism? One might think that the burgeoning field of climate psychology would offer answers. But it is itself a bastion of catastrophism, aiming to explain and then reform the views of anyone who fails to grasp the situation's desperate severity. *The Washington Post* offers "the 7 psychological reasons that are stopping us from acting on climate change." Columbia University's Center for Research on Environmental Decisions introduces its guide to "The Psychology of Climate Change Communication" by posing the question: "Why Aren't People More Concerned About Climate Change?" In its 100-page report, the American Psychological Association notes that "emotional reactions to climate change risks are likely to be conflicted and muted," before considering the "psychological reasons people do not respond more strongly to the risks of climate change." The document does not address the possibility of overreaction.

Properly confronting catastrophism is not just a matter of alleviating the real suffering of many well-meaning individuals. First and foremost, catastrophism influences public policy. Politicians regularly anoint climate change the world's most important problem and increasingly describe the necessary response in terms of a mobilization not seen since the last world war. During her presidential campaign, Democratic candidate Hillary Clinton promised a "climate map room" akin to Roosevelt's command center for the global fight against fascism. Rational assessment of cost and benefit falls by the wayside, leading to questions like the one de Blasio posed in Rome: "How do we justify holding back on any effort that may meaningfully improve the trajectory of climate change?"

Catastrophism can also lead to the trampling of democratic norms. It has produced calls for the investigation and prosecution of dissenters and disregard for constitutional limitations on government power. In *The Atlantic*, for example, Peter Beinart offered climate change as his first justification for an Electoral College override of the election of Donald Trump as U.S. president. The Supreme Court has taken the unprecedented step of halting implementation of the Clean Power Plan, Obama's signature climate policy, before a lower court even finished considering its constitutionality; his law-school mentor, professor Larry Tribe, likened the "power grab" of his star pupil's plan to "burning the Constitution."

The alternative to catastrophism is not complacency but pragmatism. Catastrophists typically condemn fracked natural gas because, although it results in much lower greenhouse-gas emissions than coal, it does not move the world toward the zero-emissions future necessary to avert climate change entirely. Yet fracking has done more in recent years to reduce carbon-dioxide emissions in the United States than all renewable energy investments combined. It has boosted U.S. economic growth as well.

The idea that humanity might prepare for and cope with climate change through adaptation is incompatible with catastrophists' outlook. Yet if the damage from climate damage can be managed, anticipating challenges through research and then investing in smart responses offers a more sensible path than blocking the construction of pipelines or subsidizing the construction of wind turbines. Catastrophists countenance progress only if it can be fueled without carbon-dioxide emissions. Yet given the choice, bringing electricity to those who need it better insulates them from any climate threat than does preventing the accompanying emissions.

The cognitive fault lines separating catastrophists from others cause both sides to reach radically different conclusions from the same information. Catastrophists assume that their interpretation is correct, and so describe other thinking as distorted. But if the catastrophists have it wrong, perhaps the distortions are theirs.

## CLIMATE CHANGE COSTS

A strong scientific consensus holds that human activity is producing climate change. But from that starting point, scientists have produced a range of estimates in response to a variety of complicated questions: How quickly will greenhouse gases accumulate in the atmosphere? What amount of warming will any given accumulation cause? What effect will any given level of warming have on ecosystems and sea levels and storms? What effect will those changes in the environment have on human society? The answers to all of these questions are much debated, but broad-based efforts to synthesize the best research in the physical and social sciences do at least offer useful parameters within which to assess the nature of the climate threat.

On scientific questions, the gold-standard summary is the Assessment Report created every few years by thousands of scientists under the auspices of the United Nations' Intergovernmental Panel on Climate Change (IPCC). By averaging widely varying projections and assuming no aggressive efforts to reduce greenhouse-gas emissions, they estimate an increase of three to four degrees Celcius (five to seven degrees Fahrenheit) by the year 2100. The associated rise in sea levels over the course of the twenty-first century, according to the IPCC, is 0.6 meters (two feet).

Most of the rise in sea levels results not from melting glaciers, but from the thermal expansion of ocean water as it becomes warmer. Melting ice from Greenland and Antarctica, which may eventually threaten a dramatic increase in sea levels, will barely begin in this century—in the IPCC analysis, the Antarctic ice sheet will have almost no effect and may even slow sea level rise as increased precipitation adds to its snowpack. Meanwhile, melting from Greenland’s ice sheet will contribute 0.09 meters (3.5 inches). In fact, “the near-complete loss of the Greenland ice sheet,” which could raise sea levels by seven meters, the IPCC reports, “would occur over a millennium or more.”

What about ecology? Predicting or quantifying damage to vulnerable ecosystems and specific species is notoriously difficult, but the IPCC offers a helpful heuristic for the likely magnitude of damage from climate change: “With 4°C warming, climate change is projected to become an increasingly important driver of impacts on ecosystems, becoming comparable with land-use change.” In other words, the impact should be similar to that which human civilization has imposed on the natural world already. Substantial and tragic, to be sure; but not something that modern society deems intolerable or a threat to human progress.

Economic tools called “integrated assessment models” attempt to convert the potential effects of climate change—on sea level and ecosystems, storms and droughts, agricultural productivity, and human health—into tangible cost estimates. This exercise is as much art as science, but it represents the best available exploration of how the impacts of climate change will likely stack up against society’s capacity to cope with them. Three of these models form the basis of the Obama administration’s analysis of the “Social Cost of Carbon”—the U.S. government’s official estimate of how much climate change will cost and thus what benefits come from combatting it. Economists and policymakers who want to place a price (that is, a tax) on carbon-dioxide emissions to force emitters to pay for potential damage resulting from climate change typically embrace the analysis as well.

According to the assessment models, a warming of three to four degrees Celcius by 2100 will cost the world between one and four percent of global GDP in that year. To put the high end of that range concretely, the Dynamic Integrated Climate-Economy (DICE) model developed by economics professor William Nordhaus at Yale University estimates that in a world without climate change, the global economy’s GDP would grow from \$76 trillion in 2015 to \$510 trillion in 2100 (an annual growth rate of 2.3 percent). A rise in temperatures of 3.8 degrees Celcius would cost 3.9 percent of GDP (\$20 trillion) that year, effectively reducing GDP to \$490 trillion.



*A man wears a polar bear costume and holds a banner with the message, "Climate Change is Unbearable" as he participates in a demonstration near the Eiffel Tower in Paris, France, as the World Climate Change Conference 2015 (COP21) continues near the French capital in Le Bourget, December 12, 2015.*

MAL LANGSDON / REUTERS

Twenty trillion dollars is a very large number—representing a cost greater than the entire annual economic output of the United States in 2016. But from the perspective of 2100, such costs represent the difference between the world being 6.5 times wealthier than in 2015 or 6.7 times wealthier. In the DICE model, moreover, the climate-change-afflicted world of 2105 is already more prosperous than the climate-change-free world of 2100. And because the impacts and costs of climate change emerge gradually over the century—0.3 percent of GDP in 2020, 1.0 percent in 2050—in no year does the model foresee a reduction in economic growth of even one-tenth of a percentage point. Average annual growth over the 2015–2100 period declines from 2.27 percent to 2.22 percent.

To be sure, economic estimates are incomplete. They cannot incorporate the inherent value to a community of remaining in its ancestral lands or any obligation humanity might have to protect other species and habitats. Even within the economic sphere, the assessment models depend on subjectively chosen inputs and averages across disparate forecasts; they rest atop numerous other models, each with their own subjectively chosen inputs and averages. Among the three models the Obama administration picked

for its analysis alone, the range of outputs is enormous: the DICE model's four percent-of-GDP estimate is near the 95th percentile of the projections from the middle-case model, while the low-case model's one percent-of-GDP estimate is below the middle-case's 5th percentile. But nowhere is catastrophe to be found.

Limitations and all, such estimates remain the best available. Further, the shortcomings of the integrated assessment models have little to do with their lack of support for catastrophism. The gap between what the models describe and what catastrophists fear does not emerge because the models disregard the heritages of indigenous cultures or the intangible value of every species. Nor do catastrophists disagree with particular inputs or outputs, expecting that tweaks to certain assumptions might validate their views. Rather, the societal collapse that catastrophists envision—one that poses an “existential” threat beyond the scope of other human problems, one that makes procreation an ethically dubious proposition—is simply irreconcilable with the outlook the science and economics offers.

Indeed, the logic of catastrophism seems to run backward: from the conclusion that significant human influence on the climate must portend unprecedented danger to the search for facts to support that narrative. But forecasts on these scales of time and magnitude exceed common experience and thus defy intuition, which facilitates misinterpretation and frustrates self-correction. Placing the problem in proper perspective requires appreciating the long-term costs in the context of the distant future when they will arise, distinguishing costs spread over long time periods from those borne all at once and, finally, applying separate analyses to expected outcomes and worst case scenarios. Catastrophists get these things wrong.

## COSTS IN THE DISTANCE

The power of compounding growth is the most crucial and counterintuitive phenomenon for understanding long-term projections. Many first encounter it in the tale of the ancient chessmaster who offers to train the emperor in return for one grain of rice on the board's first square, two grains on the second, four on the third—doubling on each square through the sixty-fourth. This sounds quite affordable, but the payment for the last square turns out to be just over nine quintillion (million-trillion) grains.

An economy growing by some percentage each year follows a similar trajectory. If GDP rises by just three percent per year, the economy will grow almost 20-fold in a century. In constant 2009 dollars, U.S. GDP was less than \$1 trillion in 1930. Eighty-five years later, after growing at an average compounding rate of 3.4 percent, it exceeded \$16 trillion. Eighty-five years from now, even at half that growth rate, U.S. GDP will approach \$70 trillion. For the majority of the world population, which resides in the

developing world and thus starts further behind, progress will likely be faster—more closely mirroring the booms in the United States and other now-developed countries in the last century. A \$500 trillion global economy in 2100 in which most of the world approaches the standard of living already enjoyed in the West may sound fantastical. But it only requires steady progress.

The first cognitive fault line separating catastrophists from others emerges here, over how to interpret the severity of climate-change damages in a world so radically different and more prosperous than our own. The standard narrative holds that most people improperly discount or ignore costs in the distant future. To the extent that those people are rational, their discounting of future problems must mean that they are immoral. “People scratch their heads and say: Why don’t people do what’s right?” remarked Harvard geology professor Daniel Schrag in a 2013 lecture. “Well, maybe they’re rational. It’s hard to accept. But in fact, maybe they actually don’t value the future as much as some of us do. The benefits will go to their children, to their grandchildren, and beyond.”

But what if, rather than not caring about their grandchildren, people have confidence that their grandchildren will enjoy a far higher standard of living and have a greater capacity to cope with whatever climate change might bring? In purely economic terms, both seem likely. Even after accounting for climate change, the DICE model forecasts a world 6.5 times richer than today’s for a population only 40 percent larger. Condemn mainstream economic estimates as hopelessly optimistic, increase the annual cost estimate for 2100 tenfold from \$20 trillion to \$200 trillion, and the world is still four times richer than today.

The abstract GDP totals represent more than just a hypothetical capacity to absorb costs. The concrete implications of this growth will be leaps forward in societal resilience and technological capability of the same magnitude achieved in the last century. Without predicting the future, analogs from the past indicate the kinds of change to expect. In many cases, they address squarely the central concerns raised by climate change.

Environmentalists, for example, have long worried about global population outstripping food supply. In 1970, the biologist Paul Ehrlich warned that, due to population growth, “at least 100-200 million people per year will be starving to death during the next ten years.” Instead, a technological revolution caused agricultural yields to surge. Today, even as concern grows about potential water crises around the world, the seeds of their resolution may be sprouting as well. Israel, suffering from the same drought often blamed for helping plunge Syria into civil war, is using desalination technology to make the desert bloom. Recently, it found itself with a water surplus. India is constructing

more than one million irrigation ponds that will increase agricultural yields by as much as 300 percent and buffer against changes in the timing of the monsoon season.

Continued progress in public health, through new breakthroughs and the transfer of best practices to the developing world, will likely ensure that life expectancy and quality will continue to increase regardless of how the climate changes. Perhaps climate change will increase the range of tropical diseases compared to a no-climate-change world. But in absolute terms, the prevalence of and mortality from such diseases should plummet. The public health challenges of 2100 will be as distant from today's as today's are from those of the early 1900s, prior to the development of either antibiotics or vaccines, when one in three American deaths were from pneumonia, tuberculosis, or diarrhea and enteritis.

To offer one more example, human infrastructure continues to triumph over the challenges and disasters of the natural world. Richer countries experience significantly lower fatality rates from natural disasters and also significantly lower damages relative to the size of their economies. The World Health Organization reports that in the three cyclones of maximum severity striking Bangladesh in 1970, 1991, and 2007, total fatalities declined from 500,300 to 138,958 to 4,234. The diffusion of existing technologies worldwide, and the development of new ones—coupled with unprecedented resources for implementation—should ensure that these trends continue.

Incremental improvements in water management, public health practices, and infrastructure are a conservative vision of progress. But innovation beyond today's imagination, in directions by definition unpredictable, is likely as well. Robin Hanson, a researcher at Oxford University's Future of Humanity Institute, wrote a well-received book called *The Age of Em* in which he argued that by 2100, computer simulations of humans will dominate an economy that doubles in size every month. James Lovelock, the British scientist, has likewise argued that, "before we've reached the end of this century, even—I think that what people call robots will have taken over."

Conversely, if innovation and economic growth stall; if the developing world halts its development; if wealthy nations begin to move backward—climate change will be the least of humanity's worries. The world's economic system of debt-based capitalism, predicated on continued growth, would collapse. The political systems built on that economic system would collapse as well. In that world, as in the prosperous one, the effects of climate change are a marginal consideration.

At its extreme, the conflation of future impacts with present circumstances produces incoherent results. Take, for instance, the EPA's "Climate Change Risks and Analysis"

project. Among its most prominent claims: Unmitigated climate change will cause more than 12,000 annual deaths from extreme heat in major U.S. cities by 2100. (The U.S. Centers for Disease Control and the EPA report fewer than 500 heat-related deaths in 2014, a figure that has been on a downward trajectory over the past 15 years). To reach 12,000 by 2100, the analysis took each city's mortality rate from extreme heat in 2000 and applied it to the hotter temperatures forecast for 2100. It concluded that, by 2100, the heat in New York City would be killing at 50 times the rate in Phoenix in 2000 (even though the New York City of 2100 is not expected to be as hot as the Phoenix of 2000). If one believes that residents of New York City will be dropping like flies from heat in the future, climate change must seem terrifying indeed. But that is not a rational belief.

## COSTS OVER TIME

A second cognitive fault line emerges over interpretation of climate change's slow-motion onset. Catastrophists lament this characteristic and blame it for humanity's failure to feel properly alarmed. The frog-in-boiling-water parable is popular here, even appearing in Al Gore's *An Inconvenient Truth*: try to throw a frog into a pot of boiling water, and it will leap out; but heat the frog in a pot of cool water, and it will sit there until dead.

The problem is that the parable turns out to be completely wrong. A frog tossed into boiling water will be killed or badly injured; one heated up will jump out when it becomes uncomfortable. In this, people are something like frogs: the one thing worse than a slow-motion crisis is a rapid one.

In the climate context, even from the vantage point of a prosperous 2100, the sudden inundation of coastal cities or disappearance of the monsoon would produce civilization-rattling disruptions. "Just imagine, for example, monsoon patterns shifting in South Asia where you have over a billion people," warned Obama in 2016. "If you have even a portion of those billion people displaced, you now have the sorts of refugee crises and potential conflicts that we haven't seen in our lifetimes." Catastrophists frequently cite this specter of hundreds of millions of refugees, which offers a vague but ominous scenario that might derive from any number of catastrophes and cause any number of others.

But would shifting monsoon patterns displace so many? Remember, growing wealth and infrastructure in the developing world will ensure a level of resilience far greater than today's. Of equal importance, gradual challenges invite adaptation: even if fully half of global agricultural production must relocate over a century, the required shift each year is only 0.5 percent of total production. For comparison, annual additions to global food production have averaged more than two percent over the past 50 years.

Even stipulating that adaptations will displace hundreds of millions of people, that displacement will not happen all at once. Spread over decades, such a disruption would look little different from the status quo. China alone currently supports a domestic migrant worker population of 278 million. According to estimates by the United Nations, there are currently 232 million international migrants. The organization projects that the figure will grow by several million each year. By 2050, the World Bank estimates that 2.5 billion people will migrate to cities for reasons unrelated to climate change. Climate change may thus be among the forces that cause the twenty-first century to witness upheavals and migrations on a scale similar to those of the nineteenth and twentieth—other forces were on full display in 2016—but that can hardly earn it the designation of “unprecedented” or “existential.”

The costs of climate adaptation can also appear deceptively large if the alternative of maintaining the status quo is imagined to be free. But regardless of climate change, almost every component of the global economy’s capital base—from city sewers to farm silos—will be fully depreciated and will need to be replaced by new investment over the next 100 years, both because existing infrastructure will deteriorate and because new alternatives will be worth installing. In that way, major coastal cities will be entirely rebuilt regardless of whether rising seas threaten them. If people allocating capital—be they small-town farmers, resort designers, or mayors—have the information and incentives to incorporate climate adaptation into their planning, it need not impose sudden and unmanageable recovery costs.

Recall Obama’s warning: “Submerged countries. Abandoned cities. Fields that no longer grow.” The statement actually began with the caveat that it is “a glimpse of our children’s fate if the climate keeps changing faster than our efforts to address it.” But certainly the climate is not yet changing too fast for society to address. And if societies continue to exhibit and build upon the adaptability they displayed in the last century, the glimpsed fate will never come to pass.

Faced with the claim that total climate costs of \$20 trillion in 2100 represent an entirely manageable burden, the catastrophist might respond that \$20 trillion must be implausibly low for the extent of disruption climate change might entail. He or she might also emphasize that climate change is not a one-time phenomenon: its effects will accumulate and compound, striking year after year against societies with a constrained capacity to respond.

But that argument gets the dynamic backward. Although climate impacts may be permanent and on-going, costly adaptation—if done wisely—need occur only once. A Manhattan properly insulated from rising waters will not require new protection each time sea level climbs another foot. Conversely, that hypothetical \$20 trillion represents

the resources that society might commit to the problem in the single year 2100. In Nordhaus' DICE model, the total allocated to climate costs between 2050 and 2150 is more than \$2.5 quadrillion, all without ever slowing annual growth by more than one-tenth of one percentage point. The world's productive capacity, bolstered by innovation and adaptation over time, is orders of magnitude larger than the demands climate change is expected to impose. Such adaptation may represent a tragic long-term drain on society's resources, but that does not mean it will noticeably alter the trajectory of human civilization.

## COSTS IN THE EXTREME

To the climate catastrophist, even a credible argument that climate change is manageable may offer little comfort. So what if the IPCC's best guess of sea-level rise by 2100 is only two feet? Some scenarios contemplate much worse outcomes, and what if those come true?

The *Esquire* article describes the views of Michael Mann, the climatologist who created the famous "hockey-stick" chart used to argue that centuries of climate stability were giving way to sharp warming in recent decades. "As Mann sees it, scientists like [NASA's Gavin] Schmidt who choose to focus on the middle of the curve aren't really being scientific. ... A real scientific response would also give serious weight to the dark side of the curve." In Mann's own words: "Maybe it is true what the ice-sheet modelers have been telling us, that it will take a thousand years or more to melt the Greenland Ice Sheet. But maybe they're wrong; maybe it could play out in a century or two."

Catastrophists worry that warming temperatures will set off an uncontrollable feedback loop, begetting ever-accelerating warming that leaves the planet uninhabitable; ocean currents might suddenly reverse, sending local climates into wild gyrations; unexpected ice-sheet dynamics might produce rapid glacial melting that causes sea levels to rise rapidly by multiple meters; agricultural yields could collapse, triggering widespread famine and conflict. Perhaps. If nothing else, such claims are unfalsifiable.

But it is difficult to know how to weigh such extreme hypotheticals. Emphasizing them risks departing the world of empirical research and model-based forecasting for one governed by fear. A variety of other long-term challenges with truly existential worst-case scenarios already exists, from the archetypical nuclear war to the emergence of artificial super-intelligence hostile to humans, to the global spread of an engineered pandemic, to coordinated cyberattacks on physical and financial infrastructure. Working with a catastrophic mindset and a century-long timeline, one can construct an apocalyptic scenario from almost any problem.

Here, the third fault line emerges over placement of climate change in broader context. Catastrophists see their worries about extreme climate change as unique from, and more concrete than, other speculative fears. But when held up for comparison, extreme climate change does not justify a special status. In objective terms, the worst case for climate change does not even place it among the worst of worst cases. For instance, the Global Priorities Project at Oxford observes that climate change could “render most of the tropics substantially less habitable than at present,” as compared to the hundreds of millions or billions of deaths associated with other challenges. Another Oxford study surveyed conference participants about the extinction-level risks of various catastrophes and neglected to even consider climate change; respondents gave molecular nanotechnology, superintelligent AI, and an engineered pandemic all at least a two percent chance of erasing humanity by 2100.

A climate change worst-case scenario also differs from others in its speed. Although genuinely existential threats to civilization might circle the globe in months, days, or even minutes, total climate catastrophe unfolds over decades or centuries. One might not like humanity’s chances of reversing or coping with such a threat, but the chances must be higher than for threats striking hundreds or thousands of times faster.

These factors place catastrophists in a catch-22. To locate climate-change impacts of sufficient magnitude, they envision scenarios that require temperatures to climb and dominos to fall across multiple centuries. But extending the timeframe dilutes costs faster than it can increase them. No matter how apocalyptic, impacts forecasted hundreds of years in the future are inherently less alarming than those under discussion for the year 2100.

Several factors may help to explain why catastrophists sometimes view extreme climate change as more likely than other worst cases. Catastrophists confuse expected and extreme forecasts and thus view climate catastrophe as something *we know will happen*. But while the expected scenarios of manageable climate change derive from an accumulation of scientific evidence, the extreme ones do not. Catastrophists likewise interpret the present-day effects of climate change as the onset of their worst fears, but those effects are no more proof of existential catastrophes to come than is the 2015 Ebola epidemic a sign of a future civilization-destroying pandemic, or Siri of a coming Singularity.

Catastrophists express frustration that the diffuse and intangible impacts of climate change prevent the threat from receiving sufficient attention—“if global warming took out an eye every now and then,” Dan Gilbert, professor of psychology at Harvard University, wrote in 2006, “OSHA would regulate it into nonexistence.” But as compared to other long-term challenges, claims of climate impact appear constantly.

Natural disasters, extreme temperatures, and even geopolitical events find themselves linked to discussions of climate change or, if no link is available, cited as the kind of thing climate change might make more common. Greater obsession with climate change produces more coverage of it, stoking greater obsession. Meanwhile, arguments against catastrophism rarely reach the audience that might benefit most from hearing them.

Finally, “motivated reasoning” likely plays a role. A charge issued frequently by catastrophists is that anyone expressing inadequate concern must be avoiding the problem because he dislikes the consequences of taking action—bigger government, more regulation, less growth. But this presumably cuts both ways. The policy agenda and social outlook demanded by the catastrophist perspective tends to align closely with the pre-existing preferences of catastrophists. Perhaps tellingly, when proposals arise that are less to their liking—nuclear power and fracked natural gas as substitutes for coal, carbon taxes paired with other tax cuts, use of conservation land for renewable power, research on geo-engineering—the overriding imperative to address climate change has tended to fall by the wayside.

## COSTS TO CREDIBILITY

The errors of today’s climate catastrophists repeat those made by the last generation of environmental doomsayers. As Paul Romer, the chief economist of the World Bank, recently observed:

*During the 1970s, the Club of Rome famously argued that our economic system was on the verge of collapse because we were running out of fossil fuel. This analysis was flawed not simply because it got the magnitudes wrong. It got the signs wrong. The problem facing the world is not that the earth’s crust contains too little fossil fuel and that we won’t have enough innovation to solve this problem. The real problems are that the earth’s crust contains far too much fossil fuel and that too much [innovation] is making this problem much worse.*

In other words, even though the Club of Rome was wrong in the 1970s, Romer believes its broader perspective should be embraced. Seemingly oblivious to the irony, he attributes the failure last time around to “an instance of motivated reasoning. Advocates seem to have been too eager to generate a sense of pessimistic urgency.”

Schrag, the Harvard geology professor, is even more blunt. Reflecting on Ehrlich’s predictions of eminent mass starvation in the 1970s, Schrag acknowledges that “none of his predictions came true.” Nevertheless, says Schrag, “It’s quite amazing that we’re

actually able to feed the world at all. Ehrlich wasn't wrong in '68, he's just wrong today." In this view, the catastrophist is not accountable for considering how growth, innovation, and adaptation might avert catastrophe. But Ehrlich was indeed wrong in 1968, for the same reasons his intellectual heirs are likely wrong about climate change today.

Some catastrophists do acknowledge, at least implicitly, the limits of their case. Unfortunately, this leads them to demand the creation of new evidence. Nicholas Stern, lead author of the United Kingdom's climate assessment, wrote recently in *Nature*: "The next IPCC report needs to be based on a much more robust body of economics literature, which we must create now. It could make a crucial difference." Stern expressed concern that the current generation of economic models fails to adequately account for the risk of shocks "such as the thawing of permafrost, release of methane, and other potential tipping points," or of social costs "such as widespread conflict as a result of large-scale human migration to escape the worst-affected areas."

Dave Roberts, whose TedX presentation entitled "Climate Change Is Simple" warns of "Hell on Earth" by 2100, suggests that the integrated assessment models should use surveys of "expert opinion" to produce "better, more representative modeling." But the DICE model, as an example, already incorporates such a survey. Undoubtedly, new models designed to vindicate the catastrophists' perspective will soon emerge. But perhaps the existing models are saying something very important about the nature of human progress and long-term challenges that catastrophists need to hear.

Or perhaps they hear more than they let on. Obama catastrophized in speeches, but seldom when the prospect of a follow-up question loomed. Pressed by *New York Times* reporter Mark Landler whether he "believe[s] the threat from climate change is dire enough that it could precipitate the collapse of our civilization," Obama relied on his legalistic rather than rhetorical gifts: "Well, I don't know that I can look into a crystal ball and know exactly how this plays out. But what we do know is that historically, when you see severe environmental strains of one sort or another on cultures, on civilizations, on nations, that the byproducts of that are unpredictable and can be very dangerous." True enough—and the same could be said for a whole host of other challenges. For instance, try replacing Obama's phrase "severe environmental strains" with "strains of militant religious extremism."

As for Bry, the newspaper columnist; Rieder, the philosophy professor; and Holthaus, the meteorologist? They each decided to have kids after all. 