

Global Warming Is Very Real

Scientists are fighting deniers with irrefutable proof the planet is headed for catastrophe

By **JEFF GOODELL**

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On September 27th, a group of international scientists associated with the Intergovernmental Panel on Climate Change will gather in an old brick brewery in Stockholm and proclaim with near certainty that human activity is altering the planet in profound ways. The IPCC's Fifth Assessment Report offers slam-dunk evidence that burning fossil fuels is the cause of most of the temperature increases of recent decades, and warn that sea levels could rise by almost three feet by the end of the century if we don't change our ways. The report will underscore that the basic facts about climate change are more established than ever, and that the consequences of escalating carbon pollution are likely to mean that, as The New York Times recently argued, "babies being born now could live to see the early stages of a global calamity."

The 10 Dumbest Things Ever Said About Global Warming

A leaked draft of the report points out that the link between fossil-fuel burning and climate change is already observable: "It is extremely likely that human influence on climate caused more than half of the observed increase in global average surface temperature from 1951 to 2010. There is high confidence that this has warmed the ocean, melted snow and ice, raised global mean sea level and changed some climate extremes in the second half of the 20th century." If you look beyond the tables and charts and graphs that fill the reports, you can see the Arctic vanishing, great cities like Miami and Shanghai drowning, droughts causing famine in Africa, and millions of refugees fleeing climate-related catastrophes. Rajendra Pachauri, the head of the IPCC, recently told a group of climate scientists that if we want to avoid this fate, governments must act now to cut carbon pollution: "We have five minutes before midnight."

But, of course, this is nothing new. In 2007, when the IPCC released its Fourth Assessment Report, it was also nearly certain that human activity was heating up the planet, with grave consequences for our future well-being. And six years before that, when the IPCC released its Third Assessment, scientists were pretty certain about it too. But phrases like "high confidence" in warming do not, to the unscientific ear, inspire high confidence in the report's finding, since they imply the existence of doubt, no matter how slight. And in the climate wars, "Doubt is what deniers thrive on and exploit," says Bob Watson, who was head of the IPCC from 1997 to 2002. The final report has not even been released yet, and already prominent bloggers in the denial-sphere, like Anthony Watts, are calling it "stillborn."

But perhaps the most significant thing about the new IPCC report is not the scientific findings. It's that the release of the report may actually mark the beginning of a new phase of the climate wars – one in which scientists and activists learn to fight back.

The IPCC, which was founded in 1988 by the United Nations and the World Meteorological Organization, is the world's leading authority on climate science. Deniers like to characterize it as a big, faceless bureaucracy – but in fact it's a tiny agency. The entire organization is housed on the eighth floor of the WMO offices in Geneva and has only 12 full-time employees, with an annual budget of a measly \$9 million. The agency doesn't do any research on its own – its role is simply to assess and interpret scientific, technical and economic data. All of the actual work – the assessments themselves – is written by scientists around the world, who volunteer their time to distill information from thousands of

studies and academic papers. As climate science has gotten more complex, the reports have ballooned. The Fourth Assessment was more than 3,000 pages long and was toiled over by more than 800 scientists and 2,500 expert reviewers – the Fifth Assessment is likely to be even bigger. These reports, which are issued every five or six years, are broken into three sections: Working Group I, which covers the physical science of climate change, will be released this month; Working Group II, which explores the impacts of rising carbon pollution on nature and human life, will be released next March; Working Group III, which analyzes various scenarios to cut carbon pollution, is due in April. Finally, a synthesis report that tries to pull it all together in a brief summary will be published next fall.

When scientists undertook the first IPCC assessment in the late 1980s, the assumption was that if they got the facts right, politicians would take action. “In the beginning, the purpose of the reports was to provide the fundamentals for a global climate agreement,” says Watson. The first report, issued in 1990, led to the United Nations Framework Convention on Climate Change, the international treaty that was the foundation for a global agreement. The second report, which came out in 1995, was supposed to be the basis for the Kyoto Protocol. But Kyoto, of course, was DOA, in part because it was never ratified by the U.S.

Global Warming’s Terrifying New Math

Deniers have always been cranked up about the IPCC, in part because of the black-helicopter paranoia of many conservatives who see climate change as a U.N. plot to take away freedom. And from the beginning, they have fought dirty, attacking not just the science but the scientists themselves. After the IPCC released its Second Assessment in 1995, the deniers were not happy that the report directly linked global warming with the burning of fossil fuels (“The balance of evidence suggests a discernible human influence on global climate”). So they attacked one of the lead authors of the report, Ben Santer, an atmospheric scientist at Lawrence Livermore National Laboratory. A fossil-fuel-industry-funded group called the Global Climate Coalition accused Santer of removing mention of uncertainties in the chapter to make global warming appear more certain than it was. Later investigations found that Santer’s so-called scientific cleansing involved little more than clarifying language suggested by fellow scientists. “Nothing in my scientific training prepared me for what I faced in the aftermath of that report,” Santer says now. One night years later, he opened his front door and found a dead rat on his porch. In the street, he watched a yellow Hummer drive off, the driver yelling obscenities at him.

As the prominence of climate change grew and the evidence became stronger, attacks escalated. In 2009, just weeks before the Copenhagen climate summit, hackers broke into the servers of the University of East Anglia Climate Research Unit in the U.K. and publicly posted hundreds of private e-mails from climate scientists involved with the IPCC’s Fourth Assessment report. Deniers seized on these messages, taking a few barbed comments out of context (in one, for instance, Santer wrote that if he ran into Pat Michaels – a well-known shill for the fossil-fuel industry – he would “be tempted to beat the crap out of him”) and claimed they now had their smoking gun, proof of a global conspiracy among scientists to keep out information that didn’t fit their thesis that the Earth was warming. The substance of the e-mails was subsequently investigated by five agencies, all of whom cleared scientists of any professional or personal misconduct. And not surprisingly, the hackers who broke into the East Anglia servers and stole the e-mails were never found.

Climate Change and the End of Australia

“For a lot of scientists, ClimateGate was a real awakening,” says Naomi Oreskes, a science historian at Harvard and co-author of *Merchants of Doubt*, which chronicles the fossil-fuel industry’s long battle to undermine climate science. “It was clear that if you were going to work on climate change, you were a public figure. And it was no longer enough to

just do the science. You also had to go out and explain it to people – and defend it.” By then, Santer reports, he was receiving countless death threats.

“Most of the world does not have a problem with denial of climate change,” says Anthony Leiserowitz, director of the Yale Project on Climate Change Communication. “It’s only an issue in Australia, Canada and, most significantly, the United States.” Although the U.S. population as a whole is moving toward accepting the reality of climate change, Congress remains a scientific backwater. One recent analysis by the Center for American Progress found that almost a third of the 535 members of the House and Senate are climate deniers. Not coincidentally, those 161 reps have taken more than \$54 million in political contributions from the fossil-fuel industry.

But lately, climate activists are less shy about calling out deniers. Organizing for Action, the successor of President Obama’s 2012 re-election campaign, recently created the Congressional Climate Change Awards, honoring 135 members of Congress, including Dana Rohrabacher, Steve King and House Speaker John Boehner, for “exceptional extremism and ignoring the overwhelming judgment of science.” And of course it doesn’t hurt that President Obama has broken his silence about climate change and seems determined to make it part of his agenda in the second term.

But the biggest change is in the public profile of scientists themselves. Leading the charge is Michael Mann, an IPCC veteran and director of the Earth System Science Center at Penn State, who has become a presence on TV talk shows and is author of a must-read book about the politics of climate science, *The Hockey Stick and the Climate Wars*. Mann is taking the unprecedented step of suing the conservative *National Review* for defamation after the magazine’s blog quoted a story that called Mann “the Jerry Sandusky of climate science” because he “molested and tortured data in the service of politicized science.”

Mann can’t talk about the pending lawsuit, but he points out that “concerted industry-funded attacks on our science” by deniers have mobilized many scientists to fight back. In Mann’s view, ClimateGate and other denier campaigns are deliberately designed to erode the credibility of scientists: “Public polling shows that scientists are among the most trusted messengers around when it comes to issues such as climate change,” Mann says. “So clearly this was an effort by fossil-fuel-industry front groups and advocates to go right at that. It was a deeply cynical effort to undermine the public faith in scientists and science.”

The war over the IPCC’s fifth assessment officially got under way in August, after a draft report of the “Summary for Policymakers” of the Working Group I report was leaked to the media. Deniers immediately seized on two issues to create controversy and undercut the findings of the report.

The first has to do with “equilibrium climate sensitivity,” which is the amount the climate is likely to warm in response to rising CO₂ levels in the atmosphere. In a leaked draft of the Fifth Assessment, scientists slightly lowered the range of possible warming from the previous assessment. Some media outlets – including *The Economist*, which should have known better – seized on this data to suggest that this is “one sign [that] suggests [the new assessment] might be less terrifying than it could have been.” In fact, as prominent climate blogger Joe Romm pointed out, these arcane, highly technical numbers are “far less interesting and consequential subject than the fact that we are headed way, way past [emissions targets] or that the real-world slow feedbacks are expected to make a very big contribution to warming this century.” To put it another way: In the real world, climate sensitivity means zip.

But that's how the denier game works: They seize on small errors and inconsequential factual inconsistencies in a piece of climate research and use it to discredit the science and reassure people that climate change is no big deal. In the 2007 Assessment, for instance, the authors and reviewers overlooked a sentence that asserted Himalayan glaciers would vanish by 2035 – an obvious misstatement, which deniers seized and used to suggest that the entire assessment was bunk. “You didn't have to be a scientist to know that's not true,” says Watson. “It was simply an error that slipped through, and deniers tried to use it to invalidate the findings of the entire report.” It's like finding a misspelling in the Manhattan phone book and then declaring the whole book useless.

Why the City of Miami is Doomed to Drown

The second issue that has come up is the question of a “hiatus,” or pause in surface-temperature warming. Texas Sen. Ted Cruz, winner of a climate-denier award from Texas green groups, recently proclaimed that “there has been no recorded warming since 1998.” Not exactly, Ted. According to the IPCC draft report, the rate of warming at the planet's surface is lower over the past 15 years, but warming has not stopped. In fact, since the 1950s, each successive decade has been hotter than the last, and the 2000s were the hottest decade since modern record-keeping began in 1880. Scientists have a variety of explanations for this, including the fact that more heat is being transferred deeper into the ocean and that volcanic eruptions have blocked sunlight. “We never expected warming to be linear,” says Kevin Trenberth, senior scientist at the Climate Analysis Section at the National Center for Atmospheric Research in Boulder, Colorado.

To former IPCC chair Watson, it is crucial that these criticisms not go unanswered. “The IPCC needs to have an answer for this,” he says. “They need to be prepared.” But in Santer's view, climate science is rapidly approaching the point where it is immune to these kinds of critiques: “Up until now, the criticism has been that climate science is like a house of cards, and if you pull out one or two sets of data, it all collapses. That narrative has been refuted. The Fifth Assessment shows that warming has a physical and internal consistency – it's warming in the deep ocean, in the intermediate ocean and in the lower atmosphere. Sea level is rising. Arctic sea ice is retreating. The observational evidence for human-caused warming is overwhelming, compelling and irrefutable.”

Why We Can't Count on Evolution to Counterbalance Climate Change

That may be true, says Oreskes, “but if there is one thing we have learned in recent years, it's that climate change is not just a scientific problem. It is also a political, social and cultural problem.” According to Yale's Leiserowitz, it's also a problem that four in 10 people in the world have never heard of. “If you can reach them, you can convince them,” says Leiserowitz. But it is going to take more than a few well-written press releases and a spiffy website: “Think about what a company like Coke does when they are launching a new product in the world,” says Leiserowitz. “They spend a billion dollars doing market research, crafting ads, targeting their audience. They know that is what it takes to cut through the media clutter today. So far, the climate movement hasn't come close to thinking about how to communicate on that scale.”

For better or worse, this Fifth Assessment may be the last grand climate-science report from the IPCC. “I think these reports have outgrown their usefulness,” says David Keith, a Harvard professor who recently resigned as an author of the Fifth Assessment, echoing the view of other top scientists. “If it were gone, scientists might reorganize themselves in a more effective way.”

In a more rational world, of course, we wouldn't need any more IPCC assessments. We would have listened to the scientists, built a global consensus and forged international agreements to reduce carbon pollution and head off the risk of climate catastrophe. But in the 25 years since the IPCC was formed, global carbon pollution is rising faster than ever. Future readers may view IPCC reports not as landmarks of scientific inquiry, but as suicide notes from a lost civilization.

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