

# The Copenhagen Diagnosis: Sobering Update on the Science

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### Introduction

On the eve of the Copenhagen conference, a group of scientists has issued an update on the 2007 report of the Intergovernmental Panel on Climate Change. In the face of an incredible din of disinformation from climate deniers, they have mustered the latest and most credible evidence to inform global leaders and attentive publics just how perilous our present situation is. Among other dire warnings, they conclude that the icecaps at both poles are melting faster than predicted, that claims of recent global cooling are false, and that world leaders must act fast if steep temperature rises are to be avoided.

The report, and Elizabeth Kolbert’s assessment, were issued just prior to proposals for greenhouse gas reductions by the world’s two leading emitters: China and the United States, whose proposals emerged from a summit meeting of the leaders of the two countries. Together, the US and China account for fully forty percent of global emissions. Their proposed reductions appear to have renewed hopes for the December 7-18 Copenhagen talks. But the non-binding character of the proposals also shows how far we remain from reaching an agreement anywhere close to the scale that the science tells us is essential.

**Head-to-Head | Carbon-dioxide emissions in China and the U.S.**

	China				U.S.			
	1990	2007	projections 2020	projections 2030	1990	2007	projections 2020	projections 2030
<b>GDP</b> In trillions of 2008 dollars, measured using purchasing power parity	\$1.5			\$28.5	\$8.7			\$22.4
<b>Share of world GDP</b>	4%	11	18	21	23%	21	18	16
<b>Share of world CO<sub>2</sub> emissions</b>	11%	21	28	29	23%	20	16	14
<b>CO<sub>2</sub> emissions per capita</b> metric tons	2	4.6	6.7	8	19.1	18.7	15.9	15.1
<b>CO<sub>2</sub> intensity index</b> CO <sub>2</sub> emissions per \$ of GDP, relative to the world level in 2007; world level in 2007=100	349	187	119	95	130	95	70	58
<b>Cumulative CO<sub>2</sub> since 1890</b> billions of metric tons	42	104	208	315	239	333	404	459
<b>Proposed reductions</b>	Cut <b>carbon intensity</b> (amount of carbon dioxide emitted for each unit of GDP) by 40% to 45% of 2005 levels by 2020.				Cut <b>emissions</b> to 17% below 2005 levels by 2020. Extend cuts to 83% below 2005 levels by 2050.			

Source: International Energy Agency (except proposal reductions)

### Chinese and U.S. emissions and GDP projections, 1990-2030

China on November 26, announced a goal cutting its "carbon intensity" - that is, the amount of greenhouse gas it emits per unit of gross domestic product - by 40% to 45% below 2005 levels by 2020. The plan differs in fundamentals from those offered by the U.S., Japan, Korea and the European Union in that it does not aim at an outright reduction of emissions, but rather pledges to slow the rate at which emissions grow by increasing energy efficiency in its expanding economy. The Worldwide Fund for Nature estimates that, from 2010 to 2015, China’s target will keep fully 4 gigatons of carbon out of the atmosphere. China’s plan also complements the country’s very aggressive moves to promote green energy, where it is poised to overtake all competitors.

The Chinese statement came one day after US President Barack Obama announced that he would travel to the U.N. climate summit in Copenhagen on December 9. Obama also

declared he would pledge the U.S. to a 17% cut in greenhouse-gas emissions from 2005 levels by 2020 and 83% by 2050. He added that the US would also adopt a mid-term goal of a 42% reduction below 2005 by 2030. The Obama proposals are, to be polite, modest compared with those advanced by other developed nations. Indeed, given the economic recession of 2007-09, the goals may add little to the reductions already in place as a result of industrial cutbacks. Germany, Japan and the European Union have all proposed more ambitious reductions. Germany stands out for its commitment of a 40% reduction in emissions by 2020, compared to 1990 levels. Japan's recently elected government also quickly committed the country to a 25% cut in emissions by 2020, versus 1990 levels. And the 27 members of the EU have pledged to reduce emissions by 20% below their 1990 levels by 2020, or the equivalent of a 14% cut from 2005 levels. They have also made a larger reduction, equivalent to a 24% cut from 2005 levels by 2020, if nations outside the bloc agree to substantial cuts.

But perhaps the most important stumbling block in the face of Obama is politics. The Obama proposal is in line with legislation currently under review in the House of Representatives. But the U.S. Congress will not act prior to Copenhagen and it is far from certain that it will approve any legislation next year. Since November of 2010 will see mid-term Congressional elections (including all member of the House of Representatives and 1/3 of the Senate), the fate of any American climate legislation is likely bound up with such variables as Obama's dwindling support and the mounting backlash against his kid-glove treatment of Wall Street.



Equally important is the fact that neither the Chinese nor the US plans offer any indication of whether and how the developed nations will help to pay for emissions reduction in the developing countries. This issue is important key to an international agreement, and is probably also key to whether the US Congress will act affirmatively in the wake of any Copenhagen agreement. China and other developing countries have called on the developed countries to pay 1% of their annual GDP to help developing countries finance emission reductions. AD and MS

Ahead of talks in Copenhagen, a group of leading climate scientists has issued a new report summarizing the most recent research findings from around the world and concluding that scientists have underestimated the pace

and extent of global warming. The report — titled “[The Copenhagen Diagnosis](#)” — finds that in several key areas observed changes are outstripping the [most recent projections](#) by the UN’s Intergovernmental Panel on Climate Change and warns that “there is a very high probability of the warming exceeding 2 °C unless global emissions peak and start to decline rapidly” within the next decade.

The report points to dramatic declines in Arctic sea ice, recent measurements that show a large net loss of ice from both Greenland and Antarctica, and the relatively rapid rise in global sea levels — 3.4 millimeters per year — as particular reasons for concern. Sea-level rise this century, it states, “is likely to be at least twice as large” as predicted by the most recent IPCC report, issued in 2007, with an upper limit of roughly two meters.

“Sea level is rising much faster and Arctic sea ice cover shrinking more rapidly than we previously expected,” Stefan Rahmstorf, department head at Germany’s Potsdam Institute for Climate Impact Research, said in a press release accompanying the report. “Unfortunately, the data now show us that we have underestimated the climate crisis in the past.”

According to the report, which was released today, several elements of the climate system could reach a ‘tipping point’ in coming decades if current emissions trends continue. The report notes that even at current greenhouse gas concentrations, it is already “very likely” that a “summer ice-free Arctic is inevitable.” The Greenland Ice sheet, too, the report warns, “may be nearing a tipping point where it is committed to shrink.”

The report’s 26 authors include scientists from Germany, France, Switzerland, Austria, Canada, the U.S., and Australia. Most were also authors of the last IPCC report, and donated their time to draft “The Copenhagen Diagnosis.” The University of New South

Wales’ Climate Change Research Centre provided logistical support.

“We thought that the IPCC report from 2007 was a superb report, but of course science doesn’t stand still,” [Richard Somerville](#), a climate modeler and professor emeritus as the Scripps Institution of Oceanography, said. “And we thought it would be helpful if we could provide some kind of updated assessment.”

In an e-mail message from Antarctica, where he is doing fieldwork, [Robert Bindshadler](#), of [NASA](#), said the group had been prompted to write the report by “the rapidity and serious consequences of climate change.”

Georg Kaser, a glaciologist at the University of Innsbruck, said he hoped policymakers would respond to the report by deciding to “totally phase out fossil-fuel burning within the next two decades.”

“Dreaming is allowed,” he added. “Frankly speaking, I would not like to be a policymaker that has just two options: one, phasing out fossil fuel burning immediately, or two, committing our society to major and long-lasting changes in the climate system.”

The report was already completed but not released by the time world leaders, including President Obama, announced in Singapore on Nov. 15 that they had abandoned the goal of reaching a legally binding agreement in Copenhagen. Since then, several countries have announced commitments to reduce their greenhouse gas emissions, including South Korea, which last week pledged to a cut of 20 percent below “business as usual” by 2020, and Brazil, which promised reductions of 40 percent below current projections by 2030. But the United States, with some of the highest per capita emissions in the world and the second-highest overall emissions, after China, has made no commitment, and legislation to curb emissions, which narrowly passed the House this year, is not expected to be taken up by the

U.S. Senate until after the Copenhagen session is over.

Andrew Weaver, a climate modeler at Canada's University of Victoria and one of the authors of "The Copenhagen Diagnosis," said he found the announcement that world leaders were [abandoning the goal of reaching a binding agreement this year](#) "unacceptable."

He went on: "Maybe they should be honest, and stand up and say, 'You know what? As your political leaders we do not accept that we owe anything to future generations.' I don't think they'd ever say that, but this is what they are saying if they don't deal with this problem."

"The Copenhagen Diagnosis" is not the first report to warn that climate change is occurring even more rapidly than had been predicted by the IPCC. Indeed, the UN itself has made this point. In September, the United Nations Environment Program released its "Climate Change Science Compendium 2009." In the foreword of that report, UN Secretary General Ban Ki-moon noted that "climate change is accelerating at a much faster pace than was previously thought by scientists." He warned: "Unless we act, we will see catastrophic consequences including rising sea levels, droughts and famine, and the loss of up to a third of the world's plant and animal species."

"The Copenhagen Diagnosis" is explicitly aimed at "policy-makers, stakeholders, the media and the broader public" [on the eve of the international climate talks](#) that begin on Dec. 7. It takes up several questions of the sort not typically addressed in scientific forums, but frequently raised on the Internet and in the press. One of these is whether the Earth's atmosphere is already saturated with carbon dioxide. The answer to this question, the report says, is "Not even remotely. It isn't even saturated on the runaway greenhouse planet Venus, with its atmosphere made up of 96% CO<sub>2</sub> and a surface temperature of 467 °C." Similarly, the report states, "global cooling"

has not occurred over the past decade, "contrary to claims promoted by lobby groups and picked up in some media." In fact, "even the highly 'cherry-picked' 11-year period starting with the warm 1998 and ending with the cold 2008 still shows a warming trend of 0.11 °C per decade," the report concludes.

The report notes that in recent years, solar output has been at a low ebb. Meanwhile, warming has continued: "It is perhaps noteworthy that despite the extremely low brightness of the sun over the past three years temperature records have been broken during this time... The years 2007, 2008 and 2009 had the lowest summer Arctic sea ice cover ever recorded, and in 2008 for the first time in living memory the Northwest Passage and the Northeast Passage were simultaneously ice-free. This feat was repeated in 2009. Every single year of this century (2001-2008) has been among the top ten warmest years since instrumental records began."

Konrad Steffen, a glaciologist at the University of Colorado who recently returned from taking measurements on Antarctica, said, "We as scientists wanted to make sure we provided all possible information. We tried to stay away from judgment calls — you wouldn't believe the lengthy emails that we had — but on the other hand we wanted to make sure the urgency is there. We want to tell people it is urgent. We see changes that we did not anticipate two or three years ago."

Gavin Schmidt, a NASA climate scientist who was not involved in "The Copenhagen Diagnosis," said he thought the report was scientifically sound, but questioned whether it would have much impact on its target audience. "Knowing exactly how fast emissions are rising, or sea ice is melting, is useful and interesting, but my guess is that it will not have much effect on the delegates, since it doesn't address the actual equity and political issues that are at the heart of the slow movement towards an agreement," said Schmidt.



Richard Somerville, of Scripps, acknowledged that scientific information — up-to-the minute or otherwise — was often ignored at climate negotiations.

“I’ve been to several of these meetings,” he said. “The delegates and the leaders say very kind things about the IPCC and thank it for its excellent work. But then, from a scientist’s point of view, once the negotiations start they might as well be negotiating, say, steel tariffs. I’ve actually heard politicians say — I won’t name any names — ‘We don’t want to be constrained by the science.’” But, he added, that only makes it more essential to get the information out.

“Not politicians and not money and not public opinion, but the climate system itself imposes a time scale,” Somerville said. “And if the world chooses not to stick within that, well, Mother Nature bats last.”

This report appeared at [Environment 360](#), a publication of The Yale School of Forestry and Environment Studies. Comments on the original article can be found [here](#).

Elizabeth Kolbert has been a staff writer for the New Yorker since 1999. Her 2005 New Yorker series on global warming, “The Climate of Man,” won a National Magazine Award and was extended into a book, [Field Notes from a Catastrophe](#), which was published in 2006.

Prior to joining the staff of the New Yorker, she was a political reporter for the New York Times. Earlier this year, she talked to Yale Environment 360 about [the responsibility of both the media and scientists](#) to better inform the public about climate change, and [she interviewed John Holdren](#), President Obama’s top science adviser, about the role of the United States heading into the Copenhagen talks.

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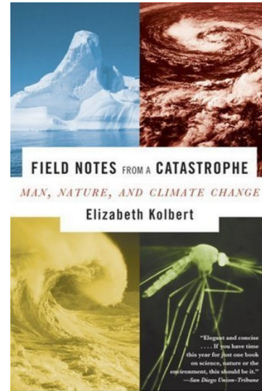
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