

04/01/2010 05:00 PM**Climate Catastrophe****Part 8: The Invention of the Two-Degree Target**

Climate models involve some of the most demanding computations of any simulations, and only a handful of institutes worldwide have the necessary supercomputers. The computers must run at full capacity for months to work their way through the jungle of data produced by coupled differential equations.

All of this is much too complicated for politicians, who aren't terribly interested in the details. They have little use for radiation budgets and ocean-atmosphere circulation models. Instead, they prefer simple targets.

For this reason a group of German scientists, yielding to political pressure, invented an easily digestible message in the mid-1990s: the two-degree target. To avoid even greater damage to human beings and nature, the scientists warned, the temperature on Earth could not be more than two degrees Celsius higher than it was before the beginning of industrialization.

It was a pretty audacious estimate. Nevertheless, the powers-that-be finally had a tangible number to work with. An amazing success story was about to begin.

'Clearly a Political Goal'

Rarely has a scientific idea had such a strong impact on world politics. Most countries have now recognized the two-degree target. If the two-degree limit were exceeded, German Environment Minister Norbert Röttgen announced ahead of the failed Copenhagen summit, "life on our planet, as we know it today, would no longer be possible."

But this is scientific nonsense. "Two degrees is not a magical limit -- it's clearly a political goal," says Hans Joachim Schellnhuber, director of the Potsdam Institute for Climate Impact Research (PIK). "The world will not come to an end right away in the event of stronger warming, nor are we definitely saved if warming is not as significant. The reality, of course, is much more complicated."

Schellnhuber ought to know. He is the father of the two-degree target.

"Yes, I plead guilty," he says, smiling. The idea didn't hurt his career. In fact, it made him Germany's most influential climatologist. Schellnhuber, a theoretical physicist, became Chancellor Angela Merkel's chief scientific adviser -- a position any researcher would envy.

Rule of Thumb

The story of the two-degree target began in the German Advisory Council on Global Change (WBGU). Administration politicians had asked the council for climate protection guidelines, and the scientists under Schellnhuber's leadership came up with a strikingly simple idea. "We looked at the history of the climate since the rise of homo sapiens," Schellnhuber recalls. "This showed us that average global

temperatures in the last 130,000 years were no more than two degrees higher than before the beginning of the industrial revolution. To be on the safe side, we came up with a rule of thumb stating that it would be better not to depart from this field of experience in human evolution. Otherwise we would be treading on terra incognita."

As tempting as it sounds, on closer inspection this approach proves to be nothing but a sleight of hand. That's because humans are children of an ice age. For many thousands of years, they struggled to survive in a climate that was as least four degrees colder than it is today, and at times even more than eight degrees colder.

This means that, on balance, mankind has already survived far more severe temperature fluctuations than two degrees. And the cold periods were always the worst periods. Besides, modern civilizations have far more technical means of adapting to climate change than earlier societies had.

Since the first rough estimate was made, many other good reasons have emerged to support the two-degree target, says Schellnhuber. At the same time, however, the constant appearance of new studies has also made the picture significantly more complex.

Coral reefs, for example, could already be doomed if the oceans heat up by 1.5 degrees Celsius. On the other hand, crop yields in agriculture are likely to rise at temperature increases of up to 2.5 degrees Celsius -- good news for the world's growing population.

Completely Speculative

But what good are all the predictions? It's difficult enough to calculate exactly how far temperatures will rise in the coming decades. It becomes completely speculative to predict in detail how warming temperatures will benefit tourism or harm biodiversity.

"Of course, the conclusions of climate impact research are not as reliable as we'd like them to be," Schellnhuber admits. "But we can't exactly drop 10,000 studies from *Science* and *Nature* on our political leaders' desks. That would obviously be too much for them. Instead we, as experts, must attempt to condense the large number of analyses into plausible scenarios."

Critics say that the climate impact researchers have gone too far with their brand of political advice. "The two-degree target has little to do with serious science," says Hans von Storch. Many of his fellow scientists, he adds, now see themselves too much as political activists who want to get something done. This, in turn, harms the credibility of science as a whole, he adds, and it is also a more deep-seated cause of the Climategate affair and the sloppy work on the IPCC report.

"Unfortunately, some of my colleagues behave like pastors, who present their results in precisely such a way that they'll fit to their sermons," says Storch. "It's certainly no coincidence that all the mistakes that became public always tended in the direction of exaggeration and alarmism."

'Completely Absurd'

Such suspicions irritate PIK Director Hans Joachim Schellnhuber, particularly when they are directed against him or his institute. Schellnhuber, a native of Bavaria, normally speaks quietly and

diplomatically, but he raises his voice when discussing the accusations. He says that he is far from being an environmental activist or someone who acts purely for political reasons.

"That's completely absurd!" he says heatedly. "I don't participate in protest marches, I'm not a member of the Green Party, I like to eat meat and I drive a BMW. And I didn't study physics to become a climatologist, either."

But no, he adds, he happens to be someone who has acquired inside knowledge about a looming disaster, knowledge that he cannot keep to himself. "If I'm a passenger on a ship and I see, through my binoculars, that we're headed for an iceberg," says Schellnhuber, "I have to warn the captain immediately."

But exactly how far away is that iceberg? How much time is left to steer the ship onto an alternate course? And how great is the risk of collision? These are key questions. In reality, it isn't about stopping a luxury ocean liner, but about the massive effort that is required to end the age of oil and coal as quickly as possible.

Time to React

"We climatologists can only describe possible futures," Storch points out. "It's also possible that things will be completely different."

Storch, a native of northern Germany and one of the pioneers of climate modeling, recommends a more dispassionate approach. He grew up on the North Sea island of Föhr, where he experienced storm tides at first hand. He learned that humans are tough and adaptable beings.

"Fearmongering is the wrong way to go about it," says Storch. "Climate change isn't going to happen overnight. We still have enough time to react."

Translated from the German by Christopher Sultan