Too Late? Why Scientists Say We Should Expect the Worst

Contributed by David Adam
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As ministers and officials gather in Poznan one year ahead of the Copenhagen summit on global warming, the second part of a major series looks at the crucial issue of targets.

At a high-level academic conference on global warming at Exeter University this summer, climate scientist Kevin Anderson stood before his expert audience and contemplated a strange feeling. He wanted to be wrong. Many of those in the room who knew what he was about to say felt the same. His conclusions had already caused a stir in scientific and political circles. Even committed green campaigners said the implications left them terrified.

Head of the world's top climate scientists Rajendra Pachauri, seen here on October 23, 2008, says he is stunned at the trillion-dollar cheques that have been signed to ease the banking crisis when funding for poverty and global warming is scrutinised or denied.

Anderson, an expert at the Tyndall Centre for Climate Change Research at Manchester University, was about to send the gloomiest dispatch yet from the frontline of the war against climate change.

Despite the political rhetoric, the scientific warnings, the media headlines and the corporate promises, he would say, carbon emissions were soaring way out of control - far above even the bleak scenarios considered by last year's report from the Intergovernmental Panel on Climate Change (IPCC) and the Stern review. The battle against dangerous climate change had been lost, and the world needed to prepare for things to get very, very bad.

"As an academic I wanted to be told that it was a very good piece of work and that the conclusions were sound," Anderson said. "But as a human being I desperately wanted someone to point out a mistake, and to tell me we had got it completely wrong."

Nobody did. The cream of the UK climate science community sat in stunned silence as Anderson pointed out that carbon emissions since 2000 have risen much faster than anyone thought possible, driven mainly by the coal-fuelled economic boom in the developing world. So much extra pollution is being pumped out, he said, that most of the climate targets debated by politicians and campaigners are fanciful at best, and "dangerously misguided" at worst.

In the jargon used to count the steady accumulation of carbon dioxide in the Earth's thin layer of atmosphere, he said it was "improbable" that levels could

now be restricted to 650 parts per million (ppm).

The CO2 level is currently over 380ppm, up from 280ppm at the time of the industrial revolution, and it rises by more than 2ppm each year. The government's official position is that the world should aim to cap this rise at
450ppm.

The science is fuzzy, but experts say that could offer an even-money chance of limiting the eventual temperature rise above pre-industrial times to 2C, which the EU defines as dangerous. (We have had 0.7C of that already and an estimated
extra 0.5C is guaranteed because of emissions to date.)

The graphs on the large screens behind Anderson's head at Exeter told a different story. Line after line, representing the fumes that belch from chimneys, exhausts and jet engines, that should have bent in a rapid curve towards the ground, were heading for the ceiling instead.

At 650ppm, the same fuzzy science says the world would face a catastrophic 4C average rise. And even that bleak future, Anderson said, could only be achieved
if rich countries adopted "draconian emission reductions within a decade". Only
an unprecedented "planned economic recession" might be enough. The current financial woes would not come close.

Lost cause

Anderson is not the only expert to voice concerns that current targets are hopelessly optimistic. Many scientists, politicians and campaigners privately admit that 2C is a lost cause. Ask for projections around the dinner table after a few bottles of wine and more vote for 650ppm than 450ppm as the more likely outcome.

Bob Watson, chief scientist at the Environment Department and a former head of the IPCC, warned this year that the world needed to prepare for a 4C rise, which would wipe out hundreds of species, bring extreme food and water shortages in vulnerable countries and cause floods that would displace hundreds
of millions of people. Warming would be much more severe towards the poles, which could accelerate melting of the Greenland and West Antarctic ice sheets.

Watson said: "We must alert everybody that at the moment we're at the very top end of the worst case [emissions] scenario. I think we should be striving for 450 [ppm] but I think we should be prepared that 550 [ppm] is a more likely outcome." Hitting the 450ppm target, he said, would be "unbelievably difficult".

A report for the Australian government this autumn suggested that the 450ppm goal is so ambitious that it could wreck attempts to agree a new global deal on
global warming at Copenhagen next year. The report, from economist Ross Garnaut
and dubbed the Australian Stern review, says nations must accept that a greater
amount of warming is inevitable, or risk a failure to agree that "would haunt humanity until the end of time".

It says developed nations including Britain, the US and Australia, would have to slash carbon dioxide emissions by 5% each year over the next decade to hit the 450ppm target. Britain's Climate Change Act 2008, the most ambitious legislation of its kind in the world, calls for reductions of about 3% each year to 2050.

Garnaut, a professorial fellow in economics at Melbourne University, said: "Achieving the objective of 450ppm would require tighter constraints on emissions than now seem likely in the period to 2020 ... The only alternative would be to impose even tighter constraints on developing countries from 2013, and that does not appear to be realistic at this time."

The report adds: "The awful arithmetic means that exclusively focusing on a 450ppm outcome, at this moment, could end up providing another reason for not reaching an international agreement to reduce emissions. In the meantime, the cost of excessive focus on an unlikely goal could consign to history any opportunity to lock in an agreement for stabilising at 550ppm - a more modest, but still difficult, international outcome. An effective agreement around 550ppm would be vastly superior to continuation of business as usual."

Henry Derwent, former head of the UK's international climate negotiating team and now president of the International Emissions Trading Association, said a new climate treaty was unlikely to include a stabilisation goal - either 450ppm
or 550ppm.

"You've got to avoid talking and thinking in those terms because otherwise the politics reaches a dead end," he said. Many small island states are predicted to be swamped by rising seas with global warming triggered by carbon levels as low as 400ppm. "It's really difficult for countries to sign up to something that loses them half their territory. It's not going to work."

A new agreement in Copenhagen should concentrate instead on shorter term targets, such as firm emission reductions by 2020, he said.

Worst time

The escalating scale of human emissions could not have come at a worst time, as
scientists have discovered that the Earth's forests and oceans could be losing their ability to soak up carbon pollution. Most climate projections assume that
about half of all carbon emissions are reabsorbed in these natural sinks.

Computer models predict that this effect will weaken as the world warms, and a string of recent studies suggests this is happening already.

The Southern Ocean's ability to absorb carbon dioxide has weakened by about 15%
a decade since 1981, while in the North Atlantic, scientists at the University of East Anglia also found a dramatic decline in the CO2 sink between the mid-1990s and mid-2000s.

A separate study published this year showed the ability of forests to soak up anthropogenic carbon dioxide - that caused by human activity - was weakening, because the changing length of the seasons alters the time when trees switch from being a sink of carbon to a source.

Soils could also be giving up their carbon stores: evidence emerged in 2005 that a vast expanse of western Siberia was undergoing an unprecedented thaw.

The region, the largest frozen peat bog in the world, had begun to melt for the
first time since it formed 11,000 years ago. Scientists believe the bog could begin to release billions of tonnes of methane locked up in the soils, a greenhouse gas 20 times more potent than carbon dioxide. The World Meteorological Organisation recently reported the largest annual rise of methane levels in the atmosphere for a decade.

Some experts argue that the grave nature of recent studies, combined with the unexpected boom in carbon emissions, demands an urgent reassessment of the situation. In an article published this month in the journal Climatic Change, Peter Sheehan, an economist at Victoria University, Australia, says the scale of recent emissions means the carbon cuts suggested by the IPCC to stabilise levels in the atmosphere "cannot be taken as a reliable guide for immediate policy determination". The cuts, he says, will need to be bigger and in more places.

Earlier this year, Jim Hansen, senior climate scientist with Nasa, published a paper that said the world's carbon targets needed to be urgently revised because of the risk of feedbacks in the climate system. He used reconstructions
of the Earth's past climate to show that a target of 350ppm, significantly below where we are today, is needed to "preserve a planet similar to that on which civilisation developed and to which life on Earth is adapted". Hansen has
suggested a joint review by Britain's Royal Society and the US National Academy

of Sciences of all research findings since the IPCC report.

Rajendra Pachauri, who chairs the IPCC, argues that suggestions the IPCC report
is out of date is "not a valid position at all".

He said: "What the IPCC produces is not based on two years of literature, but 30 or 40 years of literature. We're not dealing with short-term weather changes, we're talking about major changes in our climate system. I refuse to accept that a few papers are in any way going to influence the long-term projections the IPCC has come up with."

At Defra, Watson said: "Even without the new information there was enough to make most policy makers think that urgent action was absolutely essential. The new information only strengthens that and pushes it even harder. It was already
very urgent to start with. It's now become very, very urgent."

-- David Adam has been environment correspondent for the Guardian since 2005, before which he was science correspondent for two years. He previously worked at the science journal Nature. He decided on a career in journalism after a PhD in chemical engineering convinced him it was more enjoyable to write about other people's research than to carry out his own.

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