

Kyoto protocol is just the beginning

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It has been a long wait since the Kyoto protocol was signed in the early hours of 11 December 1997. Next year, if Russia sticks to the commitment it made last week, the treaty will at last come into force. And that will allow the world to get on with what really matters: drawing up the successor to Kyoto.

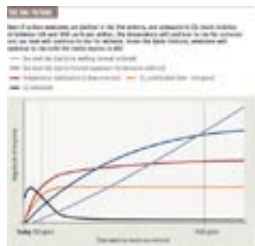
For if ardent greens and out-and-out sceptics can agree on anything, it is that Kyoto will not even come close to solving the problem of climate change. It is, as the UN Environment Programme director Klaus Toepfer said in a statement last week, "only the first step in a long journey".

The clock is ticking. Every year we are releasing almost 7 billion tonnes of carbon into the atmosphere – carbon that had lain buried since the days of the dinosaurs. It will remain in the atmosphere for around a century, raising the level of carbon dioxide in the atmosphere and trapping more of the sun's heat.

Before the industrial age, the CO₂ level was steady at around 280 parts per million. When the Kyoto protocol was drawn up in 1997, the CO₂ level had reached at 368 ppm. In 2004, it hit 379 ppm.

Floods and droughts

Most predictions of soaring temperatures, floods, droughts, storms and rising sea levels are based on a concentration of 550 ppm. On current trends, this figure, is likely to be reached in the second half of this century. Even if levels rose no higher, this would just be the start. Time lags in natural systems such as ice caps and ocean circulation mean that changes will continue for millennia after the CO₂ level stabilises (see graphic).



Carbon emissions

The bottom line is that only drastic cuts in global emissions of CO₂, of two-thirds or more, can stop the concentration of the gas rising ever higher and stave off ever more severe climate change. The more quickly the world can make such cuts, the lower the level at which concentrations will eventually stabilise.

The Kyoto protocol, however, involves only very modest reductions of less than 5%. The US does not support it, developing nations do not have to make any cuts and it expires in 2012. Perhaps most crucially, it does not provide a blueprint for where we want to end up and how we intend to get there.

But activation of the Kyoto protocol would still be highly significant, as it would free negotiators to begin to discuss what to do next. That process is set to begin formally next year, but is also likely to be the main talking point before then, at the next meeting of the protocol's signatories in Buenos Aires in December. Activation of the protocol would also increase pressure on the US to rejoin the process.

Piecemeal negotiations

Climate scientists say politicians must move on from Kyoto-style piecemeal negotiations on individual national targets to a global plan to cap concentrations of critical greenhouse gases, especially CO₂. Most would like to see CO₂ concentrations in the atmosphere kept below 450 ppm, but many accept that 550 ppm is more realistic. "I don't feel that we should be anywhere higher than 550 parts per million of carbon dioxide in our atmosphere," David King, chief scientific adviser to the UK government, said in a speech earlier in 2004.

This would still lead to substantial climate change, with the temperature rising by 2°C to 5°C and the sea level rising by 0.3 to 0.8 metres by 2100, and by 7 to 13 metres over the next millennium. But a 550 ppm ceiling would stave off even more severe changes. It would also address the international commitment made at the Earth Summit in Rio in 1992 to prevent "dangerous" climate change. The Bush administration says it stands by that agreement, even though it disowns the Kyoto protocol.

The UK could help set the agenda. The prime minister, Tony Blair, has promised to make tackling climate change the centrepiece of his presidency of the G8 group of rich industrial nations in 2005. Though he is far from finalising his contribution, one option being discussed is to propose a ceiling on atmospheric CO₂ that would set a firm and scientifically coherent benchmark to measure the success of future negotiations.

Agreeing on a CO₂ ceiling would be the easy part. Any ceiling effectively puts an absolute limit on global emissions over the coming century, and the tricky part will be deciding who is entitled to make those emissions.

Developing countries insist they can only accept quotas based on population and suggest extending the Kyoto plans for emissions trading to smooth the transition. Industrialised countries such as the US, which emits eight times as much CO₂ per head of population as China and 18 times as much as India, reject such suggestions, but are having difficulty finding a fair alternative.

Simple measures

Assuming agreement can be reached on emissions quotas, the next step will be achieving them. Stabilising at 550 ppm would mean ensuring global emissions peak no later than 2025, according to the Intergovernmental Panel on Climate Change. Simple measures such as improving energy efficiency would help, but they will not be nearly enough. To ensure we add no more carbon to the atmosphere than we take away will require major structural changes to the global energy industry.

How much this will cost is unclear. Some economists say such changes will be hugely expensive, while companies with a competitive lead in alternative technologies see only profits. Big changes will be necessary whatever happens, as oil and natural gas supplies dwindle, though coal is still available in huge quantities.

Then there is the question of exactly what changes to make. The relative contribution of renewable energy sources such as wind and solar power, the role of the hydrogen economy and whether fission power has a role to play are still fiercely debated.

The Bush administration insists that research into better technologies is more important than premature, expensive measures to cut emissions, and that may be right. But time is running out. It took 150 years for CO₂ concentrations to rise from 280 ppm to 330 ppm; it has taken just 30 years to get from 330 ppm to 380 ppm. Last year, concentrations rose by a record 3 ppm.

That might have been a blip. But it could also mean that the ability of oceans and forests to soak up much of our emissions is reaching saturation point. If so, then we could be on course for 450 ppm by 2030 and 550 ppm by 2060.

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